# Integrating Art, Landscape, and Archaeology: Investigations of prehistoric wall paintings at Çatalhöyük.

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*Abstract*

The wall paintings from Çatalhöyük, Turkey, form one of the largest sources of complex art on domestic buildings from the Neolithic period and provide a complete context within which to examine the relationships between art and artists' materials. To date, materials and paintings have been studied separately: this thesis integrates these aspects for the first time. These links become apparent through a comprehensive analysis of the seventy-seven decorated walls and fifty-five samples of mineral colourants over the occupation of the site from 7,400-6,000 BC.

A typological and spatial analysis of wall paintings is conducted using a new database of painted images. These data are then synthesised with the use of colourants for an examination of the connection between the art and its materials. To see how colour use changes over time, the occurrences of pigments are tracked in multiple contexts including paintings and burials. The life cycle of pigments is examined starting with the broader landscape in which minerals are sourced.

The research design includes X-ray fluorescence, X-ray diffraction, and Fourier transform infrared spectroscopy. Results identify standard information about primary minerals of pigments, but go further to characterise secondary minerals, to better understand sourcing and processing. These more detailed findings identify distinctions within pigment groups, specifically the iron oxide and copper pigments, and increase our knowledge of connections between the pigments and the landscape.

This thesis explores innovation in artists' materials and art in prehistory, and charts developments as they occur in images and materials over time, giving rise to a reinterpretation of the paintings. Evidence supports a more robust re-reading of several paintings from the site, especially the 'Volcano and City Plan' mural. This illustrates the knowledgeable engagement of peoples at Çatalhöyük with the exploration of their landscape, architecture, materials, and experience, culminating in the creation of extraordinary paintings.

But how do the seeds of human achievement form in the first place? Not just by taking logical thought, but rather by giving curiosity full rein and using all a human being's capability–their holistic powers of understanding and aesthetic imagination as well as analytical skill. I do not mean to imply that all technologists are sensitive aesthetes, but I do claim that the beginning of much useful technology (as indeed of most human achievements in the past) has arisen in aesthetic experience. The subsequent and more obvious stages of profitable development can occur only as a sequel to quite different dynamics.

Cyril Stanley Smith, C*. 1981.* On Art, Invention, and Technology. *In: A Search for Structure. Selected Essays on Science, Art, And History*.

This thesis is dedicated to my grandmother, Willie F. Dixon; I was the brightest light of her life, and she, mine. The best of what I am today comes from her unfailing encouragement and strong shoulders. She and my grandfather Samuel M. Dixon, treasures of my life, did all they could to facilitate my education and show me that life is for the living.

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# VOLUME ONE

*List of Figures*

List of Tables

## VOLUME TWO: APPENDICES

# CHAPTER 1 INTRODUCTION

This thesis is an investigation of iconography and artists' materials in wall paintings at Çatalhöyük, Turkey, during the Neolithic period. The corpus of images from the site is one of the most prolific sources of wall paintings on built architecture in European prehistory. James Mellaart was the first to excavate the site from 1961-5; this was the first discovery of a site of its kind, comprising sophisticated architecture, art, and artefacts from an early stage in human development. Mellaart's monograph (1967) reports and interprets all aspects of the site including architecture, paintings, and artefacts. In more recent studies of the art, members of the Çatalhöyük Research Project (ÇRP) have focused more narrowly, either on the iconography (Düring 2001; Last 1998, 2005; Russell and Meece 2005; Meece 2006; Czeszewska 2014) or on the artists' materials (Çamurcuoğlu 2012, 2013). In this thesis, the author endeavours to analyse wall paintings and their materials in a holistic fashion for the first time since Mellaart's monograph, using methods which integrate technical analysis with archaeological context. The aim of this unique holistic analysis of the materials, art, and their chronology of development is to gain insight into the role of art in Neolithic society.

Archaeologists have observed that significant cultural developments occurred during the Neolithic period and have debated the nature of the driving force for change at this pivotal point in human history. Lévi-Strauss, in *La Pensée Sauvage (1962),* put forward the idea that the science of prehistory, in both the Palaeolithic and the Neolithic periods, was enmeshed in a collage of practical knowledge and skill gained through direct experience. This would distinguish it from a modern concept of science that involves open inquiry and abstract ideas. Mellaart (1967), in his interpretation of Çatalhöyük, concluded that the peoples were ideologically motivated, emphasising the worship of nature and mother goddesses as the inspiration for the lavish imagery found in Neolithic wall art. By contrast, Professor Ian Hodder, the director of the excavation since 1993, echoes the theories of Leví-Strauss when he posits that a ‘practical science’ is at work at Çatalhöyük. Hodder (2006, 2011) interprets the phallic symbolism in the art as relating to ‘maleness, wild and dangerous animals’ as theorised by Hodder and Meskell (2011, 235).

The overall aim of this project is to integrate the studies of iconography and materials to obtain greater understanding of art in prehistoric contexts. The unprecedented methods of this thesis will also open new lines of inquiry for the further study of art and artists’ materials in prehistoric contexts. At the core of the thesis are three new resources: a technical analysis of the pigments, in Chapter 3 a database of the wall paintings, and an analysis of iconography in Chapter 4. The three data sets are analysed separately, then integrated in Chapters 5 through 8. In the iconographic analysis, iconography of all images is investigated using a new methodology; forms and motifs are coded in detail and tracked throughout the Neolithic levels at Çatalhöyük. The purpose of this methodology is to determine what the painting content indicates as the impetus to choose certain the forms and motifs, thus illuminating the source of creative drive in painting practice at Çatalhöyük.

The approach taken in this thesis, using Çatalhöyük as a case study, builds on recent research by archaeologists and archaeological scientists towards balancing the study of materiality and material culture with that of the materials themselves (Gosden and Pollard 2014; Hodder 2012). Under specific investigation are the intimate links between art, iconography, and materials, and investigation of the motivations for artistic practice. These concepts are strongly influenced by the scholarship of two authors. The first is the illustrious metallurgist and theorist Cyril Stanley Smith (1981) who hypothesises that in technology and artistic practice the catalyst is creative desire, with a creative drive innate in humanity serving as the prerequisite to the conditions that give rise to innovation. The second is Alfred Gell (1992), who established that art is not only influenced by its materials and technology but has its value and interpretation inherently enmeshed within them.

As suggested by Gosden (2011), the key to examining the relationship between people and things is a focus on time. This is because the connections between people and things does not arise instantaneously, but unfolds in particular sequences and rhythms (ibid, 184). As framed by Hodder (2012, 54), the focus on chains in the French School can facilitate a useful balance between material culture and materiality studies. The sequencing of events, in what the French School terms the *chaîne opératoire*, follows materials from procurement to use and deposition, while taking account of the knowledge and hands-on skill used to create an artefact (Lemonnier 1993; 2012). An approach based on the *chaîne opératoire,* the sequence of acts involved in the making of an artefact, shifts the analytic emphasis towards material reality, working towards the symbolic interpretation of artefacts. Regarding the wall paintings of Çatalhöyük, time is, however, the dimension that has been left unexplored in previous scholarship; prior studies have yet to examine the chronological unfolding of the palette of colours used and the types of designs seen in the corpus of over 70 painted walls with designs at Çatalhöyük.

This thesis organises the pigment evidence as a sequence of acts in the material record, interpreted as a series of events that act as catalysts for subsequent developments and innovations. Links between the artists' materials and the landscape are also explored in this thesis for the first time - specifically, the sites from which the more exotic colourants may have been procured. These colourants, cinnabar, azurite, and malachite are relatively common around the globe, but not ubiquitous. Or as Siddall (2018, 23) observes, they are locally abundant, but not geologically common. All of these are uncommon in Palaeolithic and Neolithic contexts, with a few documented occurrences of cinnabar, and even fewer of malachite and azurite. Each of these rare pigments occur infrequently over the 1,100-year occupation of Çatalhöyük and can only be mined from a limited number of sources in Anatolia; therefore, their presence can indicate specific events or short periods in which contact is made with other regions and contemporary sites.

This thesis also establishes chronological and typological sequences of wall paintings to be able to determine 1) how developments in artists' materials and changes in patterns of types of paintings unfolded and 2) potentially influenced one another. Using the evidence established in these results, the interrelationships of the paintings with the artists' materials and with the wider archaeology, and the development of these relationship over time, can be examined.

The materials analysis of pigments involves a multiple-technique approach; for the first time, all samples are analysed with Fourier transform infrared spectroscopy (FT-IR), and X-ray fluorescence (XRF), and micro-X-ray fluorescence (μ-XRF). Selected samples are also examined with polarised light microscopy (PLM) and analysed with energy dispersive scanning electron microscopy (SEM-EDS). For the blue powder samples, one newly applied technique, X-ray diffraction (XRD), is utilised. The value of pursuing the multiple-technique approach is that it increases the level of certainty in identification and enables examination of the full matrix of archaeological samples, as opposed to simply characterising the one primary mineral colourant. This level of detail is essential for supporting more penetrating enquiries for which the archaeological pigments serve as evidence.

The methods used in this thesis have been validated in several respects by the findings; the holistic approach to both pigments and paintings in this thesis has yielded a wealth of unique empirical results about the artists' materials and iconography. The technical analysis revealed significant new information concerning the sourcing and processing of pigments, especially of the rare blue colour used at Çatalhöyük. In addition to the progress made in establishing the provenance of artists' materials, a detailed review of the wall paintings evidence, in both archival photographs and preserved murals, also yielded several unexpected discoveries. The nuanced methodology developed in this thesis to analyse the motifs and forms over time has also shed new light on images in the Early, Middle, and Late periods of art on the site.

The aim is to integrate the studies of iconography and materials in a rigorous manner to obtain greater understanding of art in prehistoric contexts.

## 1.1 Scope: Neolithic East Mound Paintings and Mineral Colourants

The site of Çatalhöyük includes two mounds, known as the East and West mounds, divided by the Çarsamba river. The East mound has earlier Neolithic occupational levels, and the West mound, later Chalcolithic levels. The first excavations of the East mound, during the excavations led by James Mellaart from 1961-5, were focused primarily on the southern part. When excavations resumed in 1993 with the team lead by Ian Hodder, the East mound was divided into two areas: the South area, and the newly excavated North area.

The spatial scope of the study includes the East mound, including both South and North areas (Figure 1.1). For two reasons, the spatial scope of the thesis does not include the West mound. Firstly, the chronological dates of this area are Chalcolithic, and thus outside the scope of this investigation. Secondly, there is only very scarce relevant evidence to be found there for the study of artist’s pigments related to wall-painting practice. The Chalcolithic pigment evidence from the West mound is mainly associated with pottery decoration; nor have any intact wall painting designs been found there to date.

The temporal scope of this project is the Neolithic levels of Çatalhöyük. Within the Neolithic period, levels of occupation that are used throughout the thesis are those defined by the Çatalhöyük Research Project (ÇRP) as Early (levels XII-VIII ranging from 7,100-6,610 cal BC), Middle (levels VII-V 6,610-6,350 cal BC), and Late periods (levels VI-0 6,350-5,950 cal BC) (Hodder 2014, Figure 1.4; Bayliss et al 2015; Marciniak et al 2015).

Recent radiocarbon results of the earliest and latest levels of occupation refined start and end dates of the occupation to ca 7,100 to 5,950 cal BC. (Bayliss et al 2015; Marciniak et al, 2015). When considering the initial dates of the mound, the wealth of evidence has yet to be excavated lateral to and under the first buildings. Sampling for the earliest occupation on the mound is only possible from the deep sound trench, measuring approximately a metre square at its base. The maximum depth between the base of the mound and the first architectural layer is 3.93m. Radiocarbon dates in this area under the first architectural floors show prior activity of animal pens from 7,025-6,900 cal BC (95% probability) and midden and archaeological deposits earliest dates for activity 7,165-7,085 cal BC (95% probability). Bayliss et al (2015) give the caveat that the revised start date of the occupation at 7100 BC, 200 years

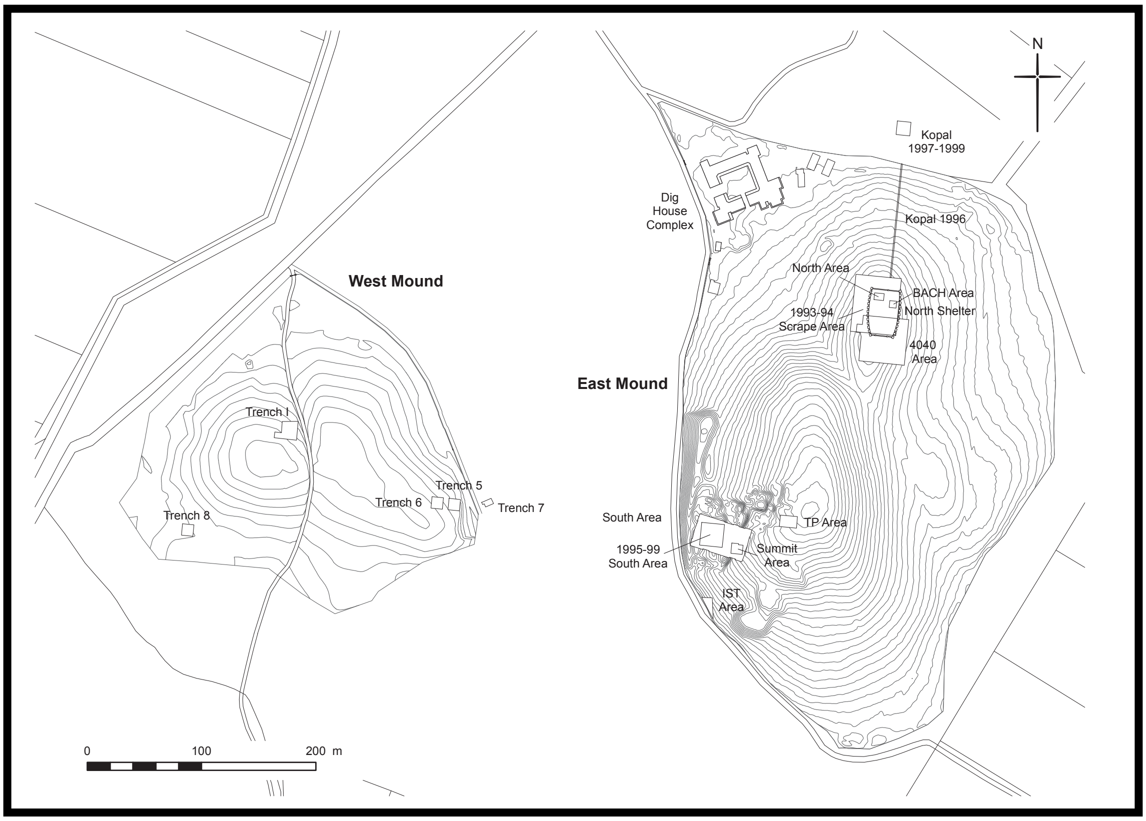


*Figure 1.1 The East mound, its topography, and the areas of excavation that are within the scope of the thesis including the South, North, Istanbul (IST), and Team Poznan (TP) Areas. Source: Author overlaid the topographic map from Hodder (2014, Figure 1.3) as a transparent layer on a Google Earth image of the same area.*

earlier than previous estimations, has limitations, “It is quite likely that elsewhere on the mound earlier occupation exists, although the modelling approach adopted here does allow for the fact that we are unlikely to have dated the earliest material within the excavated trench itself” (Ibid, 18).

Updated chronology for the latest levels of occupation by Marciniak et al (2015, 173) provides radiocarbon dates ranging from 5,975-5,865 cal BC (95% probability) and 5,965-5,915 cal BC (68% probability) for the Neolithic East mound.[1]

[1] The example that will be followed here is from recent publications by ÇRP team members that show the single value in the range, 5,950 cal BC, for the end of occupation date. (Bogaard 2017, 1; Larson et al 2019, 12615)

## 1.2 The Holistic Approach: Integrating Art, Artefacts, and Artists' Materials

This thesis investigates the complex and unique images painted by Neolithic peoples at Çatalhöyük and the interrelationship with other artefacts, which were likewise influenced by the artists' materials. The terms 'wall art', as used by Hodder (2006) and the related 'architectural art' used by St George (2012) encompass wall paintings and reliefs as well as plaster installations of bones. Wall paintings are a subset of the architectural arts that decorate the buildings at Çatalhöyük.

Plasters were used in complex ways in house decoration, most notably through raised and sunken relief technologies and bone installations. The wall plaster was used to build up texture to make animal figures, including the famous 'leopard' reliefs (see Catalogue ID numbers 11, 28, 40). Thick layers of plaster were carved away to reveal the silhouette of animal figures in what Mellaart (1967) and Todd (1976) termed sunken reliefs or 'cut-outs'. Animal bones were also set into the walls with plaster and displayed; these could be prominent installations such as those using bulls' horns - often referred to in the literature as bucrania (although these were of cattle not, as the term bucrania often refers to, oxen skulls) - or less-intrusive fox and weasel bones (Catalogue ID 34). Animal bones in art installations were analysed by Russell and Meece (2005); as this subset of wall art is previously examined, this thesis excludes the bone installations plastered into walls, platforms, or benches to focus on painted imagery.

The artefact scope of this study is confined to the wall art and the mineral colourants that Neolithic peoples used for painting. There are strong justifications for focusing on an examination of the chronological and spatial relationships of pigments on-site. In the Neolithic period, and specifically at Çatalhöyük, we see one of the most significant developments in artists' materials in prehistory. The palette of colours in use since the Paleolithic period is the rich matte earth pigments, manganese dioxide, and carbon blacks (Bahn and Vertut 1997). In Anatolia, the palette suddenly expands. This expansion is an explosion of colour that includes brilliant bright reds, greens and blues.

To explore the causes of this expansion of the colour palette, we will first investigate when and where the new, brilliant colours first appeared. We know that the brilliant red pigment cinnabar occurs in at least one other example in the Near East prior to the occupation of Çatalhöyük; the painted skulls of Kfar Hahoresh are reportedly covered in red cinnabar from Anatolia (cf. Moorey 2005, 32, citing Goring-Morris pers. comm.). However, it is not yet known when the green and blue pigments first appear in the archaeological record. Neither is it known when, or why; they are introduced for the first time on-site at Çatalhöyük.

The earliest pigments are found on architectural floors (space 181) dated to 7,035-6,955 cal BC (95% probability of contemporary floor space 199) and continue throughout the occupation. Colours range from muted earth pigments to brilliant reds, greens, and blues. Pigments found painted onto designs on walls and the raw materials used for painting are also excavated from domestic contexts. In rare cases, pigment crayons, ground pigment pressed into shape to be held in the hand, are excavated from house interiors. In burials, pigments are found in several forms, either scattered over the body or applied directly to the body; pigment lumps, powdered colour once contained by a pouch or a shell, are found interred with the dead.

In his excavations from 1961-6, Mellaart observed that few well-preserved houses are without the use of red paint. Flat applications of paint made dado panels on walls. The ubiquity of red extended to painting the house features that were built up in plaster, such as posts, niches, doorways, benches, and platforms (Mellaart 1967, 149). Proposed reasons for the use of red in the architecture and dado panels include the symbolic “blood and life” connotation and ritual (Mellaart 1967, 150), as well as the functions of waterproofing and increasing the durability of the soft mudplaster surface (Kingery et al 1988, 240, cf. Matthews 2005, 388).

The study of mineral colourants in this project draws on the protocols and ethos of reference literature; the models used are technical studies of pigments from recent European easel paintings (Feller and Bayard 1986; Eastaugh et al 2004; Roy 1993) and of archaeological pigments from Classical Antiquity in Crete, Greece, and Italy using multi-technique methods. (Brysbaert 2004, 2008; Kakoulli 2009; Siddall et al 2011) Also influential to the study is the growing body of literature characterising pigments in prehistoric contexts in San rock art with multiple techniques, namely optical microscopy (OM), scanning electron microscopy (SEM), Raman, and Fourier transform infrared spectroscopy (FT-IR) by Bonneau et al (2012).

### 1.2.1 Çatalhöyük History Houses

Mellaart (1967) observed stacks of buildings at Çatalhöyük. Directly below an excavated house, he would find a building of the same dimensions with the same use of space with platforms, ovens, and even identical paintings in the same wall orientation as the house underneath. This phenomenon – and the repetitive practice of the use of space - is part of the evidence that supports the theory, put forward by Hodder (2006, 2011), that Neolithic peoples at Çatalhöyük had a strong connection to ancestry and the past.

The extraordinary memory of the inhabitants of Çatalhöyük is further highlighted in recent research. The vertical stacks of buildings with strong similarities in architecture and artefacts are termed ‘history houses’ by Hodder and Pels (2010) and summarised in Hodder (2013b, Table 1.1). Figure 1.2 illustrates the strong element of history that persists in the vertical stacks of houses in chronological sequences of architecture at Çatalhöyük.

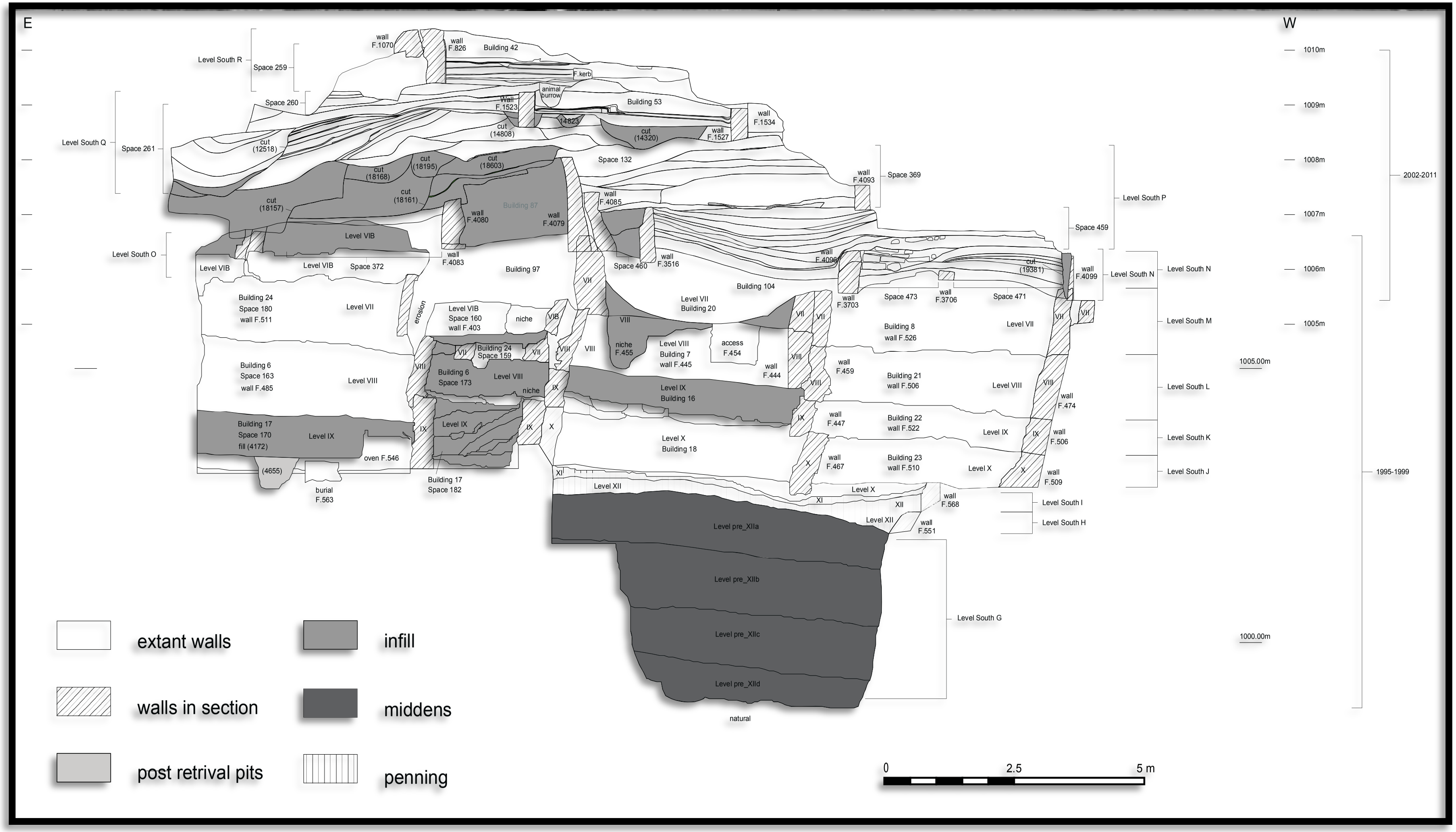


Figure 1.2 Section of the South Area excavations from natural at the base and initial architecture in level XII to level III. Note the decreased number of buildings excavated at the Early and Late periods compared to the Middle occupation levels. Figure from Farid (2013, Figure 4.6a).

Figure 1.2 also shows that excavations have exposed more buildings from the Middle period than the Early or Late periods by a significant margin. In investigating the architecture on-site, ÇRP team member Cutting (2005) made the important observation that the earliest and latest levels of occupation have far fewer excavated buildings than the Middle levels; with considerably more architecture in VII –V, comparisons between levels are not directly correlational (ibid, 157). Cutting (2005, Figure 10.5) quantifies the size of excavated areas for levels XII to I- with 250 square metres or less in levels XII-XI and level I; 500 square metres or less in levels VIII, III and II; and the marked increase in Middle levels VII, VIA, and V with over 1500 square metres and over 2000 square metres in level VIB. Recent phasing research by Farid (2013, Figure 4.6a; reproduced in Figure 1.2) illustrates that in current excavations the Middle levels continue to have more excavated areas than the Late or Early periods.

### 1.2.2 Complex Data from a Complex Past

Pulling together the relevant data for this project is a complex task, since it comes from discrete sources over two excavation campaigns. For the first time, all the data from the first investigation is merged with the paintings and pigments data available in the recent phase of excavation led by Ian Hodder since 1993. The image database, discussed in Chapter 5, synthesises photographs and metadata regarding the archaeological contexts of the art from both excavations. The aim for this project is to integrate the evidence from both campaigns into a coherent resource.

The excavations of the South area of the East mound by James Mellaart (1961-6) are, to date, the source of the most prolific evidence of wall paintings, and information regarding the paintings and reliefs comes mostly from records of those excavations. Most of the murals survive only in archival photographs taken by Mellaart and his assistant, Ian Todd, and a few preserved murals in the museum. Several factors culminated in a low rate of survival of the excavated murals; difficulties in preservation arose from the fragility of the paintings, their use of unexpected materials, and the large numbers of paintings excavated in a short time.

In the Neolithic, the wall plasters were applied in numerous layers under and over painted surfaces. To uncover a painted design, the overlying plaster must be chipped away manually, thus reducing and disturbing the surface of painted layers. Conservation techniques in the 1960s for wall paintings were developed for the sturdier lime plaster of a true fresco technique. At the time, Mellaart's discovery of the site and its prolific artwork was unprecedented and unanticipated. Existing strategies therefore had to be quickly adapted to conserve the unusual and fragile paintings; the Çatalhöyük murals are painted on a friable and brittle mud plaster substrate without the robust fresco-like bond of the pigment and plaster layers. The conservation treatment would have been a challenge for the team led by Henry Hodges, Lecturer at the Institute of Archaeology, University College London (UCL), in Ancient Technology and Conservation, with field conditions compounding the difficulty level. Given the short seasons and large numbers of paintings, only a selection could be stabilised and sent to the Museum of Anatolian Civilizations in Ankara. Even fewer of the paintings sent to the museum were conserved for display.

Paintings from the current campaign, begun in 1993, are fewer in number and more fragmentary. Painting evidence from the current campaign comes from the South area from buildings adjacent to and under those excavated by Mellaart, and the nearby North Area shown in Figure 1.1. The meticulous excavation techniques for which the ÇRP is known retains samples of pigments from burial and domestic contexts and has a dedicated preservation programme for painted murals. After excavation, the vibrant colours of pigment powders and rocks are retained in a secured archive at the dig house in the on-site archive near Konya, Turkey.

As for the colourants, the physical evidence of pigments from Mellaart's excavation was not archived, save the few preserved murals in the Museum of Anatolian Civilizations in Ankara. All that remains are Mellaart's accounts in contemporary excavation reports published in *Anatolian Studies* from 1961- 6, with excavation photographs in black and white, and the evidence recorded in the monographs by Mellaart (1967) and Ian Todd (1976).

Chapter 2, which covers methodology, will present in more detail the fieldwork for the thesis, which included trips to examine preserved murals from the Mellaart phase in Ankara at the Museum of Anatolian Civilization and *in situ* murals at Çatalhöyük. Over the course of two months, the author also surveyed the on-site pigment archive and collected archaeological samples for the technological analysis phase of the investigation. Section 3.1.1 reports on the process of surveying the archive, recording the contents in a database, photographing viable samples, and exporting samples for technical analysis. Technical analysis was undertaken at the Research Laboratory for the History of Art and Archaeology, Oxford (RLAHA), the associated laboratories at Art Access & Research (AA&R), led by Dr Nicholas Eastaugh, and at Cranfield University with Prof Andrew Shortland.

### 1.2.3 Chaîne Opératoire in Technical Analysis

In order to interpret the relevance of the constituent particles identified through technical analysis, awareness of the stage of processing the sample is taken from is crucial to the methods used here. To this end, detailed notes of the context and sample type, be it rock, powder, or painted sample, were kept with the records of each sample in this study. In prior studies of archaeological pigments, and notably at Çatalhöyük, this information is often not explicitly noted in the reporting of findings. Results from prior investigations of pigments at Çatalhöyük by Çamurcuoğlu (2012, 2013) do not report the sample type and where it occurs in the *chaîne opératoire*, a sequence from raw rock pigments to painted surfaces. No distinction is made in the reporting between raw pigments or painted samples.

It will be shown that collecting and reporting evidence more precisely is what is needed to more accurately tease out available data from archaeological pigment specimens. If a pigment is from the initial stages of the *chaîne opératoire* as a raw material - such as a rock or mineral - then the mineralogy and associated pigments other than those of the colouring mineral usually reflect the geological source of the sample. However, if the colourant sample is from further down the chain, then particles in the archaeological sample are more likely to reflect processing and context. For instance, after having been ground into a powder and scattered into a burial, or applied to a wall, in the manners in which Neolithic peoples used pigments, particles might provide evidence of the painting substrate or palettes and tools used to grind or apply the pigment powder, rather than of the mineralogy of a pigment.

### 1.2.4 Neolithic Blue: Body Adornment or Wall Paintings?

Recent pigment research at Çatalhöyük maintains that blue pigments are not used in wall painting at any time used only as burial goods (Çamurcuoğlu 2012; 2013; 2015). However, Mellaart (1964, P. III, 55; 1967, 132, 151) reports a cut-out of a cow painted blue in the Shrine 1 sequence on the west wall in VII.1 (ID 16). This is confirmed by Todd (1976, 37).

Mellaart describes the decoration for this building in detail in his *AS* report:

> Entering the shrine through the low doorway in the north, one was confronted by the figure of a cow, facing right. Its single horn, ear, and eye were modelled in low relief, whereas the rest of the animal was roughly cut in the thick layers of plaster. No legs are indicated, but the animal is shown standing on a pedestal which was painted red; the cow itself was covered with pale blue paint, the only instance of the use of this colour on walls (Mellaart 1964b, 55).

After the completion of excavations in the 1960s, Mellaart and Todd both identified this figure as being unique in two respects: all other cut-outs and paintings are of bulls, and this cow figure is also the only occasion of the use of blue in wall paintings.

### 1.2.5 Archaeological pigments

Pigments identified in technical studies of materials from prehistoric contexts are earth pigments, the blue and green minerals azurite and malachite, red through yellow minerals from mercury sulphide and arsenic sulphide phases, black from dark purple manganese oxides and carbon-based blacks from soot and char or coal and hydrocarbon.[2] (Siddall 2018) Earth pigments are ubiquitous and share the feature of being mixtures. The group of earth pigments is comprised of iron-rich ochres, wads (manganese-rich ochres), umbers, green earths (terres vertes), white earth (including gypsum, chalks, huntite, kaolinite and diatomite), vivianite-rich blue earths, and solid

[2] See Table 1.1 for chemical formulas for each pigment.

hydrocarbons such as coal. Earths are mixtures and may have one or more chromophores, minerals which contribute the overall colour of the pigment, and commonly contain secondary phases of other minerals such as clays, micas, carbonates, and quartz (Ibid, 4; Eastaugh 2004).

The term 'ochre' in the history of art and artists' materials refers to iron oxide and oxide hydroxide rich powders with variable amounts of manganese oxides (Eastaugh et al, 2004; Helwig 2007). In geology, ochres are defined as earthy, metal oxide- or metal oxide hydroxide-rich deposits; these deposits form at or near the surface. Iron-rich ochres are the most commonly found, with fewer occurrences of manganese ochres as well as copper and cobalt ochres (Siddall 2018, 4-5). The chromophore of red ochres is haematite and of yellow ochres is goethite, and, less commonly, jarosite. (Ibid) The colour of natural raw ochres is determined by the dominant mineral, such as haematite, goethite, or manganese, with mixtures being common (Elias et al, 2006).

Other red, yellow, and orange mineral pigments that are 'locally abundant but globally uncommon' (Siddall 2018, 20) are arsenic sulphide and mercury sulphide. Arsenic sulphide phases are known as orpiment and realgar and pararealgar; these are formed in volcanic environments and in association with gold mineralisation (Ibid, 20). Cinnabar, found in hydrothermal mineralisation, produces a vivid red with a saturation of colour surpassing that of red ochres that has been highly desirable for painting from prehistory to the present (Ibid, 22).

Arsenic sulphide and mercury sulphide are subject to an alteration process which turns the painted surface from red to a greyish black in some cases. Until recently, in cinnabar, the colour change was thought to be due to the photosensitive nature of the mineral that caused a phase change of the red alpha ($\alpha$-HgS) form of the mineral to its polymorph, grey beta ($\beta$-HgS), known as metacinnabar (Gettens 1972); the mercury deficiency in this polymorph may be represented as ($Hg_{1-x}S$) with x ranging from 0 to 0.08' (Klein 2008, 362). The geochemical study of bulk cinnabar samples identified a strong correlation of colour darkening and trace amounts of chlorine (McCormack 2000). Conservation scientists also view chlorine as a key component in the darkening process, hypothesising that light sensitive mercury chloride compounds react, or act as a catalyst in altering Hg(II)S into Hg(0) and S(0) (Keune and Boon 2005; Radepont et al 2011).  Observation of the darkening of cinnabar on cultural heritage materials painted with cinnabar on calcium-based substrates in architecture and sculpture correlate the surface darkening with the formation of a dark gypsum ($CaSO_4$) crust on the surface (Price and Doehne 2010). A notable case of a dark gypsum crust forming over a darkened cinnabar in archaeological wall paintings is found at Pompeii (Cotte et al 2006).  Electrochemical experiments by Anaf et al (2013) indicate to the formation of metallic mercury may also be a mechanism by which cinnabar painted surfaces are altered. Recent experimental work by Neiman et al (2015) investigating the cause of colour change in cinnabar confirms several mechanisms: 1) the early formation of a gypsum crust and halite on painted surfaces (Ibid, 925,993); 2) the conditions which induce the alteration are high relative humidity, exposure to light, and the presence of chlorine in the form of NaCl (Ibid, 922-3); 3) with XRD analysis, the compounds found on cinnabar painted samples which were artificially aged with NaCl were cinnabar, calcite, and halite; 4) the metacinnabar polymorph was not identified in the compounds detected in altered samples and concluded to not be the phase change which is the source of cinnabar darkening (Ibid 925). 5) another mercury-bearing phase calomel ($Hg_2Cl_2$) is found in most samples both red and darkened cinnabar and not associated with alteration (Ibid 925).

Green and blue mineral pigments found in prehistory, to date, are limited to malachite and azurite. Copper salts are identified in historic periods and may be found more increasingly in earlier contexts. Copper salts are associated with copper mineralisation and the corrosion of copper and bronze metals, such as atacamite and brochantite. While intentional synthesis of these compounds is possible and common in historical periods, in prehistory and the Neolithic, prior to the technology of copper smelting, synthesised copper salts have yet to be identified and are highly unlikely. However, it is possible that the copper salts originating from natural sources do occur in prehistoric contexts, such as corrosion on native copper or minerals of malachite and azurite. (Siddall 2018, 15)

Based on the history of development which occurs in later archaeological or historical periods, several blue and green pigments are excluded from investigations of materials from prehistoric contexts. For instance, the technology for blue and green frits, calcium copper silicates, known as Egyptian blue or green, are not commonly found earlier than the 4$^{th}$ Dynasty in Egypt, with an early account from the Gurob Ship Cart c. 1256 BC. (Siddall 2012) Lapis lazuli, while used in stone form for decoration and inlays in the Near East, the technology to extract the pigment lazurite, also known as ultramarine, was not developed until the 6$^{th}$ century CE; therefore, it is not relevant to consider ultramarine in archaeological or prehistoric contexts. (Siddall 2018, 17)

As they occur in nature in their raw form, colourants are complex mixtures of minerals. The results from technical examinations reflect this complexity. People procure

*Table 1.1 Pigment colours and their chemical composition and known accessory minerals. Sources for data on accessory minerals: Eastaugh 2004◆; Klein 2008✚; Roy 1993⦿; Siddall 2018❖; Mineral Data Publishing 2001-2005✜.*

| Colour | Pigment | Chemical Composition | Known to occur with these accessory minerals[1] |
|---|---|---|---|
| Red | Haematite | α-$Fe_2O_3$◆; $Fe_2O_3$✚ | Quartz, calcite, jarosite (barite from samples derived from mineralised veins); an accessory mineral in feldspathic igneous rocks such as granite or in metamorphosed rocks where it may have originated by the oxidation of limonite, siderite, or magnetite✚ |
| | Cinnabar | HgS◆✚ | Calcite, orpiment, realgar, clay minerals group including quartz, feldspar, and mica◆. Iron oxide⦿; pyrite, marcasite, stibnite, and sulphides of copper in a gangue of opal, chalcedony, quartz, barite, and fluorite✚ |
| | Red ochre | Complex, iron oxide minerals primarily iron (III) oxide ($Fe_2O_3$) haematite, or goethite, haematite, lepidocrocite, and magnetite may also be present◆ | Quartz, clays, gypsum, micas, ilmenite, rutile, feldspars, magnetite and calcite, pyrite, chalcopyrite◆; carbonates, metal sulphides❖ |
| | | | |
| Yellow | Goethite | α-FeOOH◆; (FeO[OH])❖; αFeO(OH)✚ | Lepidocrocite, jarosite, feldspars, clays and carbonates (calcite and dolomite)◆; forms as a gossan over metalliferous veins✚ |
| | Jarosite | $KFe_3(SO_4)_2(OH)_6$◆ | Gypsum, galena, haematite, pyrite and feldspars◆ |
| | Yellow ochre | Complex, primarily goethite◆ | Jarosite, lepidocrocite, clay and feldspar group minerals, carbonates (calcite and dolomite), gypsum, micas, copper ores◆; quartz, metal sulphides❖ |

| | | | |
|---|---|---|---|
| | Orpiment | $As_2S_3$❖⊙ | Gold❖; usually with realgar and found in veins of lead, silver, and gold ores with other arsenic minerals, and stibnite ✚ |
| | Limonite | $FeO.OH.nH_2O$ ◆ | A field term for poorly crystalline hydrated oxides of iron such as goethite or lepidocrocite ◆ |
| Orange and yellow | Realgar and pararealgar | Realgar AsS⊙✚ or (α-$As_4S_4$)❖. Pararealgar (α $As_2S_3$)❖ | Gold❖; associated with orpiment in similar environments✚ |
| | | | |
| Green | Malachite | $CuCO_3(OH)_2$◆✚; $Cu_2(CO_3)(OH)_2$❖ | Azurite, iron oxides and hydroxides, chrysocolla, cuprite◆; rutile, cerussite, calcite, graphite❖ native copper, limestone, galena✚ |
| | Green Earths | Primarily from celadonite (K[Mg,Fe2+]Fe3+ [Si4 O10 ][OH]2) and glauconite ([K,Na][Mg,Fe2+ ,Fe3+ ][Fe3+ ,Al][Si,Al]4 O10 [OH]2) ❖ | Clay minerals group including quartz, feldspar, and mica◆; carbonates❖ |
| | Copper Salts | $Cu_2Cl(OH)_3$ polymorphs: atacamite; paratacamite, clinoatacamite and botallackite. Brochantite ($Cu_4[SO_4][OH]_6$)❖ | Like azurite and malachite, these are associated with copper mineralisation and the corrosion of copper metals.❖ |
| | Chrysocolla | ~$Cu_4H_4Si_4O_{10}(OH)_8$✚ | Forms with azurite and malachite, cuprite, or native copper✚ |
| | | | |
| Blue | Azurite | $Cu(CO_3)_2(OH)_2$◆✚; $Cu_3(CO_3)_2(OH)_2$❖; $2CuCO_3.Cu(OH)_2$⊙ | Malachite, cuprite, tenorite, chrysocolla, iron oxides and hydroxides◆; rutile, cerussite, calcite, graphite❖ |
| | Blue Earths | Vivianite $Fe_3(PO_4)_2.8H_2O$ ◆ | Forms near copper, tin, lead, and iron deposits or within peat or lacustrine sediments ◆ |
| | Linarite | $PbCuSO_4(OH)_2$ ✜ | Uncommon secondary mineral in oxidised zones of lead and copper deposits✜ |
| | | | |

| | | | |
|---|---|---|---|
| Black/ Brown | Carbon black | C | |
| | Manganese Oxide (Wad) | Complex, main phases hausmannite, ($Mn_3O_4$), pyrolusite and polianite ($MnO_2$), ◆; also includes mixtures of other manganese oxide and hydroxide minerals, including manganite (MnO[OH]), and iron oxides ❖ | Quartz, clays, carbonates, micas, metal sulphides ❖ |
| | Bone Black | C, $Ca_{10}(PO_4)_6(OH)_2$, $CaCo_3$; biogenic calcium phosphate◆ | |
| White | White Earths | Calcium-based whites including calcium carbonate ($CaCO_3$), calcium sulphates (including gypsum ($CaSO_4$); huntite ($Mg_3Ca[CO_3]_4$), kaolinite ($Al_2[Si_2O_5][OH]_4$), diatomite (SiO2)❖; dolomite $CaMg(CO_3)_2$✚; ankerite $Ca(Mg_{0.67}Fe_{0.33})(CO_3)_2$ ◆ | Quartz, clays, carbonates, micas, metal sulphides; huntite with dolomite❖; dolomite rocks are often formed from limestone and mixed with calcite, it can also be associated with ankerite, fluorite, calcite, barite, and siderite in hydrothermal veins✚ |
| | Quartz | $SiO_2$ ◆ | |

minerals from the natural environment; in prehistoric archaeological contexts, colourants were processed mainly by grinding the raw minerals to powders, and sometimes by levigation. Tools used for grinding, such as stone mortar and pestle or sharp blades for shaving the surface, may be evidenced in archaeological samples with particles of the stone.

The interpretation of the results of the technical analysis of the pigments will consider minerals expected to occur together. Knowledge of accessory minerals, expected for each pigment and listed in Table 1.1 will be used to determine whether mixtures observed in samples are naturally occurring, or mixtures unlikely to occur in nature, which are noteworthy in that they may suggest anthropogenic actions.

### *1.2.5.1 Mineral Pigment Definitions*

Colourants are found in various stages of processing: procurement, processing, use, and discard. It will be useful to outline here some of the terminology used in the discussion of raw forms. The *raw* form of a colourant is a *rock* or *mineral*. Rocks are composed of one or more minerals and may contain organic matter, such as coal derived from organic carbon. Rocks are an aggregate of minerals or non-minerals and have no specific chemical composition (Deer 1992).

The other raw material for colourants is *minerals*. Minerals, unlike rocks, do have specific chemical composition and are made of only inorganic substance with a crystalline structure; these features, their chemistry and crystal structure, and the distinctions between them, determine the species of mineral (Klein 1937, 2008). Minerals relevant to the study of artists' pigments are those with desirable colours and handling properties that are conducive to application to the substrate, such as a wall, canvas, or sculpture. While composition within a crystal is homogenous, they commonly form together alongside other rocks or minerals in their geological environment. In nature, this leads to a heterogeneous mixture of different minerals.

Non-essential minerals, which do not significantly affect the bulk, are called *secondary* or *accessory* minerals. Components of the samples that make up little of the bulk of the sample, even a few particles, are *trace* constituents. See Table 1.1 for a list of primary pigment minerals used in the text and those which co-occur.

### *1.2.5.2 Previous Technical Investigations*

Previous studies of the pigments offer a foundation on which to build up the comprehensive picture of colour use at Çatalhöyük that is sought here. The colours visually identified by James Mellaart during his campaigns were red, yellow, orange, mauve, pink, buff, brown, grey, black, green, and blue (Mellaart 1967, 149; Todd 1976, 36).

Two authors of *Conservation of Wall Paintings,* Mora and Mora, were briefly involved with the planning of conservation research of the murals in 1965. Therefore, it is possible that they may have had access to original samples from the site, but this is not explicitly stated. Mora et al (1984, 73) lists pigments from Çatalhöyük as ochre, haematite, azurite, and charcoal.

Site conservator Pamela French reports findings from microchemical tests in her unpublished 'Report to the British Academy on the Conservation of the Çatal Hüyük Wall Paintings Summer 1973, Spring 1974', which is based on material from the Mellaart phase of excavation. There was detectable iron ($Fe^{+3}$) in the unpainted mudbrick substrate; the clay had sufficient iron to give a positive iron (Fe) result. Microchemical tests with potassium ferrocyanide in hydrochloric acid in red-brown and red areas were positive for iron; this indicates an iron-rich material in either the mineral colour in the pigmented layers or, in this case, in the plaster substrate.

Additional work was carried out in the early seasons of the Hodder campaign by Catherine S. Myers and reported in the unpublished 'Wall Painting Conservation Program Report' (1998). Myers gives microscopic examination and microchemical testing results for two samples from the South Area, four from the North, and three from the summit area between those two areas. Two results are notable for their relevance to this study. First is the documentation of possible cinnabar identified with polarized light microscopy (PLM) in a sample from the North Area, unit 2228. The second is a microchemical test of a red pigmented area that was positive for both iron ($Fe^{+3}$) and copper ($Cu^{+2}$). Microchemical tests using HCl and potassium ferrocyanide tested positive for iron ($Fe^{+3}$) in samples from the North Area, in single samples from Buildings 3, unit 3522 and 2228 and Building 5, unit 3865. Unit 2228, on the Northwest wall, also showed particles with features consistent with cinnabar under PLM, but microchemical tests were negative for mercury.

| **Early levels** |
| --- |
| South G (Pre-XII[1]) Space (Sp.) 181 |
| South J (X) ***Building (B.) 18*** and B. 23 |
| South K (IX) B. 2, ***B. 17***, Sp. 170 |
| South L (VIII) B. 43, Sp. 235 |
| **Middle Levels** |
| South M?[1] (VII) ***B. 8, Sp. 168*** |
| South O (VIA) ***B. 79, Sp. 134*** |
| South P B. 75, Sp, 332 |
| South Q ***B. 65*** |
| **Late Levels South Area** |
| South R (V-III) ***B. 56, Sp. 121*** |
| South R B. 44 |
| **Late Levels North Area** |
| Scrape G B. 23, Sp. 17 |
| North G (VII-VI) ***B. 49 Sp. 100,*** B. 59 Sp. 311, B. 77 |
| North 4040 H (VI-V) B. 60 Sp. 278, B. 76 |
| BACH G (VII-VI) B. 3 Sp. 86 |
| North G? (VI-V) ***B. 1***, Sp. 188 |
| North H, I (IV-III) B. 55, Sp. 256, 268 |
| North J (IV-III) B. 47 |
| North unstratified Sp. 1006 |

*Table 1.2 Locations of archaeological pigment samples previously analysed by Çamurcuoğlu (2015) by level and space or unit number. Samples in bold italics were also sampled for this study.*

Results from doctoral work at University College London (UCL) by Duygu Çamurcuoğlu are reported as preliminary findings in two published articles (2012, 2013) and followed up in her subsequent PhD thesis (2015). In these, conflicting numbers of analysed samples are reported; Çamurcuoğlu states 31 samples provided secure results (2012, 251). Çamurcuoğlu reports that eight yellow, four blue, one green and nine black samples were analysed, in addition to samples of red (2012, 253). The techniques used for pigment identification were reflected and polarized light microscopy (PLM), Raman spectroscopy, and scanning electron microscopy (SEM-EDS). It is indicated that most of the samples are of painted surfaces.

In the reporting by Çamurcuoğlu (2012, 2013, 2015), pigment identifications are linked to 45 archaeological contexts; in samples for which she mentions specific unit numbers, the corresponding space or building numbers were retrieved from the ÇRP database. The locations of pigments (indicated by unit number set by the ÇRP) analysed by Çamurcuoğlu were excavated from is provided in the spread sheet list in Table 1.2 and this data is merged with pigments sampled for this study in in the next chapter in Table 2.2.

*1.2.5.2.1 Red*

Pigments observed in the micromorphology study of plasters by Wendy Matthews (2005) show red and yellow iron oxides mixed on the surface of the painted plaster from unit 5843. Matthews singles out the sample for its heavy burnishing relative to other samples, and its occurrence early in the chronology—Level XII and XI—in space 181 (2005, 129).

Pigment analysis of fifty-nine red samples by Çamurcuoğlu identifies the majority as 'red ochre' (2015, 139). Çamurcuoğlu reports that the morphology under reflected light microscopy shows that all ochre particles are generally sub-angular to sub-rounded, with crumb-like or fibrous particles, coated with clay that contains carbonate minerals. Quartz, gypsum, and feldspar are recorded as 'evident in some' of the ochre samples (2012, 253).[3] Three examples of cinnabar were found in the red samples studied by Çamurcuoğlu: unit 13669 in building 49 in a mixture with red ochre, and unit 13453, unit 16694 (Çamurcuoğlu 2013, 320; 2012, 254).[4] Çamurcuoğlu states that there is no evidence of manganese or lead-based pigments.

[3] Specifically cited contexts of iron oxides are from the North Area unit 13669, unit 5383, unit 13669, unit 15932, and South Area unit 4221. Raman detected one mixture of haematite and goethite signals in South Area unit 5383.

[4] The detection of cinnabar and report of its frequency of occurrence may be hindered by the choice of Raman only for analysis. Under laboratory conditions, cinnabar is detectable in the low end (200-400cm$^{-1}$) of the Raman spectra (Burgio and Clarke 2000).

One additional piece of evidence for cinnabar comes from the ÇRP team on a plastered skull painted red and excavated in 2009. Positive results for mercury were reported in the *in situ* XRF, conducted and reported by site obsidian specialist Tristan Carter in the unpublished archive report (2009, 126).

1.2.5.2.2 Yellow

Eight samples of yellow were identified as yellow ochre from the Mellaart levels XII-VIII. (Çamurcuoğlu 2015, 148)[5]

Mineral jarosite, yellow in colour, in association with red iron oxides, was identified by site geologist Chris Doherty (ÇRP Archive Report 2009) with optical microscopy.

*1.2.5.2.3 Black*

Nine black samples were identified on painted surfaces, from sources encompassing Mellaart level VII and later (6,700-6,300 cal BC);[6] all samples contained carbon, with some[7] giving evidence of bitumen under PLM and, upon further investigation, GC-MS (Çamurcuoğlu 2015, 149). Blacks were mixed with carbonates, which Çamurcuoğlu suggests is from plaster. No phosphate was detected with Raman, but there were positive results for phosphates in all samples with microchemical spot testing. Çamurcuoğlu (2012, 256) concludes that this indicates bone black (C, ($(Ca_{10}(PO_4)_6(OH)_2$, $CaCo_3$) in all samples.

*1.2.5.2.4 White*

Çamurcuoğlu reports ‘there is no evidence of white pigments on wall paintings at Çatalhöyük’ (2015, 131). White wall plaster was analysed by Çamurcuoğlu. No

[5] Cited contexts were from unit 10501 from the South Area and the previously mentioned mixture of red and yellow ochres in unit 5383. (Ibid)
[6] One cited context of black is from the North Area, unit 13669 on painted plaster.
[7] Black samples indicating possible evidence of bitumen are units 8226 and 17494 (Ibid 149).

calcium carbonate was found with PLM and SEM (Ibid). A calcite signal was detected with Raman in plasters from three contexts in the South Area, units 4221, 10501, and 5294 (Çamurcuoğlu, 2012, 256).

*1.2.5.2.5 Green*

One sample of green pigment was found in unit 16308, level VII, ground with fine, fibrous particles with quartz in the sample. It is reported to be pure malachite with no azurite particles (Çamurcuoğlu, 2015, 149, Figure 87)[8].

*1.2.5.2.6 Blue*

The six blue samples are identified as azurite in level VII[9] (Çamurcuoğlu, 2015: 148, Figures 83-86). Çamurcuoğlu (2012, 255) reports other minerals in the azurite samples as the same for all samples of blue pigments: quartz, gypsum, and feldspar. Çamurcuoğlu (2015,148) states that the blue pigments were not used in wall paintings.

*1.2.5.2.7 Secondary minerals in prior investigations*

The secondary minerals reported by Çamurcuoğlu (2012) were the same in all colours; all samples were reportedly coated in clay and contained carbonates or included quartz, gypsum, or feldspar. It is suspected the secondary minerals from all contexts contain more variation within groups of pigments, especially in the red iron oxides and blue copper carbonates. Furthermore, it is necessary to verify the identity of blue minerals with elemental and mineralogical data. More in-depth knowledge of the mineralogy of the inorganic pigments and a wider range of instrumental techniques is utilised to shed light on pigment technology.

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[8] A green malachite sample from unit 8184, level VII, was presented in Çamurcuoğlu (2012, 255), but not reported in Çamurcuoğlu (2015, 149) doctoral thesis findings on green pigment samples.

[9] Cited contexts of azurite are in units 7575, 7597, 1007, 16308

*1.2.5.2.8 Primary and Secondary Minerals in Pigment Samples*

Prior studies have linked colour variations in ochres to differences in geological provenance (Çamurcuoğlu 2012) without an examination of the archaeological sample's composition beyond the primary colourant. Çamurcuoğlu reports that the iron oxides, cinnabar, and azurite pigments detected by Raman investigation all contain quartz, gypsum, and feldspar (Çamurcuoğlu 2012; 253, 255). All colours were reported as mixed with carbonates, except the copper carbonates azurite and malachite (2012, 253-256). Çamurcuoğlu writes that the clay-coated and carbonate particles observed under PLM may be 'mixing from the plasters or particular red ochre source' (2012, 253).

It is worthy of note that when first exposed during excavation, all painted surfaces were covered in wall plaster. Every wall painting one observes had layers of calcium-based mudplaster removed from its surface with scalpels and similar tools by conservators and those trained to work on the paintings. This renders unreliable any attempts to deduce information about the colourant or its mineralogy solely from the analysis of materials on the surface of paintings.

With reference to the over fifty red ochre pigment samples, Çamurcuoğlu reports the accessory minerals of quartz, gypsum, and feldspar as 'evident in some samples', but without specifying which (Çamurcuoğlu 2012, 253). However, from at least one context, we know the accessory minerals are not uniform for all samples; in the specimen examined by the site geologist, Chris Doherty, unique minerals in ochre, namely jarosite, opal, and mica are present (Doherty 2009, 117). Furthermore, he reports that this is indicative of igneous formation of an iron oxide and that these findings may signal off site sourcing of ochres (Doherty 2009, 117). Therefore, the composition of the iron oxide matrix in some samples may be different from the quartz, gypsum, and feldspar reported by Çamurcuoğlu, and indicate sourcing from multiple geological environments and potentially wide-spread procurement of red iron oxides.

*1.2.5.2.9 Particle Size Analysis*

Pigment particle sizes for all colourants at Çatalhöyük were reported by Çamurcuoğlu as 0.005mm–0.3mm, or 5-300 μm (2012, 253). It is unclear from those reported results whether the author considered that particle size differs between different pigments; only one size range was given for all colours including iron oxides and copper-based pigments. She labels this a 'fine' particle size. The definition of 'fine' is not explicitly stated. It is not clear whether the classification system used is that used to classify pigments by Feller and Bayard (1986), or some other geological classification system for micro-artefacts, such as the classification system for *archaeosediment* by Rapp and Hill (2006, 30).

In a more recent report, Çamurcuoğlu (2013, Table 18.3) published particle size results of blue colourants at Çatalhöyük; she reports a 0.01-0.2mm (10-200 μm) range for all samples. In this report, she attributes differences in colour hue between samples is to particle size, suggesting that the blue pigment, "presents different tones due to the grinding process, i.e., the particles are bright, pale blue when finely ground, and darker greenish blue when coarser" (2013, 317). While this is true in general of copper carbonate pigments, given the marked variations in colour between the archaeological samples, further investigation is required in this case. Therefore, the technical study in this thesis includes re-examination of an archaeological sample of blue pigments, in order to arrive at a better-evidenced explanation of their colour variability.

## 1.2.6 The Formation Environment for Copper-Based Pigments

Azurite forms a secondary mineral in the oxidised zone of copper-bearing ore deposits Henderson (2000, 210). The schematic of this geological environment in Figure 1.3 illustrates why other related minerals co-occur with azurite. Minerals commonly associated with azurite either in the same sample or in nearby contexts

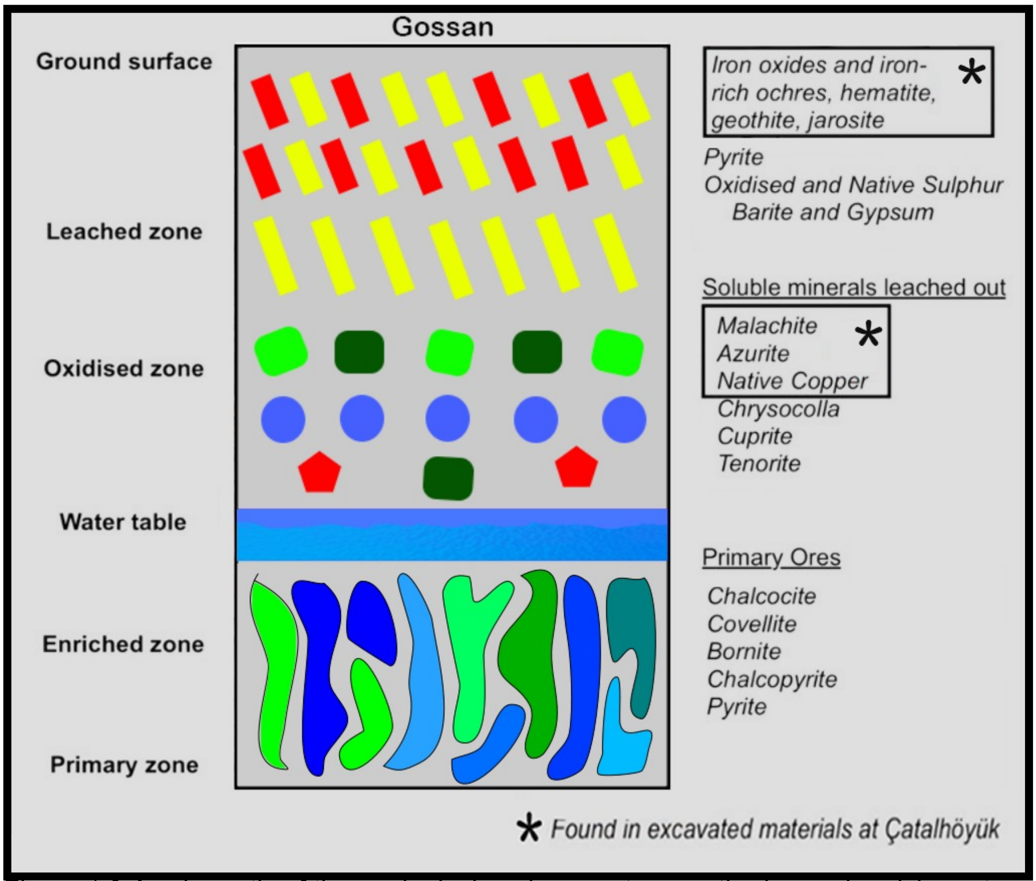



*Figure 1.3 A schematic of the geological environment, a weathering and enrichment zone of a copper-rich vein, showing how iron oxides on and below the ground's surface form a bright red gossan. An asterisk marks the materials excavated from Neolithic levels at Çatalhöyük, including iron-rich ochres, azurite, malachite, native copper and copper ores. Sources: Author's diagram from information in Klein et al (1993, Figure 14.21,) and Henderson (2000, 210), with additional design from Pete Lankston.*

are copper ore, native copper, malachite (a green-coloured pseudomorph of azurite), cerussite, atacamite, chrysocolla, chalcocite, calcite, cuprite, and brochantite. Potential sources of lighter- or yellow-coloured iron-containing minerals are limonite (limonite commonly refers to goethite/yellow iron oxide but can also refer to jarosite or other oxides or hydroxides of iron). A dark purple or near-black-coloured mineral, wad (manganese oxides), is often an accessory mineral to the iron oxides (Siddall 2018).

The purity and accessory minerals of copper vary depending on the environment in which the copper forms. Primary native copper forms in relatively anaerobic environments, such as swamps. In a reducing atmosphere, hydrothermal solutions containing sulphidic copper minerals form in the presence of iron. As shown in Figure 1.3, the iron ions leach from the gossan cap into the underlying minerals (Henderson 2000, 210). Elements present in copper such as iron, nickel, and arsenic come from ores and expand into cracks and fissures (Tylecote 1992). In this thesis, the geological formation environment is considered in the interpretation of technical findings for the relevant blue, green, red, and yellow colourants.

## 1.3. Iconography, Typology, and the Content of Wall Paintings

While defining art presents challenges to scholars of all periods, Richard Bradley has articulated particular issues posed by the disciplinary inheritance of art in prehistory. He argues that art in prehistory has inherited a cobbled mixture of definitions and methods, rather than one that is designed: '… archaeology acquired a category of prehistoric art through a series of accidents' (Bradley 2009, 26). This has taken place over the last 200 years, influenced by events including the discovery of cave art in the nineteenth century, the fashion for and influence of 'primitive' art in fine art in the last century, and the growing power of the antiquities market. Meanwhile, the fine art tradition for studying art - especially wall and easel paintings – has its own limitations, in that it puts literal and analytical frames around an image, often divorcing it from its architecture or social source. Therefore, this thesis endeavours to move towards a definition of art in prehistory which is both more intentional than that currently offered by archaeologists, and more holistic than that currently offered by artists. Following Bradley's (2009) line, this study considers art in relation to archaeological questions regarding context, as part of a broader quest towards understanding the peoples making and living with it.

Approaches to the art of Çatalhöyük by Mellaart (1967) and Hodder (2006), can be classified, for the most part, as mythological; the narrative of an image is the most important component and is comparable to myths known from ethnography. The limitation of this perspective is that while some images convey narrative, many with stories to tell do not.

The definition of art employed here incorporates the view of Gosden and Garrow (2013, 39), that the entire lifespan of an artwork is relevant, because each event in the lives of artisans/creators of art had social and cultural impact. Therefore, each stage of the process of making art from procurement of materials to finished object are elements of the artwork; and, for the most accurate analysis and interpretation, it is essential to consider the process in full.

For the purposes of this thesis, the relevant definition of art will, in addition, be one which emphasises the key ideas of art firstly as communication and secondly as aesthetic expression of beauty separate from functionality. This draws upon the distillation of art defined by Robert Layton in *The Anthropology of Art* (1991). "There are two approaches to the definition of art which are applicable across cultural boundaries, even if neither seem to have quite universal application. One deals in terms of aesthetics, the other treats art as communication distinguished by a particularly apt use of images' (ibid: 4).

The first of Layton's definitions, the non-essential aspect of art, was echoed by Colin Renfrew (2002) and Jonathan Last (2005). Renfrew (2002) defines art as, 'any painting or sculpture or material object that is produced to be the focus of our visual contemplation or enjoyment. It is implicit in such a definition that the work does not at the same time fulfil some other primary purpose' (Ibid 66). In his examination of art at Çatalhöyük, Jonathan Last concluded that while it is integral to Neolithic society at the site, and part of the habitus of how people were socialised, art is still distinguishable from other aspects of life. His working definition of art was, 'the place where symbolism and aesthetics come together' and, 'a discursive, non-routine aspect of people's lives' (Last 2005, 199).

What justifies Renfrew's (2002) selection of the non-essential aspect of art as the essential feature distinguishing art from everything else in the material record? In contexts such as that of the prehistoric environment, much time and energy would be invested in the considerable day-to-day necessities of water, food, and shelter. This raises the question: what motivates people to spend valuable resources, such as time and energy, on producing non-essential things, or ornamenting functional things far beyond function? What does it tell us about the human condition that even under such adversity, we expend considerable effort on non-essentials, and what is it in them that makes them worthwhile to us? Given the investment required, this 'non-essential' activity must fulfil a significant human need in order to persist as it does and must arise from a drive as powerful as that of hunger or thirst.

Research of the non-essentials - of what we are here calling the beautiful, communicative stuff of life, or ‘art’ - explores a vital yet sublime aspect of what it is to be human. Does the value of art lie in its beauty, as Layton and others propose in their discussions of aesthetic value? Or is art the expression of the inner emotional life, as hypothesised by Wassily Kandinsky in *Concerning the Spiritual in Art*, in which he wrote that the artist’s ‘…open eyes must be directed to his inner life and his ears must be constantly attuned to the voice of inner necessity’ (1914, Part VIII, reprint 2000). In ‘What is Art’, Leo Tolstoy agrees that feelings are central to the activity of art, but emphasises the sharing of these feelings, especially for the common good, as the most important aspect, ‘Art is not, as the metaphysicians say, the manifestation of some mysterious idea of beauty or God; it is not, as the aesthetical physiologists say, a game in which man lets off his excess of stored-up energy; it is not the expression of man’s emotions by external signs; it is not the production of pleasing objects; and above all, it is not pleasure; but it is a means of union among people, joining them together in the same feelings, and indispensable for the life and progress toward well-being of individuals and of humanity’ (1904, 50). Here, Tolstoy presents art as a means to social coherence, aligning him with those who see the role of art as primarily communicative.

In anthropological interpretations, art can be associated with ritual priorities, even to the exclusion of the material objects altogether. Rappaport insists that anthropologists take the absence of ‘material efficacy’ as ‘one of ritual’s defining features’ (1999, 46). Material products produced or used in ritual are considered less significant. This shows how the non-essential aspect of art, and its communicative aspect, are in fact intertwined, rather than contradictory – despite most approaches to date emphasising one or the other.

Using the example of Upper Palaeolithic cave paintings, Rappaport (1999, 47) observes that, ‘the fact that such paintings were sometimes executed one on top of the other in palimpsest, strongly suggests that the act of painting them was of greater significance than the paintings themselves.’ This argument is potentially applicable to paintings at Çatalhöyük, since some compositions have a design repeatedly applied in layers up to forty times. However, the considerable skill and painterly manner with which designs are executed indicates that form and content of the paintings were also significant. Ian McNiven (2013, 555) neatly ties content and creation together by claiming that both serve to authorise and legitimise ‘the *past* (through ritual act of creation) and the ‘*future* (through the on-going agency of the object)’. In this way, it can be said the artefact connects generations, simultaneously grounding the present and reaching ahead. This aspect of art as a time-travelling communication is especially useful when engaging with material culture at Çatalhöyük. As we will see, peoples there maintained artistic traditions and practices over exceptionally long periods of time, spanning multiple generations.

Most of the material culture at Çatalhöyük includes exceptionally artistic examples. Aside from paintings, buildings are also adorned with plastered animal bone

*Figure 1.4 Artistic object from Çatalhöyük. Modelled pot incised with lines indicating a face and ears found in Space 279, Level V-IV. Source: Figure 141, 2006 ÇRP Archive Report.*

installations, most notably the bucrania analysed by Russell and Meece (2005). In burials, bodies are adorned with beads of copper and bone, and even the bones are sometimes covered in colours. Functional items such as a bowl or a knife are also skilfully ornamented far beyond function.[10] The decision to focus solely on wall paintings in this thesis should not be taken as an attempt to limit the definition of 'art' at Çatalhöyük, or as implying that other artefacts at the site do not fall into the categories of art in general, or of wall art in particular.

In summary, the term 'art' is used in this thesis with an emphasis on the holistic approach to artefacts with a non-essential quality. The role of 'art' as it used here encompasses expression but refers principally to communication between peoples - not only among contemporaries, but also with both ancestors and descendants.

[10] See Figure 7.12 for an example of decoration on a knife.

### 1.3.1 Wall Paintings at Çatalhöyük

At the time of their excavation, the Neolithic wall paintings were a rare, prolific collection of images that displayed a sophisticated artistry not previously thought possible at such an early age in prehistory. As reported in a history given by the British Institute at Ankara (BIAA), 'His [Mellaart's] project resulted in the unearthing of an unexpectedly sophisticated Neolithic town, whose spectacular mural art, the oldest as yet known, changed our way of thinking about the civilisation of that period.' (https://biaa.ac.uk/about-the-biaa#BIAA%20HISTORY; accessed 21.6.2018)

### 1.3.1.1 Discovery in Iconic Paintings

Is there anything left to discover when looking at iconic works of art? Works that are studied and cited again and again may not have major new aspects to reveal; or do they? Despite hundreds of years of interest and examination by historians of art and the public, a re-examination of the Sistine Chapel ceiling the *Last Judgement* in 1980, by art historian Leo Steinberg discovered a significant and hitherto unnoticed aspect to the composition. This discovery was made 468 years after the chapel painting was completed in 1512 AD. Steinberg observed that the figures in opposite corners and the centre are visually and conceptually connected with one another; evidence of the corner figures, when examined with the artists' self-portraits and contemporary reproduction sketches by other artists, suggests the grotesque figures were based on self-portraits *by* and *of* the artist. The diagonal line created through the composition, from corner to corner through a relevant centre figure, illuminates hints of Michelangelo's intent and inner struggle with his own judgement that he inserted into the composition. Steinberg terms this The Line of Fate (Figure 1.5). Revelations in the *Last Judgement* exemplify the point that even the most iconic of images may have more to reveal after centuries of study.

*Figure 1.5 Michelangelo, Last Judgment with an overlay of the Line of Fate interpretation. Image from Steinberg (1980, Plate V).*

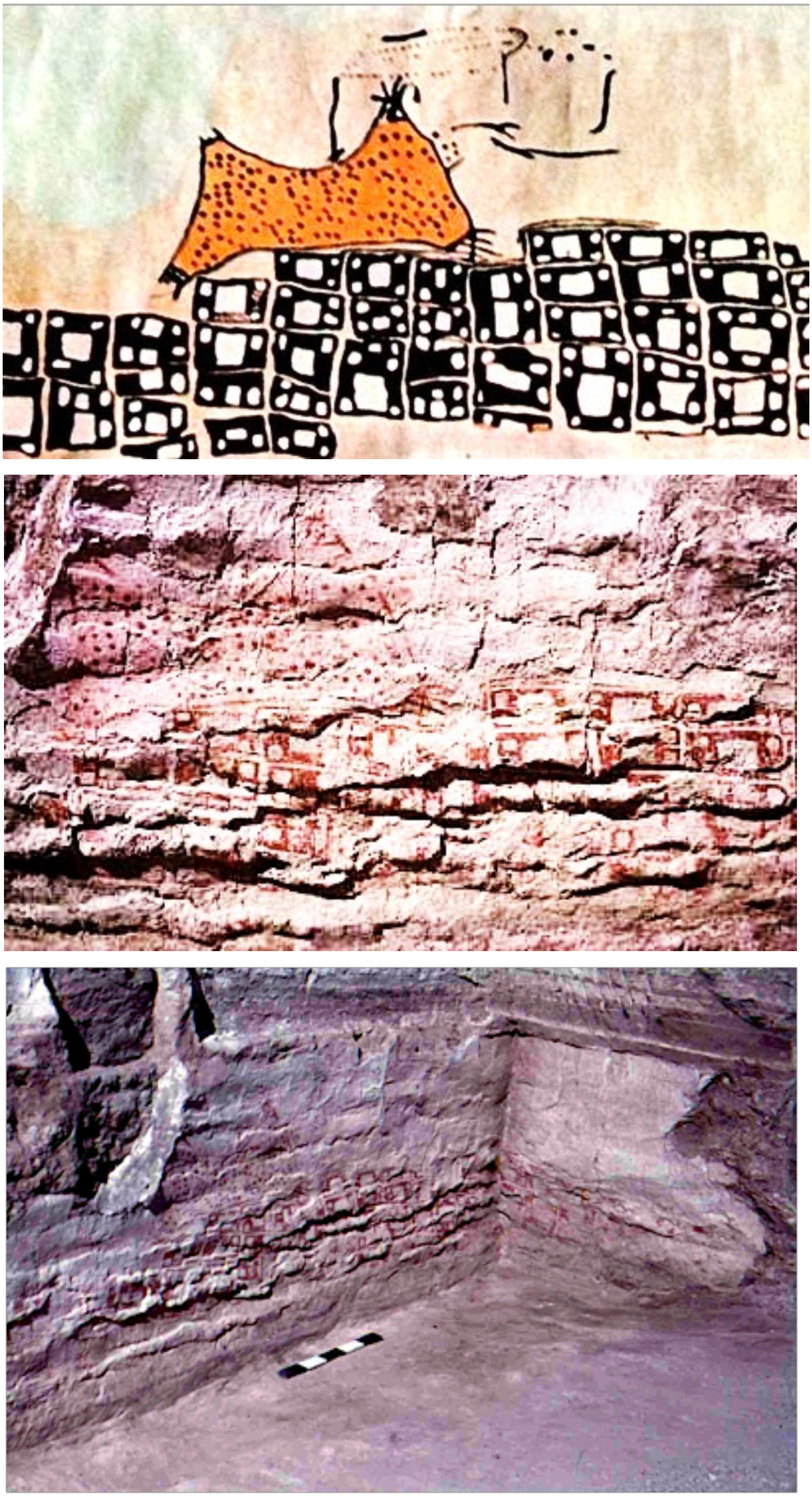


*Figure 1.6 Three views of the Volcano/City Plan mural. Top) Reconstructive drawing of Volcano/City plan with false colours. Source: Mellaart (1967). Middle) Archival photograph of the mural in situ showing the monochrome red colour scheme. Bottom) View of the full composition as it extends from one wall to the other. Source: Archival photographs by Todd in the ÇRP archive.*

This brings us to the iconic image of the ‘Volcano/City Plan’ at Çatalhöyük. The upper register of the painting has a silhouette of a figure shaped with two ‘peaks’ facing upward and two pointing downward filled with dots. Between the peaks and to the right of the upper figure are lines streaming out of the figure. In the lower register are about 80 rounded rectangular motifs repeating in two to four rows for about three meters along the base of the wall and wrapping over the adjacent east wall (Todd 1976, 45).

Despite its prominent status as a piece of prehistoric art, recent research on the ‘Volcano/City Plan’ showed that there is still value in comparing replicas with the original wall. Reproductions are often in black and white (Mellaart 1967, Pl. 59; Todd 1976, Figures 18, 19) or in orange and black from the transcription painting by Grace Huxtable during excavations (Figure 1.6). These reproductions lead to the common misrepresentation of the colour scheme as polychrome orange and black. This appears even in authoritative art historical sources such as the *World of Ancient Art* by Boardman (2006, Pl. 11). However, examination of archival reports and photography of the mural during research for the replica of the painting made on-site in 2004 (St George 2012) showed that the painting is, in fact, rendered in a monochromatic red (Figure 1.6).

### 1.3.3 Interpretive Ambiguities in Çatalhöyük Wall Paintings

Controversy surrounds the interpretation of motifs as purely abstract vs. representative or meaningful. This disagreement is present in the two interpretations of geometric motifs. Mellaart (1967) saw groups of these as related to other technologies such as patterns in textile production or plant life in agriculture. Hodder (2006) asserts that there are no representations of plant life in the paintings; others in the team who have written about the paintings also interpret these images as abstract geometric forms (Meece 2006). This scope for ambiguity is played out to its fullest extent in the recent re-interpretation of the iconic mural entitled the 'Volcano/City Plan'.

As the title given by Mellaart suggests the long-standing interpretation of the image has been that the upper register figure is that of a volcano. Between the peaks and to the right of the upper figure are lines streaming out of the figure - thought to be plumes of smoke. The double-peaked silhouette of the figure closely matches that of the Hasan Dağı volcano, in Cappadocia, ~130 km northeast of Çatalhöyük. According to Mellaart's (1967) reading, the lower register figures convey the footprint of buildings viewed from above - approximately 80 houses in four rows - or the plan of the village. While the rectangles, thought to represent 'houses' in the city plan, cannot be directly correlated with site plans of Çatalhöyük, Todd observed that "the gradual increase in the number of rows does give the impression of houses rising up toward the centre of the site, just as they do in the excavated area" (Todd 1976, 47).

The other artefact evidence Mellaart uses to support his reading of the painting is obsidian. Obsidian blades, flakes, cores, and even globes with polished surfaces sourced from Cappadocia (Figure 1.7) have been found in significant quantities at Çatalhöyük (Mellaart 1967, 209; Carter 2011). Obsidian was thought by Mellaart to be the most valuable material in terms of economic, social, and religious significance at Çatalhöyük. It had a 'volcanic, and thus chthonic origin and would have linked it to the underworld, the place of the dead, and it was… therefore imbued with magical potency' (Mellaart 1967, 177). The raw material for the obsidian trade was thought to

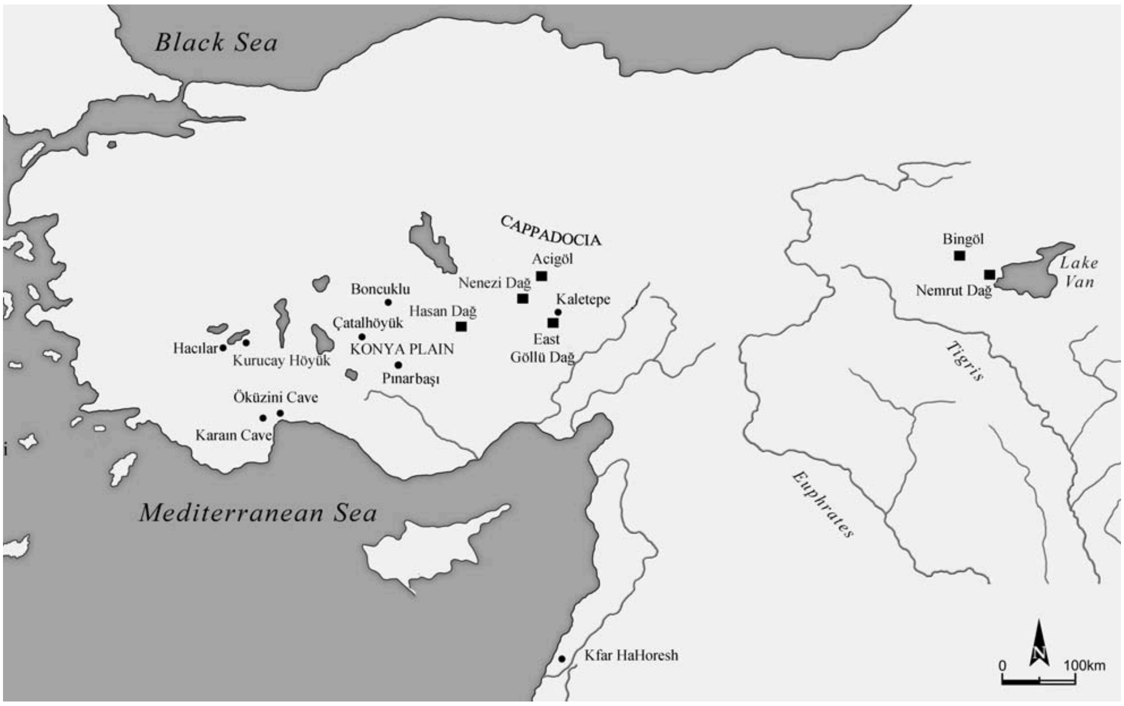



*Figure 1.7 The most important sources of Obsidian for Çatalhöyük throughout the occupation were Nenezı Dağı and East Göllü Dağı. After level VII, obsidian was sourced from northern Cappadocian sites of West Acıgöl and East Acıgöl. From Carter 2011, Fig. 1.*

be from Cappadocia, and possibly from Hasan Dağı (Mellaart 1967, 177), thus explaining the motivation of an artist to display the importance of the region with the figure of the volcano.

In an *Anatolian Studies* (AS) article, S. Meece (2006) challenges this interpretation. She makes a case for an alternate view in which the upper figure is a leopard skin, seen from above, with the corners as paws. Her argument centres on the more animal-centred culture of Çatalhöyük and the interpretation of garments on painted figures and statuary as leopard skins. She discounts Mellaart's reading in his 1967 monograph, using the additional justification that Mellaart's own initial publications in popular magazines also considered the leopard skin as a potential reading of the figure.

Geometric figures are the most prevalent kinds of figures in Çatalhöyük paintings. According to Meece, the figures along the lower register of the 'Volcano/City Plan' were just that, geometric figures, with no specific connotation, reference, or representative quality (Meece 2006, 6). Meece disputes that Neolithic peoples could conceive of their houses from above or make the leap to represent a building footprint in two dimensions. She also asserts that map-making was not within the thought processes or artistic capabilities of the time,

> '… the process of actually making a map, including reducing a space, constructing analogies between two-dimensional and three-dimensional space, and representing distant features is a significant development of abstract thinking and symbolic representation' (ibid 17).

The debate continued with Keith C. Clarke, specialist in Analytical Cartography. In 'What is the World's Oldest Map', Clarke (2013) refutes the position of Meece that maps were not made until 4000 years after Çatalhöyük and disputes the view that as 'a pre-literate, small-scale society, Neolithic Çatalhöyük would be an extremely unlikely place to expect to find the first cartographic map'. (Meece 2006, 10) Clarke argues that humans made maps as early as the Magdalenian as aids to navigating, hunting, and finding seasonal food sources. Specifically, Clarke cites the sandstone blocks from Abauntz cave in Navarra, Spain, dated to 13,660 calBP, as an example of prehistoric map making (Utrilla et al 2009, in Clarke 2013). He asserts this example may be one of many maps made of materials that were less durable in the archaeological record or those which have yet to be discovered. Clarke also asserts that the cognition necessary for map-making was most certainly present in prehistory.

Volcanologists have carried on the debate with evidence from the summit of Hasan Dağı, or Mount Hasan. (U-Th)He zircon geochronology, with samples of andesitic pumice veneer from the taller peak on the summit of Hasan Dağı, Schmitt et al

(2014) showed an eruption age of 8.97 ± 0.64 ka (or 6,960 ± 640 BCE); this puts the eruption of the taller peak within the range of carbon 14 dates for cultural strata at Çatalhöyük, including level VII when the 'Volcano/City Plan' was made. Figure 1.8, inset (c) and (d) show that the unusual double peak in the 'volcano' figure closely matches the shape of Mount Hasan, made of two peaks known as Big and Small Mount Hasan, of similar elevation, 3,250 and 3,069 m (ibid 2014, 3). Viewed from the north, the larger peak is on the right. In the painting, the larger of the two peaks on the right has the trails of smoke coming from its peak.

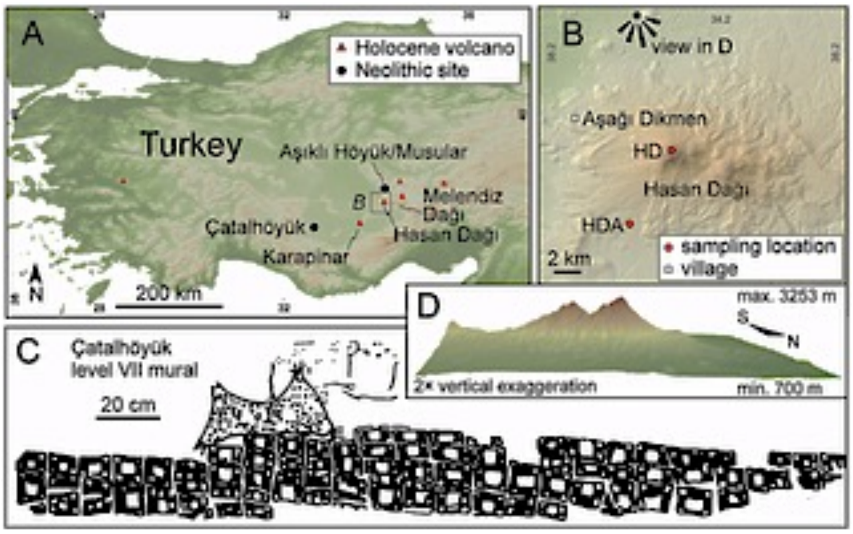



*Figure 1.8 (a) Map of Turkey with two archaeological sites of Çatalhöyük and Aşıklı Höyük with known Holocene volcanoes in Anatolia. (b) Inset showing locations of sampling from Hasan Dağı, (c) black and white replica of 'Volcano/City Plan' mural from Meece (2006, figure 2), (d) Three-dimensional rendering of Hasan Dağı twin peaks volcano viewed from the North. Source: Schmitt et al 2014, Figure 1.*

In Chapter 7, the above evidence, along with new findings from this thesis, is used to weigh in on the interpretation of the 'Volcano/City Plan' mural. The conclusions lend support to one side of the debate.

### *1.3.3.1 The Artefact-Painting Connection: Related Technologies in Paintings*

In *Çatal Hüyük: A Neolithic Town in Anatolia*, Mellaart claims textile-like paintings are the precursor for the modern-day kilim patterns. For example, he states that the form of stitched borders on paintings ‘make no sense unless a kilim provided its prototype’, (Mellaart 1967, 152). In *Goddess of Anatolia* (1989), Mellaart again asserts his hypothesis that Çatalhöyük textiles and symbolism were the beginnings of a continuous tradition leading to the designs of modern-day kilims.

However, it is probably interpreting the evidence too far to make this connection with kilim patterns. The direct evidence Mellaart had for woven textiles at Çatalhöyük came from organics preserved by a fire in areas adjacent to burials in VI.5 and VI.1. The heat from the fire was close enough to carbonise, but not destroy, textiles that served as wrappings for secondary interment of human remains. Burnham (1965) conducted a technical examination of these few fragments, no more than a few centimetres in size, in the museum in Ankara. He reports the fibres to be skilfully and finely prepared and of animal origin, most likely sheep wool, save one vegetal fibre used to sew a hem. However, he observed a plain or tabby weave, not patterned weaving such as is necessary for a modern kilim. Another weave of a ‘twined, net-like pattern’ is pictured in two other fragments (ibid plates XXXIa-b). Based on the textile evidence, Burnham therefore disputed Mellaart’s assertion that the painted patterns are prototypes of patterned weaves in modern kilims:

> ‘Admittedly a number of the patterns in the wall-paintings are reminiscent of those found on kilims, but it must be remembered that these tapestry-woven motifs, although controlled by the limitations of weaving techniques, are not a natural outcome of them. If they had existed, one would expect to find evidence in the textiles of the characteristics splits where colours change in a vertical direction, or the turning of the threads around adjacent warp ends where changes occur on the diagonal. No signs of either can be observed. The fairly evenly balanced thread counts for warp and weft also argue against the knowledge of tapestry weaving.’ (Burnham 1965, 175)

Thus, the designation of the textiles of Çatalhöyük as precursors to modern kilims and the paintings of this type as ‘kilim’ designs by Mellaart in his 1967 and 1989 sources is not supported by what we know from textile remains.

Even if the textiles are not precursors to the modern kilim, the connection remains between patterns in paintings and the evidence we have for fibre technologies. Therefore, within this thesis, the terminology used for this type of painting is not ‘kilim painting’, after Mellaart, but the more general ‘textile-like painting’.

Discoveries made during this research can further inform debates on interpretation of the art at Çatalhöyük; specifically, the incorporation of additional archaeological evidence is used to address and more satisfactorily answer the question ‘human or animal?’. From the first excavations to the most recent literature, this has emerged as one of the repeatedly contested issues in the interpretation of wall art.

Mellaart (1967) interpreted many of the designs in wall paintings as botanically themed. In contrast to Mellaart’s position, Professor Hodder, in *Çatalhöyük: The Leopard’s Tale* (2006) initially argues that ‘the art at Çatalhöyük, plentiful as it is, makes little reference to domesticated plants and animals. It shows an overriding concern with wild plants and animals. I will argue that this great revolution was produced by people whose social concerns were mainly about obtaining and distributing wild resources.’ (2006, 19). Later in the same monograph, however, Hodder contradicts himself by stating that motifs are not influenced by botanical life, ‘…we have seen in the art that there is much depiction of animals, either wild or domestic, but little depiction or symbolism associated with plants, wild and domestic. (Hodder 2006, 83)

In this thesis, contrasting interpretations of paintings are tested in detail against the evidence; this leads to a more informed evaluation of whether the paintings contain botanical themes or whether they are, as asserted by Meece (2006), just geometric designs. This process hinges upon the inclusion of comparative and contextual evidence. Hence, in Chapters 6 through 8, this study examines connections between the paintings and other artefacts including textiles, forms of personal adornment and subsistence technologies.

### *1.3.3.2 Human, Animal, or Other?*

A specific example of a recent excavation which has given rise to disagreements in the interpretation of wall paintings can be found in the controversy over splayed figure reliefs (Figure 1.9), which have been interpreted as both human and animal. The first interpretation of these figures is by Mellaart (1967, 113; Mellaart et al 1989, 46), who claims they are 'goddess' figures. However, in light of later excavations, Hodder (2006) asserts that the splayed figures are more likely connected to zoomorphic forms. This interpretation is supported by evidence of a complete stamp seal found in 2005 with an identical silhouette to the relief. Unlike the splayed figures, the stamp seal[11], had the head and ears intact. With the additional lines on the ears and muzzle on the complete stamp seal the resemblance of both to a bear is a

*Figure 1.9 Splayed figure in raised relief in level VIB, building 31. Source: AS XIV Pl. IIIc.*

reasonable reading. Hodder finds the most convincing interpretation of both to be that they depict bears. (Hodder, 2006, 201).

Whether a human or an animal is depicted has also been a salient question in relation to another, similar piece of recently excavated art: a face mask discovered in 2015. This remarkable relief of a painted mask with obsidian eyes remains, to date, a one-of-a-kind object. Der and Meskell (2015, 284) read the features of the mask as ambiguous, potentially either human or animal. In Chapter 7 on art in the Middle Levels, this issue is explored in depth, examining the evidence to the question 'human or animal?', using interpretations informed by the archaeology of Çatalhöyük.

#### *1.3.3.3 Can symbols be domesticated?*

The Neolithic period is known as a pivotal point in human history. It is interpreted as a shift from being at the mercy of the environment - necessitating travelling to food, water, or shelter - to developing skills needed to cultivate food sources and remain in a single location. Danielle Stordeur (2010) characterises art practice of this time as demonstrating 'profound mental transformations' leading to the origins of farming and herding, indicating a causal relationship between the two. Drawing on and updating Jacques Cauvin's (1977) concept of the Neolithic as a 'revolution of symbols', Stordeur extends this concept to construct the hypothesis that it was not just plants and animals that were domesticated, but symbols as well.

Looking across sites in the northern Levant from 9500 to 7000 BC, Stordeur observes a shift in the predominant symbolism from animal to human. The 'domestication' in art to which she refers is that more and more people were choosing the human form as the subject of their painting and sculpture. This was a change from the previous dominance of art content focused on the forms of powerful or symbolic animals, such as bovines, felines, birds, and vultures. In addition, Stordeur argues that artistic depictions of animals are more prevalent in the early stages of a culture's experimentation with farming, and when sites are at a more mature stage, the motifs shift to human, rather than animal. Contrary to Cauvin, she argues that symbols and technologies did not change simultaneously. Rather, she proposes that changes in symbolism followed changes in technology; Stordeur's supports her position with evidence of the domestication of agriculture begins at 9,000 BC, but the symbolism does not start to change until around 8,200 BC. Stordeur acknowledges that the material culture contemporary with early experiments in agriculture shows 'feverish spirit of invention' with early experiments in agriculture. Recent research by Bogaard et al (2017) also demonstrates the innovative trend in agricultural continues after domestication and well into the Neolithic period. Extensive evidence from sites and their art put forward by Stordeur (2010) shows that the symbolic world of the Neolithic peoples did not change at the point of initial change in agriculture; it was only later in the 'fully agricultural' stage that humans took centre stage in artistic representations. In this thesis it will be investigated when, where, or whether Stordeur's observations hold true with respect to the appearance of the human form in iconography at Çatalhöyük.

### 1.3.4 Archival Research: Approach

Prior to this study, the lack of a published catalogue with an established chronology has been a hindrance to research at Çatalhöyük. Interpretation of iconography of wall paintings at Çatalhöyük since James Mellaart's initial excavation phase in the 1960s has focused on narrow themes or subsets or single images. Some of the difficulty in examining the wall art canon in full was the limited availability of the material. Therefore, a high priority of typological analysis in this thesis was to compile a comprehensive, up-to-date resource of all wall paintings. Several scholars have already articulated the need for a comprehensive catalogue of wall paintings, and they have begun to outline its necessary features.

Layton (2007, 52) contended in reference to rock art, that determining the social role of art requires ‘reference to the material patterning in the art’. The type of patterning relevant here is that of the form of paintings as they appear through the chronology, and this suggests that a successful catalogue would need to be arranged chronologically.

In addition, there has been consensus that a successful catalogue would need to be detailed and comprehensive. P. R. S. Moorey, in his discussion of wall paintings in *Ancient Mesopotamian Materials and Industries,* asserts that a detailed catalogue with which to study archaeological wall paintings is required for robust interpretation and scholarship (Moorey 1999, 323). More recently, Garfinkel et al (2010) also articulate the need to present comprehensive evidence of artwork, rather than isolated examples, to illustrate specific arguments. This comprehensive approach to presenting evidence is applied in volume three of *Sha’ar Hagolan: Symbolic dimensions of the Yarmukian Culture: Canonization of Neolithic Art* (ibid). The authors explicitly state, ‘This is not a representative sample in which only the entire and most attractive examples are included; rather, it is a corpus which documents and presents the entire assemblage’ (Garfinkel et al 2010, 11).

The database compiled for this research, the Çatalhöyük Painting Image Database (ÇPID), documents comprehensively the canon of wall paintings and serves as a tool for future research. The ÇPID is the basis of the iconographic analysis presented in Chapter 5. A detailed examination of the content of each painting is presented in a

Master Table of results. This is followed by an analysis of iconography over time and a quantitative comparison of typological methodologies. The ÇPID facilitates the comparison of wall art with archaeological evidence to investigate open questions regarding interpretation.

With its full database of images from both the Mellaart and Hodder phases of excavation, the methodology in this thesis fulfils the comprehensive approach to data gathering called for by Moorey and Garfinkel. In addition, it uses a chronological organisation to facilitate the search for patterning discussed by Layton. To examine the iconography over time, the images will be ordered chronologically and mapped onto GIS renderings for each of the chronological levels. The steps towards creating such a catalogue and devising a project which synthesises data relative to the paintings on-site, are 1) to compile the available information, and 2) to establish a chronology. This will then facilitate stylistic analysis, as explained below.

#### *1.3.4.1 Archival Research: Sources*

One aim of this cataloguing, as mentioned above, was to improve the availability of images. This required archival research drawing on the grey literature of excavation reports, published monographs by Mellaart and Todd, and the ÇRP archives. While Mellaart reported at least 40 paintings and reliefs in the table of painting and relief types in his 1967 monograph, only a small number of them were published, and most of the published images were in black and white. Mellaart published black and white photographs of the well-preserved paintings and reliefs in preliminary excavation reports after each season for the British Institute of Archaeology in Ankara journal Anatolian Studies (*AS*) (Mellaart 1962-4, 1966). Ian Todd, then assistant to Mellaart and later co-director of the excavation, took the colour photography used in *Çatal Hüyük: A Neolithic Town in Anatolia* (1967) during 1961-5 excavations. Todd (1976) went on to publish a monograph on the Çatalhöyük excavation with his own interpretation of the site and its wall paintings, with a few images printed in black and white.

The colour photographs taken during the 1960s excavation were initially held in the archive of the BIAA and the personal records of James Mellaart. When Çatalhöyük was reopened for excavation under the permit granted to Hodder in 1993, much of the archival photography by Todd was digitised and held by the Çatalhöyük Research Project and made available to researchers on the ÇRP via the central database. The resource of the original colour photography was accessible to a few researchers directly involved in the project, including the author.

The final source of data for compiling a complete database of images was a set of three volumes, *Goddess of Anatolia (1989)* which included a few otherwise unpublished colour images from the collection of Mellaart's private photography mentioned above. The controversial main thesis in these volumes was that paintings with stripes, triangles, and concentric lozenges, resembling woven patterns, were the earliest evidence not just of textile technology, but specifically of the form of Turkish decorative textile called kilims (Mellaart et al, 1989). These volumes publicised, and aimed to validate, the trade of 'oriental' artefacts, such as by the kilim industry in Turkey, through exploiting supposed links to its famous prehistoric site, Çatalhöyük. Even more contentiously, the volumes were co-authored and published by art dealers specialising in the antiquities trade, based in Milan and London. The *Goddess of Anatolia* volumes held in the library in the BIAA were accessed during this research, so that their colour photographs could be included in the image database.

### *1.3.4.2 Stylistic Analysis*

Stylistic analysis, with 'style' defined as a quality which is shared by the group*,* yields patterns as they occur. In what Gell terms more than a 'mere taxonomy', it entails grouping paintings by content and form and examining how they changes through time, relative to other social developments. In Gellian terms, it is a '*morphology* applied to visual objects' (Gell 1998, 166). This analysis seeks to determine the overall character of a culture, something which Gell refers to as an *axis of coherence*.

Regarding what images are *of*: the term 'painting content' is being used here to refer to what is being painted, or the subject matter of each work of art. The terms 'painting content', 'subject matter' or 'type' of painting are being used interchangeably.

Stylistic analyses are applied to Çatalhöyük over the three periods at the site, which include several chronological levels within Early, Middle, and Late periods as defined by the ÇRP team. The availability of evidence of over 70 paintings made during a span of over 1,100 years lends itself to analysis of style over the period of occupation of the site, rather than of the styles of individual artisans.

## 1.4 Aim: The Archaeological History of Art

Given the cobbled-together nature of the study of 'art' in archaeological contexts highlighted by Bradley (2009), it is necessary to seek a new methodological pathway. This thesis proposes strategies for the development of a new Archaeological History of Art. This incorporates methods for making best advantage of both the available evidence and the strengths of context and materials research, towards sophisticated and robust research of paintings in prehistory- in this case, the Neolithic Çatalhöyük.

This approach will combine borrowings of a taxonomical approach from the history of art with ethnographic/anthropological approaches to cultural study.

Materials analysis of paintings in historical contexts offers highly developed tools for investigating artists' materials in the service of art historical questions, especially for Old Masters easel paintings and high profile works of contemporary art. For this aspect of research, one of the leading practitioners, scientist Nicholas Eastaugh, coined the useful term 'technical art history' (Eastaugh et al, 2002). This approach has untapped potential for engaging with paintings in prehistory to address archaeologically relevant questions.

By contrast with historical contexts in which art is studied, prehistory gives us no texts which can provide contextual insight. Fortunately, however, we do have the possibility of a rigorous study of both context and materials.

## 1.5 Research Questions

The **primary research** question is: *How can our understanding of the peoples and their culture at Neolithic Çatalhöyük be furthered through integrated analysis of artists' materials, wall paintings, and archaeology?*

In order to address this question, the following interrelated sub-questions are investigated:

*Pigments:*

1) What does the technical analysis tell us about how Neolithic peoples at Çatalhöyük used each colour?

2) How did pigment usage change over time?
3) What does pigment trade and sourcing tell us about the development over time of Neolithic peoples' relationship to their landscape?

*Paintings:*

1) What is the best method with which to analyse types of paintings at the site: with a broad or a narrow typology?
2) Can individual artisans be identified?

*Synthesis:*

1) How, when, and where do the content of painted images (typology) and artists' materials (pigments) change through time, between early, transitional, and late levels of occupation?
2) What does the paintings' practice and imagery reflect of the culture of Neolithic peoples at Çatalhöyük?
3) What is the influence of artists' materials on the technology and content of painted images at Çatalhöyük?
4) What is the relationship of wall painting practice with the production of other artefacts, e.g., obsidian, metals, beads, and textiles?
5) Was the content of the paintings influenced more by ideology or lived experience?

## 1.6 Chapter Outlines

**Chapter 2: Methodology** begins with an explanation of the rationale for procedures developed for collecting and organising information. Methods for the collection of archaeological pigment samples and the technical analysis of mineral pigments are set out. Ways of synthesising the paintings and colourant data from both excavation campaigns are then proposed.

**Chapter 3: Pigment Results** presents results from the technical analysis of archaeological samples of colourants, organised by colour. It is then explained how these technical results can inform a better understanding of pigment processing and uses.

**Chapter 4: Colour in Time and Space** provides a macroscopic look at pigments through time and space. Their temporal and spatial distribution at Çatalhöyük is examined. Archaeological and mineralogical data are used in the investigation of potential sources of cinnabar, azurite, and malachite minerals in the landscape.

**Chapter 5: Wall Painting Iconography** results presents the original and comprehensive database, The Master Table of Painting Typology and Colourants. The Çatalhöyük Painting Image Database (ÇPID), a compilation of all painted images from Neolithic Çatalhöyük, is also presented.

**Chapter 6: Synthesis Early Levels.** This and the following two chapters discuss artistic practice at Çatalhöyük by integrating the findings of previous chapters concerning the art and artists' materials for each of the three periods. The changes in painting typology through the chronological levels are discussed, then integrated with the chronological understanding of the colour palette. This chapter focuses on the Early levels.

**Chapter 7: Synthesis Middle Levels.** Results show that the Middle, or Transitional levels exhibit the highest degree of change and innovation in all aspects of art practice. This chapter examines innovation through multiple strands: first in new content of paintings, then in the expansion of the palette of colours. Evidence of colour use and painting types is addressed chronologically, using selected examples from the art and pigments of these levels.

**Chapter 8: Synthesis Late Levels.** The art practice of the Late period shows two interrelated changes. The first is a turn inward in the lives of the Neolithic peoples. The painting content emphasises human figures both singly and as groups, indicating a shift towards interest in humans, both as individuals and as part of the community. This co-occurs with a lack of expansion in the colour palette and discontinuation of pigments not local to the site.

**Chapter 9: Conclusion.** The discoveries and contributions concerning the canon of prehistoric art and the history of artists' pigments are reviewed. Future research into integrating painting content with other artefact classes at Çatalhöyük is suggested. The significant discoveries in the history of art at Çatalhöyük made during this project are reviewed.

**Appendices** include an original, up-to-date database of paintings with maps of their findspots plotted on to GIS maps of each level of the site. Also, in the appendices are results of the survey of pigments on-site at Çatalhöyük and a list of archaeological samples of pigments by colour, maps of rare pigment findspots and chronology list, results from technical analysis of archaeological pigments with multiple techniques, and reference spectra used to confirm the identification of minerals.

## 1.7 Thesis Outcomes

This project demonstrates the methodological value of both a more in-depth technical examination of colourants and a more sophisticated typological analysis. This new two-pronged approach points the way to a new perspective on art in the Anatolian Neolithic, giving new insight as to how the lived experience had a strong influence on the choice of content of wall paintings. To date, the reflection of hunting practice in the well-known ‘hunting scenes’ is well established, and these scenes are often interpreted as exemplifying Çatalhöyük culture; however, as we shall see, this type of painting only occurs for a limited time at the end of the occupation of the site, in neighbouring houses. The many other subjects for painting chosen by Neolithic peoples in the previous 1,000 years before the hunting scenes signals other aspects of lived experience were equally influential. These include agriculture, other technologies such as textile and bead-making and elements of the creative process itself such as the procurement of artists’ materials and obsidian from the landscape. The sum of the empirical evidence gathered in the thesis, including the new evidence, supports a new perspective on the thematic development of wall paintings’ content over time. It also gives rise to the re-interpretation of several key images in the canon of wall painting at Çatalhöyük, especially the iconic image of the ‘Volcano/City Plan’ mural.

# CHAPTER 2 METHODOLOGY

## 2 Introduction

This chapter presents the methodologies used in this project to investigate the prehistoric murals at Çatalhöyük, from the microscopic to the macroscopic - from grains of pigments to painted walls. It begins by covering the forensic art history analysis of artists' materials on a microscopic scale, looking at pigments and their components. Section 2.1 presents the collection of pigment samples from freshly excavated material in the on-site archive from the Çatalhöyük excavation. This is followed in Section 2.2 by an explanation of the approach to the technical examination and enumeration of the techniques used in this study. The chapter then broadens out in Sections 2.3 and 2.4 to present the methods used to examine pigment data on a macroscopic scale, with information on the chronology of pigments, findspots of pigment specimens in excavated contexts, and the investigation of pigment sourcing in the landscape. The goal of these investigations is to discover where Neolithic people prospected for colour, both on- and off- site.

Section 2.5 covers the methods for the iconographic analysis of the imagery of wall paintings. It details the archival and research methods for making the comprehensive, up-to-date record of all wall paintings with the Çatalhöyük Painting Image Database (ÇPID). The methods used for coding and analysing the ÇPID are also outlined. The section concludes by proposing strategies for analysing the connections between art and artists' materials in stacks of history houses.

## 2.1 Pigments – Microscopic Investigations

Technical analysis in this thesis aims to improve the quality of evidence and level of detail for colourants in archaeological contexts. As discussed in the last chapter, the complexity of the heterogeneous mixture of a colourant is often overlooked in materials analysis. The tendency for most pigment analyses in archaeological contexts, especially in prehistoric contexts, simply identify one component: the mineral that is the primary colouring agent was identified by Artioli (2010). However, samples have other constituents such as accessory minerals and other micro-artefacts that relate to processing or provenance. Complementary methods are often used in historical painting investigations to provide a full range of data including the elemental, molecular, and crystal structure of pigments (McGlinchey 2012). To bring this higher standard to archaeological pigments and wall paintings in prehistory, this project employs a multi-technique approach for the first time in the technical study of artists' materials at Çatalhöyük.

Through analysing the composition of the colourants from Çatalhöyük with multiple techniques, this investigation goes beyond the list of colours to develop an understanding of the complex matrix that is present in archaeological pigments, especially in bulk specimens. In addition to identifying the primary colouring minerals present in samples, the technical analysis aims to detect accessory minerals or materials which may indicate anthropogenic activity, such as processing activities, or the intentional mixing of other minerals. Through looking at different sample types such as pigment powders, crayons, and painted layers, it will become possible to observe materials that illuminate the *chaîne opératoire* in mineral pigments.

### 2.1.1 Technical Analysis Priorities

Priorities for the technical analysis are:

- Characterise the primary colourants of archaeological samples.
- Illuminate the processing and composition of the mineral matrices of blue archaeological pigments including secondary and trace minerals.
- Document the elemental and molecular spectra of iron oxide pigments for archival value and future study.

The specific objectives of the technical analysis by colour are as follows:

- Red and yellow: identify ochres by the primary, secondary, and trace elements of the chemical composition. Determine the similarity or difference of samples of these colours grouped by three chronological levels of their archaeological findspot context. Screen for trace amounts of elements and compounds that are not associated with the primary colouring mineral with XRF and FT-IR.
- Blue: identify pigments (identify secondary minerals and the primary, secondary, and trace elements of the chemical composition).

Previous study characterised the black painting materials and white wall plaster (Çamurcuoğlu 2015, 131, 149); therefore, these were excluded from this study. Colours investigated in this study are red, yellow, blue, and green; these colours had primary colourants identified in prior study, but secondary and trace components of samples and the differences and similarities within each colour group had yet to be analysed in detail.

Technical analysis in this study does not aim to connect colourants with provenance. To match the composition of archaeological materials to a specific geological source in the landscape, samples from known sources in the landscape are required. For a project like this, in order to sample off site, away from the excavation, specific and difficult to obtain permits are required from the Turkish Cultural Ministry. The time and resources to collect samples from around Anatolia were prohibitive, supplanting vital aspects of the study. Thus, establishing geological provenance was not attempted with the technical analysis. However, in the macroscopic investigations of colourants, the examination of potential sources of cinnabar, azurite, and malachite with specific mineralogical sites in Anatolia is done by comparing geological and archaeological data.

### 2.1.2 Analytical Strategy

Five complementary techniques were used in the technical analysis: optical and polarised light microscopy (OM/PLM); scanning electron microscopy coupled with energy dispersive X-ray spectroscopy (SEM-EDS); X-ray fluorescence (XRF); X-ray diffraction (XRD), and Fourier transform infrared spectroscopy (FT-IR). Instruments were used at the Research Laboratory for Archaeology and History of Art (RLAHA), Art Access & Research (AA&R), and Cranfield University. See Table 2.1 for details of techniques as applied to specific samples.

The most widely utilised technique for the technical study of paintings and pigments is optical and polarised light microscopy (OM/PLM) (Eastaugh et al 2004a). OM/PLM is used here as an initial step in examination and as a means of characterisation. The increased magnification facilitates visual inspection of painted surfaces or individual grains of pigments; under microscopy we can observe the colour and morphology of particles at up to 500x. Polarised light techniques, adapted from mineralogy, also aid in the identification of inorganic pigments. (See Appendix III for more information.) XRD and FT-IR techniques were applied to the pigments of

*Table 2.1 Instrumental techniques applied to archaeological mineral pigment samples from Çatalhöyük.*

| **Technique and Abbreviation** | **Sample Colour(s)** | **Number of Samples** | **Units** | **Sample Type: Raw Pigment, Powder, Cake, Painted Surface (PTD), Bone** | **Context of Samples** |
|---|---|---|---|---|---|
| **Micro X-ray Fluorescence (μ-XRF)** | All colours: red, yellow, green, blue | 58 | See Table 2.2 | All sample types (incl. 1 pigmented plaster) | See Table 2.2 For all units and correlating sample types and contexts. |
| **Fourier Transform Infrared Spectroscopy (FT-IR)** | All colours: red, yellow, green, blue | 58 | See Table 2.2 | All sample types (incl. 1 pigmented plaster) | See Table 2.2 For all units and correlating sample types and contexts. |
| **Optical and Polarised Light Microscopy (OM/PLM)** | Blue | 4 | 16308, 19447, 7597,7575 | Powder | All found as pulverised powders in burial environments. |
| **Scanning Electron Microscopy EDS (SEM-EDS)** | Green, Blue, Red | 15 | 4225, 12867s4, 16308, 7575, 6250, 17339, 12867, 13365, 14009, 17048, 18536, 12487, 12456, 11862s6, 11862s9 | Raw pigment, Powder, Raw pigment, Bone | See Table 2.2 For all units and correlating sample types and contexts. |
| **X-ray Fluorescence (XRF at RLAHA)** | Blue, Red | 2 | 16308, 19700 | Powder, PTD | Burial, Wall |
| **X-ray Diffraction (XRD)** | Blue | 5 | 16308, 19447, 7597, 7575, 19447 | Powder | All found as pulverised powders in burial |
| **Coloured Archaeological Bone Samples** | | | | | |
| **Fourier Transform Infrared Spectroscopy (FT-IR)** | | 7 | 18552s3, 18545s10, 18508s7-10, 12450 | Animal bone | Burial contexts |
| **Native Copper Sample** | | | | | |
| **μ-XRF, FTIR, SEM-EDS** | Green | 1 | 12867s4 | Native copper | Domestic |

Çatalhöyük for the first time; XRF was previously used for a small number of samples,[12] but was used to analyse all samples in this study.

OM is used to inspect the sample matrix and target particles of interest for further testing. Particles are removed under magnification for SEM-EDS and FT-IR. SEM-EDS is used here to examine particle morphology at increased magnifications and followed by EDS analysis to provide more detailed information concerning the elements present in a pigment sample. This facilitates the identification and characterisation of micro-artefacts on the surface of pigment rocks, which may be related to their processing.

*Figure 2.10 Sample preparation for XRD at Cranfield University*

XRF data shows the elemental composition of samples for a range of elements. XRF is used here to identify the elemental composition of samples and detect secondary

[12] X-ray fluorescence was used in four paintings analysed by Zararsiz et al (2008) and a few painted artefacts by the ÇRP team on-site by Carter (ÇRP Archive Report 2009) and Haddow (ÇRP Archive Report 2016), but not utilised on a large scale for pigments.

and trace elements. This study aims to find similarities and differences between elemental data within the broad class of pigment colour groups, for instance the red and yellow iron oxides, and the blue and green copper carbonates. Samples are grouped by type such as rock, cake, powder, or painted surface. Distinctions are made in the results of the sample chemistry between major, minor, and trace elements.

FT-IR shows the unique combination of molecular compounds. FT-IR complements the chemical data from XRF by yielding molecular information to identify anionic groups in the minerals, such as carbonates and sulphates.

XRD was only used for the blue pigments (Figure 2.1) to identify primary and accessory minerals in the bulk of the powders.

All pigment samples were analysed with FT-IR and XRF (Appendix II) for sample characterisation.  In addition to materials identification, documenting the samples was a priority. At the time of this project, exporting archaeological materials from Turkey was growing increasingly difficult. Therefore, obtaining spectra on all the extant pigment samples to document their composition for archival value and future study appeared vital. The other techniques were not applied to every sample, but with selected samples to answer specific research questions.

### *2.1.2.2 Qualitative Data*

Most archaeological pigment samples are likely to have some degree of contamination, as previously discussed. To best understand the matrix of the sample, rather than just the primary pigment, analysis by FT-IR and XRF therefore needed to focus on the bulk, rather than on discrete particles. Because of this difficulty, it is acknowledged that the resulting data are qualitative to a degree. Shugar and Mass (2012, 33) outline the three choices available to the challenges of quantifying data. One, accept the limitations of qualitative data. Two, accept and report the high degree of error with results. Or three, make reference materials that match the heterogeneity of the archaeological samples.

The first two options, the limitations of the data, are accepted, acknowledged, and reported here. The third option was put into practice by comparing archaeological colours to mineral specimens in addition to the standard commercially available powders from Kremer Pigmente.

### *2.1.3 Instrument Specifications*

*OM/PLM*

*Particles were examined with optical microscopy (OM) and polarised light microscopy (PLM) up to 500x magnification with binocular microscopy with the Leica DM 2500P microscope at RLAHA.*

*XRF*

Art Access and Research (AA&R) *a Bruker ARTAX* $\mu$-X-ray fluorescence was used for all samples. It is a portable instrument with an open system for uneven objects, such as the samples being analysed here. The microspot size of primary X-radiation is <100 $\mu$m using a polycapillary lens. This lens type increases the fluorescence intensity by a factor of over 1000 compared with a pinhole collimator. Analysis capability ranges from elements Na (11) to U (92) with spatial resolution down to 70 $\mu$m. The excitation source is an X-ray tube with a Mo target. The detector type is a Peltier cooled silicon drift detector. *Samples were run for 300 seconds each at*

*50keV. Dr Nicholas Eastaugh generously provided access to his laboratory and technical expertise; Francis Eastaugh helpfully assisted with instrument operation for XRF and FT-IR.*

*At RLAHA, the Bruker TRACer III-V handheld unit was used for the XRF bulk analysis of selected samples. This unit has an X-ray tube as an excitation source, with a Rhodium (Rh) target, and a high-resolution, Peltier cooled, silicon PIN diode detector. Settings for non-vacuum were used, with filters appropriate to the elements to be detected. For screening higher Z elements, such as Hg or As, the red filter (0.001" Cu, 0.001' Ti, 0.012' Al) was used. Dr Yiu-Kang Hsu, Dr Ray Liu, and Brian Gilmore graciously assisted with operating the instrument.*

*FT-IR*

At AA&R laboratory, the FT-IR spectrometer is a Bruker vertex 70, equipped with a mid-infrared source and KVR beam potassium (KBr) beamsplitter, a HENE laser and a deuterated triglycine sulphate detector, with scan capabilities from 600-4000cm$^{-1.}$

At RLAHA, FT-IR is an Agilent Technologies Cary 600 Series spectrometer. The spectrometer is equipped with Pike GladiATR accessory. The attenuated total reflection (ATR) element is diamond. ATR allows samples to be analysed directly, in a solid state without further preparation. Infrared spectra were collected between 4000 and 600cm$^{-1}$ with a default setting of 64 scans for background runs and samples; resolution was 4cm$^{-1}$. Background scans were run prior to each sample measurement. Selected samples had 128 or 256 sample scans run to clarify results. Technical assistance was generously provided by Dr Christophe Snoeck.

*SEM-EDS*

SEM is used to analyse a few, select samples to image at high magnifications and gain elemental data for individual grains. *A JEOL JSM-5910* scanning electron microscope (SEM) for higher magnification imaging and EDS is used for elemental analysis, with INCA software for processing data. Qualitative data is gained from carbon coated stub mounts. The beam current ranged from 10-20keV. Technical expertise and assistance with operation was generously provided by Dr Chris Doherty at RLAHA.

*XRD*

XRD was used to analyse only the green and blue pigments. The instrument used was a Panalytical X'pert Pro diffractometer with a Medipix2 detector and Cu radiation. Data was collected over the region 10 to 20 degrees 2-theta with a step size of 0.013 degrees and a time per step of 200 seconds. *Detection limits for minerals were greater than 1% by weight. Dr Keith Rogers at Cranfield University generously provided instrument access, operation, and spectral interpretation.*

See Appendix II for specific information on *about how each technique works and sample preparation.*

## 2.1.4 References for the Characterisation of Colourants

Two sources were referenced for comparative spectra from all techniques: 1) The *Artists' Pigments* series (vol. 1 Roy 1986; vol. 2 Feller 1993; vol. 3 Fitzhugh 1997; vol. 4 Berrie 2004) and 2) materials database for the Forbes Collection on the Conservation and Art Materials Encyclopaedia Online (CAMEO www.cameo.mfa.org).

The primary resource for interpretation of OM/PLM is the reference volume *The Pigment Compendium* (Eastaugh et al 2004a). Additional comparative images are used from the previously mentioned *Artists' Pigments* series.

For XRF, additional confirmation was provided from emission line reference charts for K-level and L-level emission lines in keV for each element (http://www.med.harvard.edu/jpnm/physics/refs/xrayemis.html).

For FT-IR, the Infrared and Raman Users Group (IRUG) database was used for interpretation and comparison of spectra (www.irug.org).

For XRD, the database used at Cranfield University for the comparison of data was the International Centre for Diffraction Data's PDF-2.

### *2.1.4 Results regarding cinnabar and the use of spectroscopy to detect Mercury*

One challenge for characterisation is that cinnabar has wide variations in colour and refractive indices. As will be discussed in reference pigments in Chapter 3, cinnabar usually has a highly refractive, quartz-like brilliance and bright red colour; this is the type of cinnabar that was historically sought after by artisans as a colourant. However, as the mineralogical samples seen in Figure 2.2 from OUMNH demonstrate, it also can mimic a red ochre in appearance with a red or red-orange colour that is matte and dull. Both the brilliant or dull cinnabar types were interesting to a prehistoric artisan, and therefore they have the potential to be present in archaeological samples. To detect cinnabar accurately in smaller amounts, it is not only desirable, but necessary, to confirm the characterisation with chemical data, given how misleading a visual identification can be.

The other difficulty in characterisation is that cinnabar is a challenge to detect in bulk powders or paint layers in archaeological samples if it is present as a secondary or trace component. Part of the difficulty in these cases, when relying solely upon visual examinations such as optical microscopy, is that it is like looking for a needle in a haystack; if the cinnabar is in a mixture with red ochre, it is like looking for a hay-coloured needle in a haystack. Even if one does find the needle, additional difficulties arise in characterising with OM/PLM, as the particle morphology and colour of iron oxide can be similar to those of cinnabar.

Of the techniques for this study, the most effective method to detect cinnabar, either in bulk or smaller, trace amounts, is XRF. Cinnabar can be detected with FT-IR; however, the identifying peaks are below the fingerprint in the range of 400-200cm$^{-1}$, outside the detection limits of all but specialist instruments. FT-IR instruments at both laboratories available for this study, RLAHA and AA&R, did not detect in the region below 400cm$^{-1}$. SEM-EDS would confirm the identity of a cinnabar particle, if located; however, if the particles are not present in large amounts, we return to the needle in a haystack issue. In order to detect cinnabar in mixtures, results from other techniques are required.

The solution to this problem of detecting cinnabar in the Çatalhöyük samples was to use the highly sensitive micro-XRF at AA&R as a screening method. If peaks of Hg were detected, then additional investigations could be made into that particular haystack. Of all archaeological samples, it was standard to take at least three runs. This was done with multiple runs of different POI (points of interest). In those in which low peaks of mercury were detected, additional runs were made and further investigated with SEM-EDS.

### *2.1.4.1 Operation Conditions for XRF detection of Mercury*

*Tracer III SD Operation Conditions for XRF Analysis of materials with Heavy Metal Poisons*

The following protocol was used to screen for mercury with the micro-XRF instrument at AA&R laboratory.

Parameters for the Measurement of "Poisons" using the Tracer III SD (higher Z elements Hg, Pb, Br, Se, Cd, Br, As:

- 0.001" Cu, .001" Ti, .012 Al (Red Filter)
- 40kV
- Highest current setting available
- No vacuum

These settings allow all the X-rays from 14keV to 40keV to reach the sample thus efficiently exciting the elements Hg, Pb, Se, Cd, Br, As. There is little sensitivity to elements below Fe with these settings.

## 2.1.3 Survey of Pigment Archive

The pigment archive at Çatalhöyük consists of rocks, pigment powders, cakes, and crayons gathered from the East Mound during present excavation seasons since 1993, with most of the samples collected since 2005. The survey of 164 samples from this archive formed the initial pigment database for this study.

For each of the 164 specimens in the archive, the following fields are recorded:

- Colour
- Location including unit, building, and level
- Specimen size
- Evidence noted of processing, burning, shaping, plaster on surface.

The database containing this information is Appendix III. Notable samples were also documented with digital photography and drawings by the author where appropriate.

The information from the archive was gathered with a view to understanding the *chaîne opératoire* of pigments. The archive contains specimens from a range of stages in processing, from raw minerals, to powders, to those materials that had been subjected to grinding and formed into cakes or crayons.

The samples were excavated from a range of contexts including burials, painted walls, and floors or middens of domestic contexts. Pigments from each type of findspot context are included in the survey and database. Findspot contexts for pigments are, as expected, on paintings of architectural wall plasters. Pigments are also found in burial contexts, and house interior and exterior spaces. Burials contain pigments in a few forms. Some are powdered, then scattered over the remains, or deposited as a coherent cake. Other pigments in burials are found applied to human or animal bone. House interior and exterior spaces have remains of raw rocks and minerals used as colourants.

#### *2.1.3.1 Sampling Rationale*

Of the 164 surveyed samples in the on-site pigment archive at Çatalhöyük, 65 archaeological samples were selected and exported to RLAHA for technical analysis. This study prioritised bulk samples from the archive, especially those found within domestic contexts and burials, rather than sampling *in situ* painted layers. Pigments in a matrix of bulk minerals were chosen to provide better insight into raw materials. Goals were to 1) identify the compositional profile to compare like colours to analyse intragroup similarities and differences (i.e. groups of iron oxides or copper carbonates), 2) compare secondary and trace components of samples for insights into processing or provenance from samples that have not been mixed or influenced from the wall plaster materials.[13] Samples were taken of powders, cakes (defined as minerals ground and in a coherent mass), and rocks (minerals that are not yet ground to a powder). In cases where the form was essential to the research value, such as the cakes and crayons, these remained in the archive, but were subsampled. Painted plaster layers were the focus of the previous technical analysis of pigments by Çamurcuoğlu (2015); therefore, this analysis did not target painted surfaces. However, in the South Area, building 80 was of interest as the first full wall design to be discovered in the latest excavation phase, since 1993; samples of painted plasters were taken where available and when not essential to the design of a complete painting.

Table 2.2 shows a synthesis of samples from this project with those of previous analyses. Each of the 65 samples exported to RLAHA are numbered in the far-left column; the background colour of each row is colour coded to match the pigment sample. For samples listed in the literature review of prior studies, each sample is presented in a row with a grey background with one coloured text for the sample unit on the right to indicate sample colour. Prior studies included in the database are from unpublished and published sources of prior work by the conservation team (French 1968, Myers 1998, Çamurcuoğlu 2012, 2013, 2015).

### *2.1.3.1 Investigation of Raw Materials – the Effect of Context*

The context of the sample is vital to interpret the results from technical analysis. Pigment samples from painted walls are less suitable for the line of questioning about

[13] Samples were also selected on the basis of their viability as a colourant. The archive samples that were excluded from sampling and export were discounted because they were archaeological materials that were not suitable as a colourant, such as pumice, clay, bone, colluvium, or soil.

the raw materials of colourants. In cross-sectional analysis of painted surfaces, valuable information about technique can be obtained by examining the layer structure and particles within each layer. However, with ochres on painted surfaces it is difficult, if not impossible, to differentiate the accessory minerals associated with the ochre. By the time a mineral colourant is on the wall it goes through processes that can contribute additional particles into the sample. It is ground with sharp tools or on a stone palette. The substrates of the walls at Çatalhöyük are of an easily disturbed soft mudplaster that can be easily transferred to the paint layer upon application. With no certainty can particles on a painted layer be attributed to the parent mineral of the colourant rather than to tools, a workshop environment, particles from the wall substrate, or any number of things the colour came in contact with prior to its application to the wall surface. The same issue of a contamination of sorts exist for pigments that were powders scattered into burials. It is difficult to strongly associate particles of processed colourant with accessory minerals.

The sample type that is well suited to showing the matrix of iron oxides with a reliable connection to accessory minerals is in raw pigment rocks. These were deposited in houses and courtyards, often when the pieces were ground too small for handling.

#### *2.1.3.2 Sample Interpretation*

It is the interpretation of the analysis that determines if secondary or trace minerals originated from the natural, geological environment, or artefacts of anthropogenic activity such as particles from grinding tools or contaminants picked up in a workshop. Identifying the secondary and trace components of a sample, then cross-

*Table 2.2 Colour-coded list of archaeological pigment samples. Samples for this study are in coloured rows; colours of the cells correspond to the colour category: red cells for red minerals, yellow for yellow, etc. Previously analysed samples are in grey rows with coloured text indicate the sample colour. Rows are in chronological order, grouped into Early, Middle, Middle and Late levels in the North and Late levels in the South.*

| RLAHA Sample No. | ÇRP Unit No. | ÇRP Sample No. | ÇRP Flot No. | Area | Level | Building; In History House sequence*; Building sampled in prior study+ | Other location specs | Sample Types: Rock (RCK); Powder (PWD); Cake (CK); Painted Plaster (PTD); Bone |
|---|---|---|---|---|---|---|---|---|
| **South Area Early Levels** | | | | | | | | |
| | | | | | South G Mellaart Pre-XII | | space 181 | |
| | 5294 | | | South | South G Mellaart Pre-XII | none | space 181 | |
| 1 | 4671 | 2 | 2733 | South | South J Mellaart X | B. 18*+ | space 172 | PWD, RCK |
| | | | | | South J Mellaart X | B. 18 | not specified | |
| | | | | | South J Mellaart X | B. 23 | | |
| 2 | 5153 | 5 | | South | South K Mellaart IX | B. 17* | B.23 Space 170 (E.X.1) | PWD+PTD |
| | 5153 | 5 & 8 | | South | South K Mellaart IX | B. 17* | B.23 Space 170 | |
| 3 | 4947 | 5 | | South | South K Mellaart IX | B. 17* | space 182 | RCK |
| 4 | 5228 | 4 | | South | South K Mellaart IX | B. 17* | space 182 | PWD |
| 5 | 5228 | 3 | 3287 | South | South K Mellaart IX | B. 17* | space 182 | PWD, RCK |
| 6 | 5214 | 2 | | South | South K Mellaart IX | B. 17* | space 182 | PWD, RCK |
| 7 | 5349 | 5 | | South | South K Mellaart IX | B. 17*+ | space 170+ | RCK |
| 8 | 5349 | 10 | | South | South K Mellaart IX | B. 17*+ | space 170+ | RCK |
| | | | | | South K Mellaart IX | B. 2 | | |
| | | | | | South K Mellaart IX | B 17 | space 170 | |
| | 3620 | | | South | South K Mellaart IX | B. 2 | space 117 | |
| 9 | 4464 | 13 | | South | South L Mellaart VIII | B. 6* | space 163 | CK |
| 10 | 4464 | 14 | | South | South L Mellaart VIII | B. 6* | space 163 | RCK |
| 11 | 4620 | 1 | | South | South L Mellaart VIII | B. 6 * | space 163 | PWD, RCK |
| 12 | 4407 | 1 | | South | South L Mellaart VIII | B. 6 * | space 163 | PWD, RCK |
| | | | | | South L Mellaart VIII | B. 43 | space 235 | |
| | 4406 | | | South | South L Mellaart VIII | B. 6 | space 163 | |

| RLAHA Sample No. | ÇRP Unit No. | ÇRP Sample No. | ÇRP Flot No. | Area | Level | Building; In History House sequence*; Building sampled in prior study+ | Other location specs | Sample Types: Rock (RCK); Powder (PWD); Cake (CK); Painted Plaster (PTD); Bone |
|---|---|---|---|---|---|---|---|---|
| **South Area Transition/Mid-Levels** | | | | | | | | |
| 13 | 1525 | 2 | | South | South M Mellaart VII | B. 40+ (E.VII.12, E.VII.2) | space 107 | CK |
| 14 | 4225 | 8 | | South | South M Mellaart VII | B. 8*+ (E. VII.1) | space 165, 168+ | PWD |
| | | | | | South M Mellaart VII | B.8 | space 168 | |
| | 4215 | | | South | South M E.VII.6 | none | space 168 | |
| | 4221 | | | South | South M Mellaart VII | B.8 | space 165 | |
| | 3776 | | | South | South M Mellaart VII | B 40 | space 108 | |
| | 4221 | | | South | South M Mellaart VII | B. 8 | space 165 | |
| 15 | 19808 | 3 | | South | South N Mellaart VIB | B. 89 | space 379 | RCK |
| 16 | 18544 | 4 | | South | South O Mellaart VIA | B. 80 | space 135 | RCK |
| 17 | 19223 | 8 | | South | South O Mellaart VIA | B. 97 (E.VIB.28) | space 365 | PWD |
| 18 | 18488 | 3 | 9035 | South | South O Mellaart VIA | B. 76 (F.VIB.70) | space 137 | PWD |
| 19 | 19700 | 5 | | South | South O Mellaart VIA | B. 96 | sp. 370 | PWD, PTD |
| 20 | 19700 | 6 | | South | South O Mellaart VIA | B. 96 | sp. 370 | PTD |
| 21 | 19700 | 7 | | South | South O Mellaart VIA | B. 96 | sp. 370 | PTD |
| 22 | 18918 | 5 | | South | South O Mellaart VIA | B. 80 | space 135 | PWD |
| 23 | 18918 | 6 | | South | South O Mellaart VIA | B. 80 | space 135 | PWD |
| 24 | 18918 | 7 | | South | South O Mellaart VIA | B. 80 | space 135 | PWD |
| 25 | 18918 | 8 | | South | South O Mellaart VIA | B. 80 | space 135 | PWD |
| 26 | 18918 | 9 | | South | South O Mellaart VIA | B. 80 | space 135 | PWD |
| 27 | 18918 | 10 | | South | South O Mellaart VIA | B. 80 | space 135 | PWD, PTD |

| RLAHA Sample No. | ÇRP Unit No. | ÇRP Sample No. | ÇRP Flot No. | Area | Level | Building; In History House sequence*; Building sampled in prior study+ | Other location specs | Sample Types: Rock (RCK); Powder (PWD); Cake (CK); Painted Plaster (PTD); Bone |
|---|---|---|---|---|---|---|---|---|
| **South Area Transition/Mid-Levels** | | | | | | | | |
| 28 | 18918 | 11 | | South | South O Mellaart VIA | B. 80 | space 135 | PTD |
| 29 | 18918 | 12 | | South | South O Mellaart VIA | B. 80 | space 135 | PTD |
| 30 | 18918 | 13 | | South | South O Mellaart VIA | B. 80 | space 135 | PTD |
| 31 | 18918 | 14 | | South | South O Mellaart VIA | B. 80 | space 135 | PTD |
| 32 | 18508 | 7 | | South | South O Mellaart VIA | B. 79+ | space 134 | PWD |
| 33 | 18508 | 8 | | South | South O Mellaart VIA | B. 79+ | space 134 | PWD, BONE |
| 34 | 18552 | 3 | | South | South O Mellaart VIA | B. 80 | space 135 | PWD, BONE |
| 35 | 18508 | 10 | | South | South O Mellaart VIA | B. 79+ | space 134 | PWD, BONE |
| 36 | 18508 | 9 | | South | South O Mellaart VIA | B. 79+ | space 134 | PWD, BONE |
| 37 | 18545 | 10 | | South | South O Mellaart VIA | B. 79+ | space 134 | PWD |
| | 18418 | | | South | South O Mellaart VIA | B. 76 (F.VIB.70) | space 137 | |
| | | | | | South O Mellaart VIA | B. 79 | space 134 | |
| | | | | South | Mellaart VI (E.VI.20) | | Mellaart | |
| 38 | 12540 | 3 | | South | South P Mellaart V | none | Space 132 | PWD, BONE |
| 39 | 18536 | 3 | | South | South P Mellaart V | none | space 344 | RCK |
| 40 | 17048 | 3 | | South | South P Mellaart V | none* | space 329* | PWD |
| 41 | 17339 | 12 | | South | South P Mellaart V | none* | space 333* | PWD |
| | | | | | South P Mellaart V | B. 75 | space 332 | |
| 42 | 13365 | 4 | | South | South Q | B. 65*+ | space 298 | PWD, RCK |
| 43 | 14009 | 1 | | South | South Q | B. 65*+ | space 297 | PWD |
| 44 | 14009 | 7 | | South | South Q | B. 65*+ | space 297 | PWD |

| RLAHA Sample No. | ÇRP Unit No. | ÇRP Sample No. | ÇRP Flot No. | Area | Level | Building; In History House sequence*; Building sampled in prior study+ | Other location specs | Sample Types: Rock (RCK); Powder (PWD); Cake (CK); Painted Plaster (PTD); Bone |
|---|---|---|---|---|---|---|---|---|
| **North Area Transition/Late Levels** | | | | | | | | |
| 45 | 1993 | 8 | | North | North G | B. 1*+ | space 71 | RCK |
| 46 | 17532 | 5 | | North | unstratified | none | space 1003 | CK |
| 47 | 7597 | 4 | | North | unstratified | none | space 1003 | PWD |
| 48 | 7575 | 7 | | North | unstratified | none | space 1003 | PWD |
| 49 | 20450 | 7 | | North | unstratified | East of B. 1*+ | space 77 | PWD |
| 50 | 19447 | 14 | | North | unstratified | East of B. 1*+ | space 77 | PWD |
| 51 | 16308 | 4 | | North | North Scrape G | B. 102 | space 17 | PWD, CK |
| 52 | 17485 | 3 | | North | North G | B. 49+ | space 100+ | PWD |
| 53 | 19457 | 1 | | North | unstratified | B. 108 | space 84 | RCK |
| 54 | 6250 | 8 | | North | North G | none | space 88 | RCK |
| 55 | 3290 | 5 | | North | North F Mellaart VII-VI | B. 5 * | space 154 | PWD, RCK |
| | | | | | North G? Mellaart VI-V | B. 1 | space 188 | |
| | | | | | BACH G Mellaart VII-VI | B. 3 | space 86 | |
| | | | | | BACH G Mellaart VII-VI | B. 3 | space 86 | |
| | 8184 | | | North | North? G | B. 3 | space 86 | |
| | 3522 | | | North | BACH? G | B. 3 | space 86 | |
| | 2228 | | | North | North? G | B. 3 | space 86 | |
| | 3865 | | | North | North? F | B. 5 | space 154 | |
| | 7913 | | | North | North G | B. 49 | space 100 | |
| | 16694 | | | North | North G | B. 49 | space 100 | |
| | 13669 | | | North | North G | B. 49 | space 100 | |
| | 15932 | | | North | Scrape G | none | space 66 | |
| | | | | | Scrape G | B. 23 | space 17 | |
| | | | | | North G | B. 59 | space 311 | |
| | 14684 | | | | North G | B. 59 | space 311 | |
| | | | | | North G | B. 77 | | |
| | 16308 | | | | North Scrap G | B. 102 | space 17 | |
| | | | | North | North H Mellaart VI-V | B. 60 | space 278 | |
| | 13453 | 3 | | South | North H | B.60 | space 278 | |
| | | | | | North H Mellaart VI-V | B. 76 | | |
| | | | | | North H and I Mellaart IV-III | B. 55 | space 256, space 268 | |
| | | | | | North J Mellaart IV-III | B. 47 | | |
| | | | | North | unstratified | | space 1006 | |

| RLAHA Sample No. | ÇRP Unit No. | ÇRP Sample No. | ÇRP Flot No. | Area | Level | Building; In History House sequence*; Building sampled in prior study+ | Other location specs | Sample Types: Rock (RCK); Powder (PWD); Cake (CK); Painted Plaster (PTD); Bone |
|---|---|---|---|---|---|---|---|---|
| **South Area Late Levels** | | | | | | | | |
| 56 | 12456 | 25 | | IST | Mellaart IV-V | | | CK |
| 57 | 11862 | 6 | | IST | Mellaart IV-V | B. 63 | near wall F. 1964 | *Pigmented plaster |
| 58 | 11862 | 9 | | IST | Mellaart IV-V | B. 63 | near wall F. 1964 | *Pigmented plaster |
| 59 | 12867 | 7 | 6849 | IST | Mellaart IV-V | | space 294 | RCK, PWD |
| 60 | 12867 | 3 | | South | South R | B. 56*+ | space 121 | PWD |
| 61 | 12867 | 4 | | South | South R | B. 56*+ | space 121 | PWD-Cu |
| | | | | | South R Mellaart V-III | B. 56 | space 121 | |
| | | | | | South R | B. 44 | | |
| | 5383 | | | South | South R | B. 42 | space 202 | |
| | 11330 | | | South | South R Mellaart IV-V | B. 42 | space 202 | |
| | 2606 | | | South | South T | none | space 119 | |
| | 10501 | | | South | unassigned | none | space 1001 | |
| | 10501 | | | South | unassigned | none | space 1001 | |
| 62 | 15839 | 12 | | TP | TP N | none | space 372 | PWD |
| 63 | 4194 | 1 | | South | unstratified | none | space 164; space 1004 | PWD |
| 64 | 5575 | 3 | | South | unstratified | none | space 1007 | PWD |
| 65 | 19306 | 1 | | South | unassigned | none | erosion layer | PWD |

referencing them against minerals which co-occur in their formation environment aids in interpretation. If a secondary mineral identified in an archaeological sample is one known to grow in the geological environment with the primary minerals, then it is possible, but much less likely the secondary mineral is natural in source, rather than added by an artisan.

In the analysis of a paint layer, the potential reasons for secondary and trace components increase. Trace particles can be acquired in the handling of the pigment in a workshop area with brushes, applicator or cutting tools, or grindstones; these could be used in prior activities such as food preparation or perhaps in previous painting projects, with other colours. Also, when the paint layer is applied to a substrate, the soft mudplaster of the house walls can contribute trace particles into a paint layer.

All of this is to make the point that identifying the components of a sample is one step in analysis; understanding the reason some components are present in the sample *matrix*, is another. Evidence often points to more or less likely sources for components of the matrix to be present- either from geological origins or anthropogenic activity. It is not always possible to determine, beyond doubt, the reason secondary and trace components are in a sample; however, one narrows down the potential sources with awareness of the formation of the raw materials and stages of processing.

### 2.1.4 Raw Materials: Mineral Reference Samples

For the first time in the study of pigments at Çatalhöyük, the current analysis focuses on developing a detailed understanding of when and where each colourant is used with an integration of both Mellaart and Hodder campaigns of excavation. This project is set apart by two aspects 1) a strong emphasis in the early stages and raw materials in the painting process, and 2) focusing on not only the primary colourant in pigment samples but investigating the full matrix of the archaeological samples for clues to understand the painting process. Museum collections of minerals used for artists' pigments were sampled and analysed in order to better illuminate the early stages of the painting process and see what the full matrix of raw materials has to offer.

Reference samples for this study came from mineral specimens from the Oxford University Museum of Natural History (OUMNH), and powdered pigments from Kremer Pigmente, a supplier of high-quality artists' materials for artisans and museum conservation professionals. Traditional technical examinations of pigments in art historical or museum objects typically use the reference material developed for the analysis of pigments from fine art contexts to characterise pigments. Kremer Pigmente samples were obtained for azurite, malachite, lapis lazuli, red ochre, cinnabar, quartz, gypsum, bone ash, calcite, jarosite, chrysocolla, and atacamite. See Appendix II for batch numbers for each pigment.

Often, pigment studies use modern, processed pigments from manufacturers to compare samples. Manufactured pigments have been filtered and processed in a way that archaeological specimens were not; and, the industrial processing may affect the composition of the sample matrix, especially of trace elements.

The method in this study utilises a new approach that compares archaeological samples similar to those in archaeological contexts, an additional set of mineral specimens similar to the raw pigment minerals that would have been procured by Neolithic peoples from the landscape and powdered by hand. These potentially provide a more direct comparison with the archaeological specimens.

*Figure 2.11 Drawer of mineral specimens of azurite from the Oxford University Museum of Natural History collection*

Reference standards collected from the mineralogical collection at the Oxford University Natural History Museum are hematite, goethite, jarosite, cinnabar, realgar, orpiment, azurite, and malachite. Samples of less than three millimetres were removed to use as reference specimens. These were obtained by kind permission and assistance of Monica T. Price, Head of Earth Collections. Another advantage of observing the mineralogical references from the OUNHM is to examine mineral specimens with established provenance. Additional reference specimens for iron oxides and mineral cinnabar are supplied from the materials collection at the RLAHA, courtesy of Brian Gilmore. See Appendix II for mineral specimen accession numbers.

In addition to the technical analysis, the study of colourants in this project also includes a macroscopic examination of chronological and spatial relationships of colourants, merging data from both the 1960s excavation reports and the second phase starting in 1993. The macroscopic aspect of the study also examines potential geological sources of azurite and cinnabar to identify the most likely provenance of these colours.

## 2.3 Macroscopic Investigations: Pigment Chronology and Spatial Analysis

The first half of the macroscopic investigations establishes a chronology of pigment use and documents occurrences of the rare pigments cinnabar, azurite, and malachite. Archival methods and archaeological data were compiled to examine the chronological and spatial relationships of pigment use; the results of this are in Chapter 5. For chronology, the date of a pigment is determined by the archaeological context in which it is excavated. As previously discussed, the ÇRP team assigns the chronological level for each building and unit; contexts are determined by a combination of stratigraphy with a radiocarbon dating programme (Hodder 2011, Bayliss et al 2015, Marciniak et al 2015). Information on when and where pigments occurred was gathered from the archival excavation reports and research database maintained by the ÇRP (www.catalhoyuk.com/database/catal). For spatial relationships, use of colour in the Neolithic levels is mapped using data on where colourants were put in paintings and deposited in domestic contexts and burials.

### 2.3.1 Pigment Chronology Database

Chronology of pigment use was determined by synthesising archival excavation reports (from both Mellaart and Hodder phases of excavation) and a survey of the on-site pigment archive. Excavation and conservation reports included Mellaart 1962, 1963, 1964, 1966; French 1968, 1974; ÇRP Archive reports 1995-present; Çamurcuoğlu 2015. Direct observation of collected pigment samples on-site was also made. Pigments in the on-site archive were excavated from deposits in domestic contexts as raw materials from processing or in burials in the form of powders or cakes. To determine patterns and changes in the use of mineral colourants, a detailed database was compiled in the Master Pigment Database in Chapter 4 and Appendix I. The background colour of each row is coloured to match the sample colour: red, yellow, blue, or green. Samples are grouped into Early, Transitional, and Late levels and placed in order, with the earliest levels at the top and the latest levels at the bottom.

This strategy of organising and reporting data in a chronological series facilitates the observation of changes over time in colourant use. With this information we can also detect where and when new materials were introduced. This data set is also cross-referenced with that of the paintings and their chronology to analyse relationships between colourants and iconography in the discussion in Chapters 6 through 8.

## 2.3.2 Spatial Relationships: Mapping Paintings and Rare Pigment Occurrences

The method for analysing spatial relationships for rare pigments is to plot them by excavation findspots, which are mapped onto GIS maps for each area, South and North, and chronological levels 0-Pre-XII. This enables us to address the question of where new materials occur on-site. The findspot metadata for each excavated sample records the building, unit, and context from the ÇRP database in Table 2.2 and plotted in maps in Figures 4.3 to 4.16.

The unit number of the findspot for each sample is also used throughout the reporting as the unique identifier for samples. This will facilitate integrating the findings from this project into the archaeological data of the ÇRP.

The temporal and spatial evidence of pigment use will form the empirical basis on which to address, in part, the research question 'How does this assessment of pigments contribute to our understanding of the use of colour in the Neolithic period?'. To view the spatial relationships of paintings on-site, their position is plotted onto GIS maps for each chronological level. Maps of each of the 14 occupation levels from Pre-XII-0 are labelled with the catalogue identification number for each painting. Each number in red corresponds to the catalogue identifier number for that painting. The identifier number is plotted on the map where the design was excavated. All maps are included in Appendix IV.

## 2.4 Macroscopic Investigations: The Landscape

Geological sources of each mineral were investigated to address the research question: ‘Given our new understanding of the colourants from technical analysis, what can we tell about the introduction of pigments at Çatalhöyük from off-site sources?’

As discussed in Chapter 1, mineral pigments known to occur on-site are carbonaceous blacks, ochres, copper minerals, and cinnabar. Each of these has unique geological environments in which they form. Two of the pigments listed, carbon black and iron oxides, would have been readily available to Neolithic peoples on-site. Carbonaceous blacks are made from burnt organics such as wood or bone and were, most likely, made on-site. Earth pigments, or ochres, are ubiquitous and would have occurred on and near the site.

For artists’ materials sourced away from the site, this study draws on different methods specific to each mineral in order to move forward on what we know of their provenance. Azurite, malachite, and cinnabar are mined from specific locations. Each of these has unique geological environments in which they form.

First, sources of copper and mercury in Anatolia were investigated. As seen in Figure 2.3, maps of Neolithic copper mining sites and modern mineralogical maps of Anatolia confirm that there are no ore deposits of the source minerals of copper or mercury near Çatalhöyük; therefore, these materials were most likely to have been sourced off site. Then, data were plotted on maps with known trade routes and associated archaeological sites. With this information, the potential sites of geological provenance can be identified.

### 2.4.1 Rare Pigment Sourcing: Copper Minerals and Cinnabar

For copper minerals and cinnabar, the method for investigating the mineralogy of the surrounding landscape is to locate potential sources of the ore and overlay this information with known areas of trade for Çatalhöyük peoples. Mineralogical maps from modern geological surveys (Figure 4.27) show ore sources for copper, which are the source site for copper pigments, and for mercury, the source for cinnabar pigments (mineralogical map of Turkey with highlights of Hg deposits from http://www.mta.gov.tr/v2.0/haritalar/maden_haritalari/myatak/myatak1.html).

For copper pigments, this study will utilise an additional resource of a study of known mining sites for copper in the Neolithic period by Wagner and Öztunalı (2000). Based on that survey, Birch et al (2013) investigating copper artefacts at Çatalhöyük assert that native copper was widely and easily accessible, listing the following sites in the region from the Wagner and Öztunalı study: Yakadere (Urvay), Yapraklı (Çankırı); Ergani Maden, Maden (Elazığ); Bakırtepe, Yusefeli (Artvin); Poluşaği, Pörtürge (Malatya); Kırmıztarla, Pörtūrge (Malatya); Demirdağ (Purunsukköy), Divriği (Sivas); Derekütüğün, Bayat (Çorum); Üçoluk, Uğurludağ (Çorum); Çağşak (Çorum); Camlı, Suşehri (Sivas); Alıhoca, Ulukışla (Niğde); Halifeler, Anamur (Içel) and Bakırlı, Sandıklı (Aryon) (Birch et al 2013).

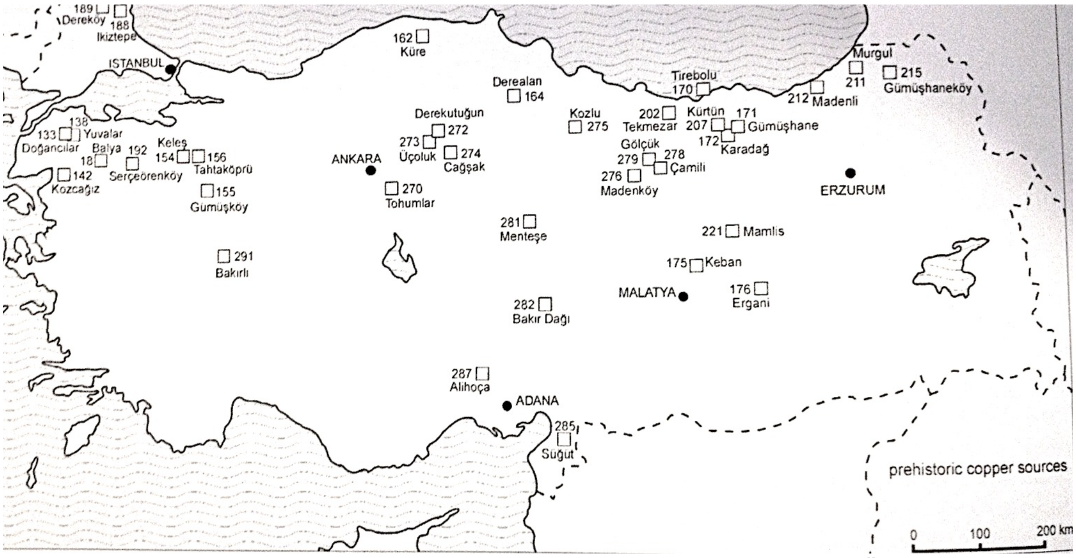



*Figure 2.12 Neolithic copper mines identified in a survey by Wagner and Öztunalı (2000, Figure 2) between 1975 and 1989.*

## 2.5 Paintings

The paintings section of the thesis 1) identifies the typology of paintings in the Early, Middle, and Late levels; 2) examines typology changes from each period to the next; and 3) cross-references this information with changes in artists' materials to analyse the relationship between the art and materials over time. A database of images, the Çatalhöyük Painting Image Database (ÇPID), is an outcome of this research and the main resource with which to investigate questions concerning the wall paintings, specifically regarding frequency, iconography, complexity, and style. The method for creating the ÇPID is described in Section 2.5.1. The method to determine painting frequency is in Section 2.5.2. Section 2.5.3 details the mapping of each of the paintings for each chronological level to investigate the spatial relationships of paintings with the archaeological data.

Sections 2.5.4 and 2.5.5 present the methods to develop the typology for images and the ways in which the content, or form, of each image is coded and analysed. This is followed by the two different methods to group painting types, and an explanation of how they are compared in the analysis.

Section 2.5.6 shows how evidence was gathered and processed to examine the role of history in artistic practice through the history house sequences at Çatalhöyük. And finally, Section 2.5.7 presents the method for organising evidence into the Master Summary of Pigments and Paintings in which data from the painting types is collated with the painting colourants in order to view changes over time and relationships between the two data sets.

### 2.5.1 Image Database of Çatalhöyük Paintings

The paintings research is used to address the question: ‘What is the influence of artists’ materials on the content of painted images at Çatalhöyük; specifically, how are the materials and painting designs connected?’.

As was discussed in the last chapter, a comprehensive and up-to-date record of all the Çatalhöyük paintings is not yet published. For this thesis, a database of images of wall paintings and their metadata was created to address this gap in the literature and create a resource with which to study the wall paintings of Çatalhöyük. The ÇPID is an output of the thesis and serves as the body of evidence to investigate research questions regarding paintings. With it, this project quantifies and analyses the frequency and typology over time. This information will serve to identify new and unique developments/innovations and measure the rate of change in painting forms and motifs over the 1,400-year occupation of Çatalhöyük. Furthermore, the ÇPID makes an original contribution to the knowledge base and provides a necessary resource for future scholarship.

### *2.5.1.1 Data Collection*

For the analysis of the paintings, a careful re-examination of all the available evidence was required. The aim of the research was to integrate images from both phases of excavation to create a full account. This includes archival research of available excavation reports, monographs, and archival photography. A research trip was also taken to the two museums in Turkey that display murals from the site. The Museum of Anatolian Civilizations in Ankara displays a small number of well-preserved murals from Mellaart's excavation phase. The Archaeological Museum in Konya houses two recently excavated painting fragments. Original murals were observed and photographed directly from museum displays and *in situ* during fieldwork.

The availability of information on paintings from the two different excavation campaigns differs considerably. Mellaart discovered the majority of the wall paintings during the first phase of excavation in the seasons from 1961-5. Due to limited time and resources, only a small number of the total paintings found at this time could be conserved and sent to the museum in Ankara. As previously discussed, the surviving evidence of most of the paintings from the first excavation phase are in black and white photographs published in Mellaart's excavation reports and a colour photograph archive by Todd.

Wall paintings from the second phase of excavation by Hodder from 1993 to the present represent a small number of the total corpus of evidence (see Chapter 5 on Painting Frequency results for precise numbers).

Archival reports and photography from both phases of excavation were gathered in order to complete the database of paintings for research and analysis. Additional research was conducted during ten days' study of the excavation archives at the British Institute in Ankara.

*2.5.1.1.1 Photographic Sources for the Image Database*

Photographs for the ÇPID come from three sources. Images for recent excavation photographs from the campaign directed by Hodder from 1993 to the present are sourced from archive reports from the ÇRP and taken exclusively by site photographer Jason Quinlan. The authors' own photographs were utilised for murals on display in museum collections, discussed above, and taken during fieldwork on-site.

Images from the first campaign of excavation come from archival photography in excavation reports by James Mellaart in *Anatolian Studies* volumes XII-XVI, 1962-6, his monograph, *Çatal Hüyük: A Neolithic Town in Anatolia* (1967), and multi-author volumes entitled *Goddess from Anatolia* (Mellaart et al 1989). The copy of *Goddess from Anatolia* utilised for this study was accessed at the library of the BIAA during research there. As was discussed in Chapter 1, the text is largely disregarded as unscholarly. It was utilised in this project for the rare find of colour plates of paintings from Mellaart's excavations, several of which are unavailable elsewhere in print. The results in Chapter 5 include examples of the plates of the rare images and a list of where they are used in the image database.

The source of each photograph in the ÇPID is cited in its metadata. References to plates in Mellaart's sources are listed. The archival photographs taken by Ian Todd are referenced with his name and the photograph number, i.e., 'Todd 54_16'. Photographs of recently excavated paintings from the current project are labelled ÇRP and credited to site photographer Jason Quinlan.

### *2.5.1.2 Coding for Painting Colour*

Each of the 77 paintings is coded for the colour of pigment used in the design. To be able to apply the same coding system to all of the images, broad categories of colour hue are used to code the pigments used in paintings. For this purpose, broad categories of red, black, white, and blue are sufficient to identify the trends of colour use in wall paintings over time. For paintings that only survive in photographs, colour plates were used to identify the colour used for the design. Direct observation of colour was utilised in cases of surviving murals viewed in museums or *in situ*.

### *2.5.1.3 Chronological and Spatial Order of Paintings in the Image Database*

To best achieve the aim of analysing the chronological and spatial relationships of the artwork, the database is organised to convey these relationships as much as possible by organising the available documentation. As discussed above, the archaeological levels of Çatalhöyük are organised by ÇRP into three periods of Early, Middle, and Late. This includes further divisions of the fourteen levels of the occupation of the site using Mellaart's labels of Roman numerals from Pre-XII up to 0. The recent ÇRP also uses a system of alphabetical letters to designate archaeological levels. As the majority of painting evidence was excavated and classified in Mellaart's Roman numerals this system is kept throughout the thesis; correlations between the two systems are charted in Table 5.2 for reference.

The paintings were entered into the database in chronological order from the earliest levels first down to the latest images last. The logic is that the paintings are organised in the results in the approximate order in which they were deposited on-site. For example, the earliest occupied levels are shown at the top of the Master database of paintings, moving down through the table into the later Middle levels, and to the end of the site at the bottom.

Each painting was assigned a unique catalogue identification number. The numbers start at one for the paintings in Early occupation level IX and go up in consecutive number to the Late levels IV-III. The lower the catalogue identification number, the earlier in the occupation levels is the painting.

Within each occupational level from Pre-XII to 0, building numbers are arranged low to high. While building numbers do not always correspond to the order in which the structure was excavated, having the catalogue ordered in this way makes it easier to navigate and search for specific images.

Multiple paintings excavated from the same building were ordered by wall orientation (i.e., North, East, South, or West). This order of directions, clockwise from N, E, S, W, was kept throughout the database to best conceive of a painting's placement in the context of the building.

#### *2.5.1.4 Catalogue Entries*

The following fields are completed for each catalogue entry: at least one photograph[14] of the mural, an identification number unique to that painting and wall, a brief description of the composition (by this author), context (chronological level and building number, i.e. III.8 is Level III, building 8), wall orientation (N, E, S, or W),

[14] Colour photographs are used when available, black and white if not. Or, in a few cases, images from Mellaart's excavation of reconstruction drawings of Ian Todd or traced transfers of paintings by Grace Huxtable are used.

dimensions (if documented), excavation phase (Mellaart or Hodder), references to the paintings in primary sources, and the photograph source.

The most complete record for each mural is presented in the database as information is available. Some information, especially of the dimensions for each painting, is not fully reported in the archival information from Mellaart's excavations.

Each identification number corresponds to only one wall per building, with only one mural on each wall in most, but not all, cases. For each wall painting, the available images from sources were viewed and then the most appropriate photographs were selected for use in the database. The preference for the first picture of each entry is one showing the full wall, with pictures in colour if available. To contextualise different images of paintings from the same mural, especially alternate or detailed photos showing relevant details or alternate views with pertinent data, are included and labelled (a), (b), (c), etc.

Çatalhöyük paintings rarely have a neat border. With this in mind, in the Çatalhöyük Painting Image Database, the first photograph for each entry is a full room view where that evidence is available. Then, cropped, detailed shots follow in listings for the same wall. In this way, the viewer gets a sense of the wide perspective of the original composition. This is especially important in rooms with full wall compositions or those that extend from one wall to the next.

### 2.5.2 Paintings Frequency

Utilising the metadata from the image database, a count of murals for each of the 14 chronological levels in the two excavation areas is established. Quantified results are obtained for each of the three periods, Early, Middle, and Late Levels, in the North and South Areas. The results obtained in this thesis are compared with recent work by Czeszewska (2014) in her chapter in the 2014 ÇRP volume where she quantifies and analyses Çatalhöyük iconography. The frequency of paintings in this study re-examines the counts of paintings per level and updates it with the most recent excavation findings.

### 2.5.3 Mapping Locations of Paintings

Spatial data for the paintings is established using GIS maps from the ÇRP, generously supplied by Camilla Mucuzzato. All paintings in the database are plotted on each map for one of the 14 architectural levels in the South and North excavation areas. Each painting is represented by its unique identifier number assigned to it in the ÇPID. For instance, the fourteenth painting in the chronological list is shown on the GIS with ID*14 in red letters on the wall in which it was excavated.

### 2.5.4 Defining Typology – Broad or Narrow?

In the past, the paintings of Çatalhöyük have been classified in one of two ways: either with six diverse categories, or with a simple, three-category system. Mellaart (1967) used diverse categories in his interpretation of the painting content. Coding of painting types with fewer, more broad categories is used in more recent studies. Czeszewska (2014) investigates three general categories of images, depicting ‘geometric’, ‘anthropomorphic’, or ‘zoomorphic’ content, to investigate the changing relationship of humans to animals. The typological analysis for this study compares each of these two methods of analysing painting styles with either a few, broad categories or numerous, specific types. The following sections give details of the methods used to code the paintings and analyse changes in style over time.

### *2.5.4.1 Coding Painting Style: Broad and Element Types*

The images from the database are classified into types in two ways. The first is Broad Types. This adapts the three categories from prior studies: anthropomorphic, zoomorphic, and geometric in the 3-Broad Typology.

Problems of ambiguities in the painting content arise with just three types. If you only have a code for animals OR people, how do you classify a painting with animals AND people? Also, in which of the three Broad types would the motif of handprints fit? Are they geometric motifs since they are not human or animal figures?

Ambiguities in the 3-Broad typology were resolved in the following way. Handprints were considered a subset of anthropomorphic content. In order to track and examine changes in this content, this category was split to distinguish human figures and handprint designs. Zoomorphic content encompasses all animal forms including birds and quadrupeds, in general, or more specifically bulls, boars, and deer. Geometric types are abstract motifs that are neither human nor animal, such as circle, lozenges, or triangles.

The content of images lends itself to additional categories of paintings. A fourth category was added to the Broad analysis; this distinct category is formed of compositions with animals and figures of trees, and other motifs that can loosely be categorised as geometric figures. Mellaart (1967) and Todd (1976) classified these images as 'landscape or architecture'. A 5-Broad Type method was used which includes the 3-Broad Types, the 'Landscape / Architecture' type and a fifth category with the Handprint type (separated from the anthropomorphic category).

An additional classification was added to distinguish between images with one type of motif from those with two or more–the Compound category. In a single composition, a design can often include two or more forms, for instance, geometric motifs with humans or animals. The content in these images do not fall neatly into one classification such as only 'anthro-' or 'zoomorphic'. The 'Compound' category tracks the occurrence of two or more types in the same painting and when and where these occur over time. This is with a view to investigating how much of the painting content is unaccounted for in the use of Broad categories. In the quantitative analysis, the Compound category is sub-divided into categories according to the combination of types within the painting: Geometric-Human, Geometric-Animal, Human-Animal.

In Chapter 5, 5-Broad and Element Types categories are both used in the quantitative analysis of the painting styles and then the results of each are compared in the quantitative analysis.

### 2.5.5 Analysis of Style

*Stylistic analysis* – looking at forms and motifs in a collection of artworks from a culture – endeavours to reveal how the components relate to each other and to the whole (Gell 1998, 165). Stylistic analysis of the typology is used here firstly to see how the relationship between the wall painting components as a body of art changes over time. Secondly, when this information is compared to the evidence of pigments, it illuminates how images relate to their materials.

A stylistic analysis is made from the detailed typology of forms and motifs. From this, the *larger unity* of the wall paintings is observed. The larger unity, in Gellian terms, is analysed from of the *corpus* of an artistic practice of a culture. The goal of stylistic analysis is to reveal how the components are related to a whole (Gell 1998, 165).

Through this analysis, coherent threads that run through the information content of the paintings are identified. The forms and motifs which make up information content of paintings reveal threads, or *axes of coherence*.

Stylistic analysis in this thesis will examine how the corpus of wall art at Çatalhöyük changes through Early, Transitional, and Late levels of occupation. Each of these periods and their features are discussed in Chapters 6 through 8.

### 2.5.6 Art in 'History House' Sequences

History houses are long-lived households which are built upon in subsequent generations. They utilise and build upon the same space and footprint of the building of the previous generation. Sequences of houses built upon in subsequent generations were discussed by Mellaart (1967). This phenomenon was further studied and termed history houses by Hodder and Pels (2010).

Occurrences of wall paintings and rare artists' materials are quantified to examine the relationship of art and artists' materials and the frequency of art practice in the sequences of history houses. History house sequences are noted on the GIS maps used for spatial analysis, as are wall paintings and rare artists' materials including cinnabar, copper-based pigments, and copper-based artefacts. These are quantified into a table which lists each sequence identified by Hodder and Pels (Ibid) and presented in Chapter 4.

### 2.5.7 Master Results Tables

The databases created for paintings and pigments are used to link two data sets. One spreadsheet contains data from the Çatalhöyük Image Database with the series of wall paintings in chronological and spatial order. The second spreadsheet has the Pigment Chronology database with series of pigments in the order in which they are found in the chronology. The chronology is divided into three periods of occupation defined by the ÇRP as Early, Middle, and Late (Hodder 2014; Figure 1.4). Data were synthesised into a Master Table for Pigments in Table 4.1, a Master Table for Paintings in Table 5.1, and a merged Master Table of both together in Appendix 0. For chronological data each level is assigned a date range from the radiocarbon dating programme reported by Cessford (2005) with updated results for some contexts by Bayliss et al (2015) and Marciniak et al (2015). The Master Table for Paintings and Pigments is the basis to examine and analyse 1) iconography and colour use over time and 2) the relationship between the two over time.

## 2.6 Summary

In this chapter we have looked at the methods used in the thesis to investigate the artists' materials and wall paintings of Neolithic Çatalhöyük. The chapter began with the smallest scale, the microscopic technical examination of pigments. We examined the techniques used to determine and compare physico-chemical properties of mineral colourants and how they will be used to answer archaeologically relevant questions. The scale then increased to the macroscopic to look at pigments on the site and in the landscape. The chapter continued with investigations into the wall paintings. We demonstrated how the evidence for the wall paintings was gathered and ordered to create a database with which to address the research questions.

This chapter details the systematic methods of data collection, the outputs of which are a technical examination of current colourant evidence, a chronology of colourant use, a catalogue of wall paintings from both excavation campaigns, and a typology of forms and motifs. The methods employed and the data sets built up during this phase of research will provide the basis for empirical evidence to support the thesis.

# CHAPTER 3 MATERIALS ANALYSIS FOR PIGMENTS

Reference samples are presented in Section 3.1. Section 3.2 presents colour characterisation for archaeological pigments according to colour: blue, green, red and yellow. The results for selected samples in the chaîne opératoire: rocks, crayons, powdered plaster, and painted wall plaster are in Section 3.3. Section 3.4 gives results for examining archaeological animal bone.

## 3.1 Reference Samples

In this section we examine the macro- and microscopic characteristics of both the mineral specimens from which pigments are ground as well as commercially available pigment powders. Mineral specimens are the raw minerals that would have been sourced from the landscape by prehistoric artisans. Minerals would then be ground up and pulverised into fine powders to make pigments for painting. As discussed in Chapter 1, previous technical studies found azurite, malachite, and cinnabar powders. In this section, we examine the minerals specimens, the raw materials of these pigments to better understand the pigments in their unprocessed, raw form and see the different minerals that commonly grow next to them. These reference samples provide the basis of comparison with the archaeological samples from Çatalhöyük.

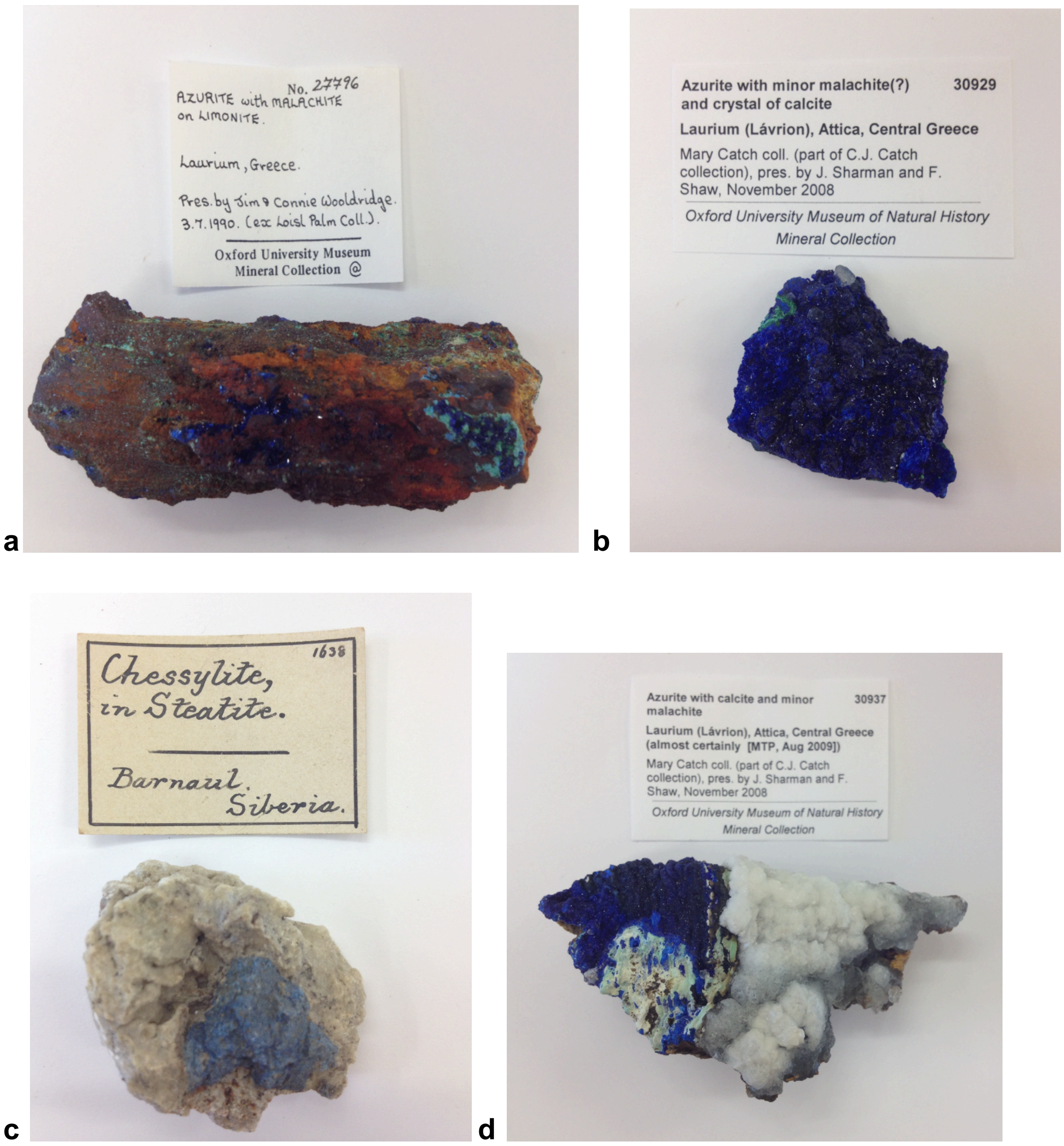
### 3.1.1 Museum Mineral Specimens - Raw Materials of Artists' Pigments

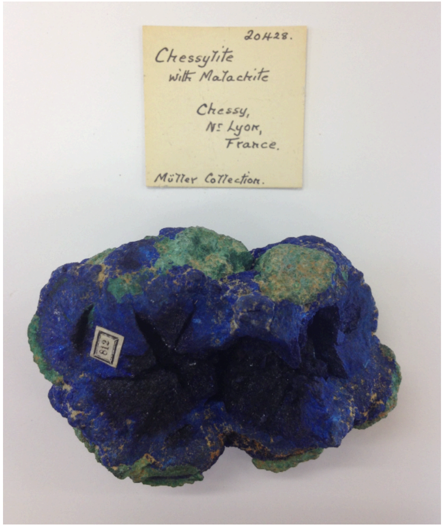
Mineralogical specimens from the Oxford University Museum of Natural History (OUMNH) and the J. Paul Getty Collection show the raw minerals from which colourants for paintings are sourced.

#### *3.1.1.1 Copper Carbonates: Azurite and Malachite*

Figure 3.1 shows the variety colours of the main mineral body and accessory minerals of azurite and malachite. In Figures 3.1a, d, e, h, i, it is apparent that the green and blue artists' pigments azurite and malachite often both occur together in samples of powdered pigments, given that their respective crystals can grow in close proximity in the same parent mineral.  Other minerals which co-occur are iron oxides, seen here in the rust colours on the specimen surface seen in Figure 3.1a. The mineral specimens give information relevant to interpreting instrumental analysis from archaeological samples azurite and malachite can occur together in the same mineral as can iron oxides and therefore in results from archaeological samples.

*Figure 3.1 Azurite minerals from the OUMNH collection (**a-i**).*




20428.
Chessylite
with Malachite
Chessy,
Nr Lyon,
France.
Müller Collection.

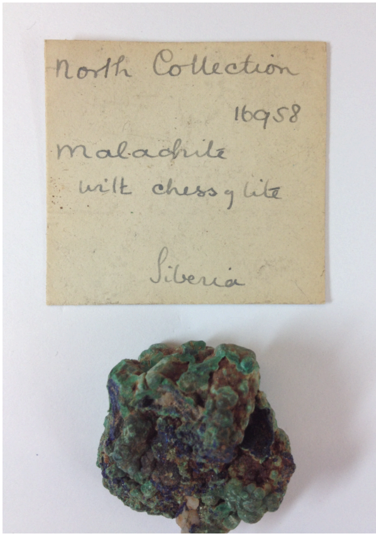
e


16978
Chessylite
Chessy,
France.
Pres by
Rt Hon Sir Ford. North F.R.S. 1909.

f


Chessylite
6628
Chessy.
Nr Lyons.
France
H.L.B.

g


North Collection
16958
Malachite
with chessylite
Siberia

h


Malachite,
1982.
with Chessylite.
Copper Queen Mine,
Bisbee,
Arizona.

i

Several samples in the OUMNH collection came from a mine in Chessy, France, known for its mineral copper deposits. This site plays a role in the nomenclature of the blue mineral, now known as azurite; historically, it was referred to as chessylite in reference to this particular mine (see labels in Figure 3.1c, e-i).

These samples also illustrate that minerals from the same source do not necessarily have similar composition or appearance. Looking at the samples from Chessy (Figures e-g) as a group, one observes the variation in accessory minerals, colour, and crystallinity that can occur with minerals from the same location. For instance, sample f has well-defined crystals with only a minor appearance of other minerals in the form of small green malachite areas. Sample e has considerably more green malachite and smaller, less defined blue crystals. Sample g shows a markedly different colour – a light hue of blue relative to the darker, more refractive crystalline minerals in e and f. The matrix of the mineral in sample g also has a predominance of a white, chalky calcite mineral.

Further information relating to this point about connecting the source of a mineral and resulting pigment with its composition or appearance with only a visual inspection, can be gathered from samples c and g. Their visual appearance is similar, with a blue hue, with a much less saturated colour than the other minerals, poorly defined crystals, and surrounding matrix of a white accessory mineral. If, on the basis of these similarities, these were assumed to be from the same source, the conclusion would be incorrect. The two samples came from sources a great distance apart – one from Chessy and the other from Siberia.

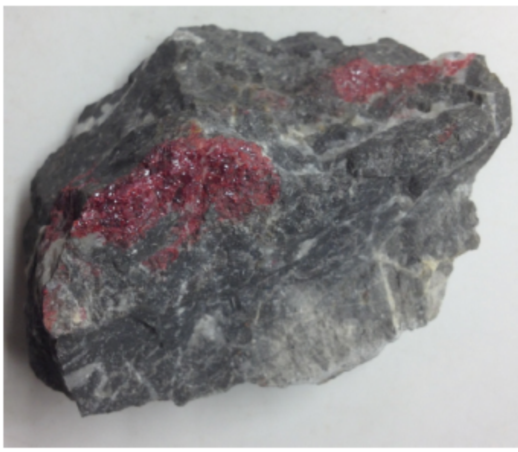
Further to this point, the three samples shown in Figure 3.1e-g, are all from Chessy, if they were ground into a powder for a pigment, would vary considerably in appearance and composition.  It is often assumed artists' pigments with the same source will have similar composition; however, as we see here, assuming samples that have the same colour, crystallinity, or even composition would be incorrect; similar looking samples can come from different locations and the same source can have minerals with few similarities like the Chessy mine minerals. These findings will be taken into account as this study investigates the source of pigments, with an emphasis on the blue colours.

### *3.1.1.2 Cinnabar*

Samples from OUMNH in Figure 3.2 illustrate that visual inspection of colour is insufficient to distinguish cinnabar from iron oxides; elemental analysis is required to characterise samples. For correct characterisation, it is therefore crucial to be informed of the varieties in visual appearance when examining the archaeological samples in this study. This group of samples was sourced in different locations, from China, Europe and North America. As with the blue minerals, red cinnabar minerals vary considerably in appearance, even those from the same mine. The samples in Figure 3.2c-d are from the well-known cinnabar source in Almaden, Spain:

*Figure 3.2 Cinnabar minerals from the J. Paul Getty Collection (**a-d**) and the OUMNH collection (**e-g**).*

**a** CinnabarChinaHunan2Getty2221



**b** CinnabarColoradoPershing1Getty1543

c CinnabarSpainCuidadRealAlmaden1Getty0503

d CinnabarChinaHunan2Getty1221


e


f


g

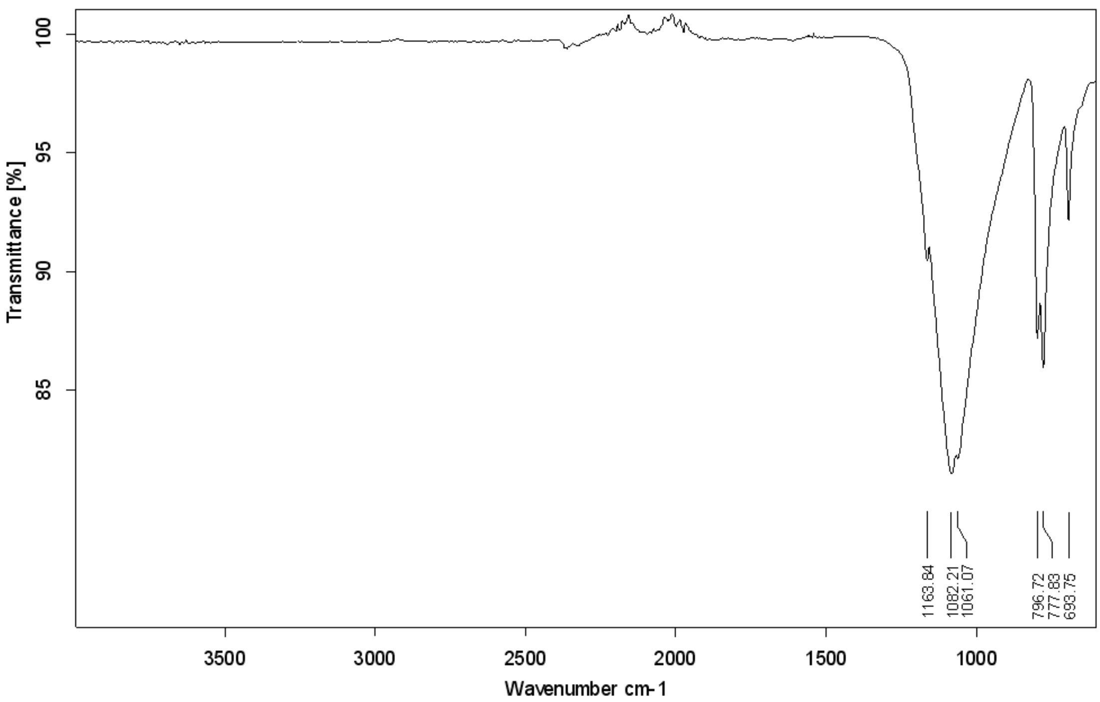
the first is homogenous and the second contains other accessory minerals such as quartz. Specimens in Figure 3.2a-d and 3.2f all have the desirable quartz-like brilliance and saturated colour sought from cinnabar as an artists' pigment. These features are highly desired by artisans.

In contrast, the samples in figure 3.2e and 3.2g have a less crystalline, more matte appearance with a red-orange colour. On visual inspection, these samples are more similar to an iron oxide.

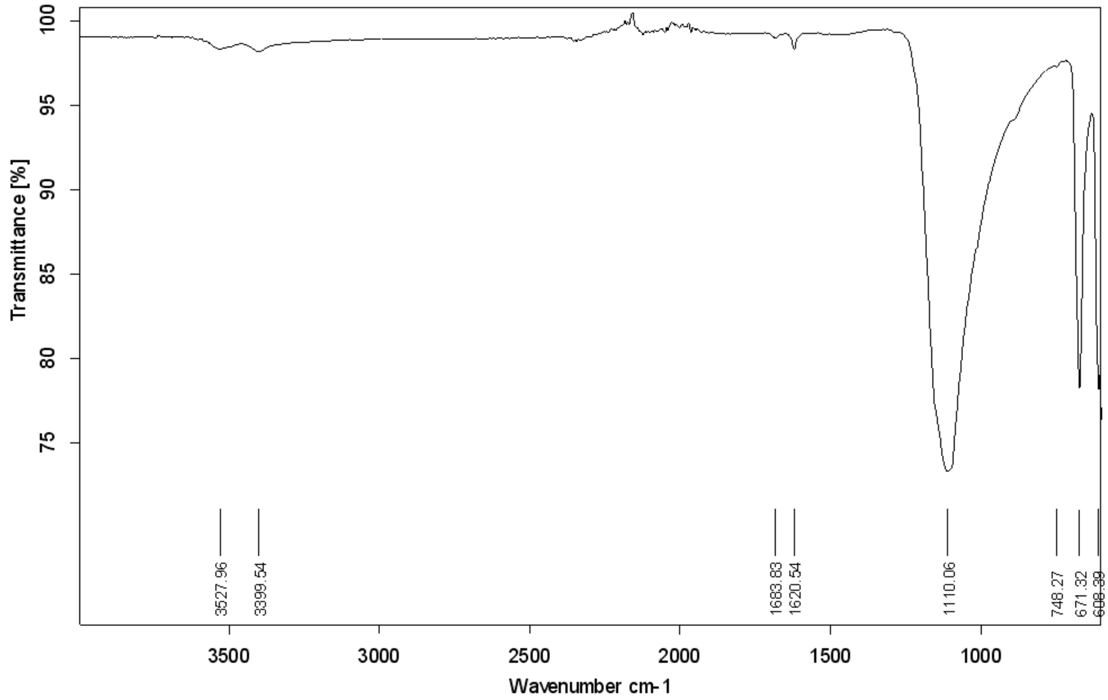
## 3.1.2 Accessory Minerals: Kremer Pigmente Quartz, Gypsum, and Calcite

Figure 3.3 shows results for the accessory minerals of quartz ($SiO_2$), gypsum (calcium sulphate dehydrate $CaSO_4$), and calcite (calcium carbonate $CaCO_3$). The FT-IR technique was used to distinguish between gypsum and calcite, as XRF data would not differentiate them. The reference elemental data from XRF was collected. However, since the elemental formulas are similar, i.e. calcium peaks in XRF can be contributed from calcite or gypsum, molecular structure from FT-IR spectra were used to distinguish the two minerals. These results were compared with those of the archaeological samples.

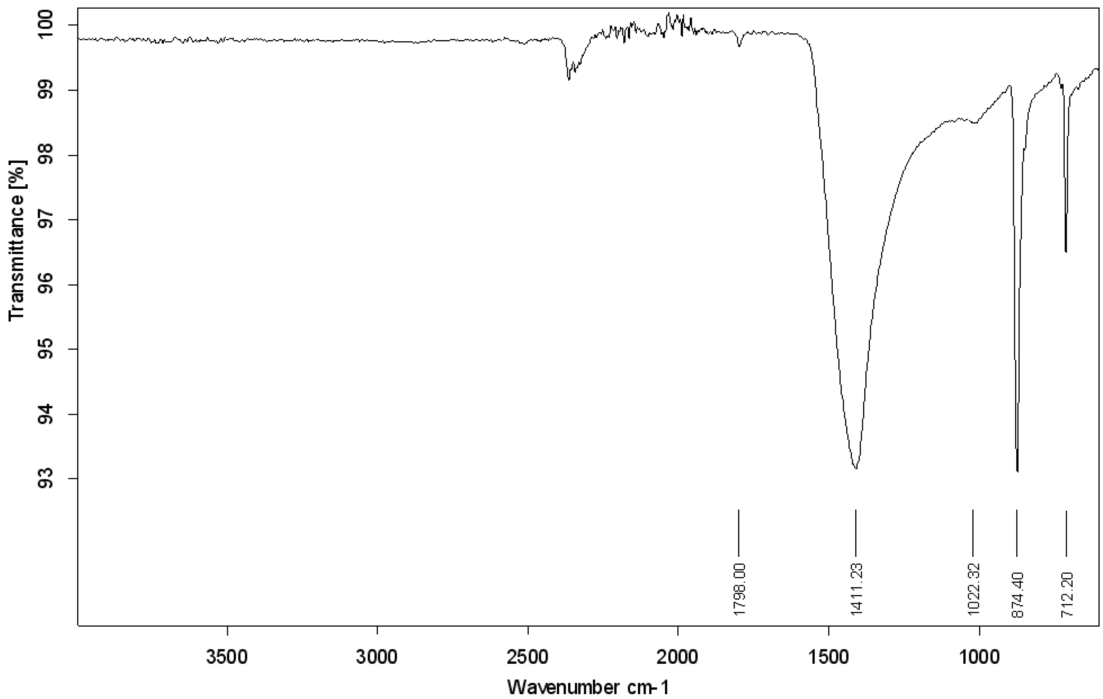
*Figure 3.3 FT-IR reference spectra of a) quartz, b) gypsum, and c) calcite standards from Kremer Pigmente.*




a) Kremer Pigmente quartz, #58620.13010.140 100, coarse ~100μ.




b) Kremer Pigmente gypsum, anhydrate plaster, #58320.13010.140.




c) Kremer Pigmente calcite #58720.13010.140 ~20μ.

## 3.2 Colour Characterisation

### 3.2.1 Blue

Four archaeological samples of blue minerals in bulk powder were analysed. As observed in macrophotography in Figures 3.4-7, sample 16308 is noticeably lighter in colour than the three other samples from units 7597, 7575, and 19447.

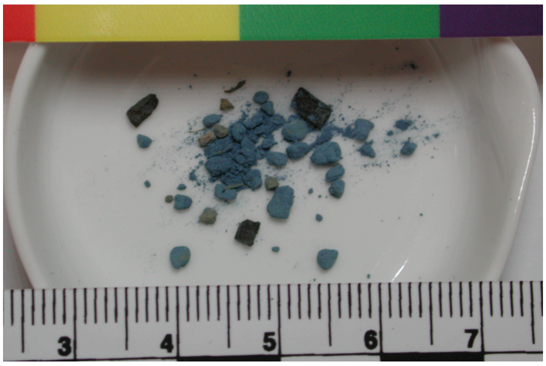


*Figure 3.4 Unit 7597*

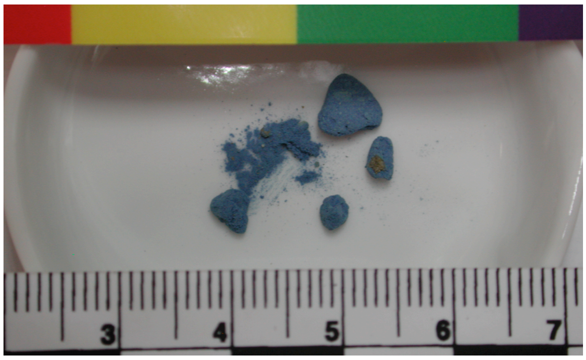


*Figure 3.5 Unit 7575*

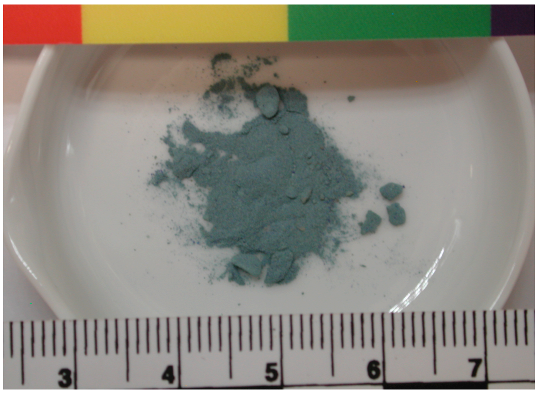


*Figure 3.6 Unit 16308*

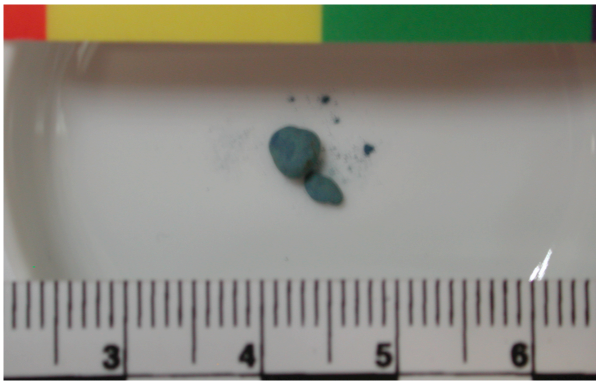


*Figure 3.7 Unit 19447*

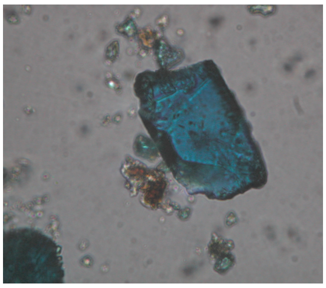


*Figure 3.8 Reflected light 500x from unit 7575 showing pale blue body colour and conchoidal fractures on the surface. Particle size 120 µm.*

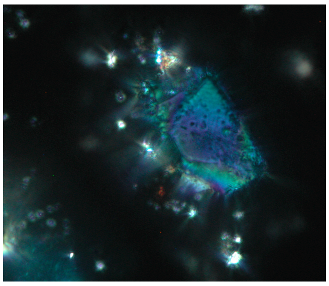


*Figure 3.9 500x crossed polars, unit 7575 showing interference colours of dark blue.*

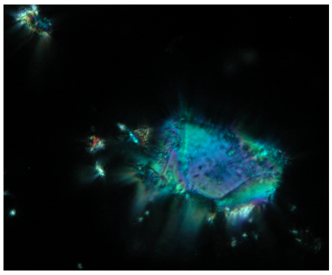


*Figure 3.10 500x crossed polars, unit 7575. The particle in the previous figure shows mottled, straight extinction in comparison with this brighter view with the stage rotated by 45°.*

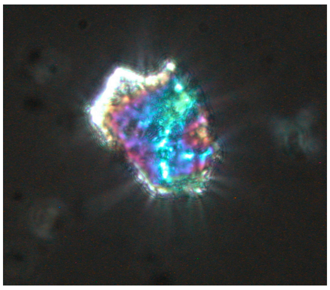


*Figure 3.11 500x under crossed polars sample 7575 shows birefringence with interference colours of dark blue, red, orange, and yellow.*

PLM of all blue minerals identified morphology of angular shards with conchoidal fracture on surfaces and features of birefringence and straight extinction and pleochroism from pale blue to green-blue and some higher order colours of violet, red, orange and yellow (Figures 3.8-11). These characteristics are consistent with copper carbonates azurite and similar to those of malachite (Eastaugh, 591, 595). Red particles are observed in the microscopy of samples 7575 and 16308 (see characterisation of red particles in Section 3.2.3).

Table 3.1 shows results of analyses of particle size and features under optical and polarised light microscopy. All four samples exhibited similar characteristics under polarised light of carbonates, namely birefringence, straight extinction, and pleochroism.

| | **Absolute Particle Size Range from smallest to largest in micrometres (μm)** | **Relative Particle Size Range** | **Notable Characteristics under optical and polarised light** |
|---|---|---|---|
| Sample Unit 7597 | Smallest 10 X 10; Average 60 X 60; Largest 120 X 70 | Coarse to Very Coarse | Vitreous. Conchoidal fracture. Birefringence. Pleochroic, 2nd order colours purple, yellow, white and green. Straight extinction. |
| Sample unit 7575 | Smallest 0.5 X 0.5; Average 3.5 X 2; Largest 80 X 50 and 180 X 120 | Very Fine to Very Coarse | Vitreous. Conchoidal fracture. Birefringence Pleochroic, 2nd and 3rd order colours green, purple, and blue; |
| Sample unit 16308 | Average 270 X 200; Largest 320 X 280 | Very Coarse | Dull lustre. Conchoidal fracture Birefringence. Pleochroic, 2nd order colours green and blue; Observed an orange particle with straight extinction. |
| Sample unit 19447 | Average 40 X 60; Largest 110 X 80 | Very Coarse | Vitreous. Conchoidal fracture. Birefringence. Pleochroic, 2nd and 3rd order colour purple, green, and blue. |

*Table 3.3 Analysis of Blue Pigment Particle Size and Characteristics.*

The three darker blue colours were similar to each other in their general size and were made up of a range of particle sizes, from very fine to very coarse. The range found was wide, with the smallest particles starting at 5μm and the largest particles up to 120μm in the dark blue samples, with the average particles being in between at 50-80μm. In the light blue sample, unit 16308, the average size was larger, starting at 200μm with the largest size at 320μm. It can be seen that the sample lightest and dullest in colour (unit 16308) had the largest particle size average and range. This differs from the 10-200μm range reported for all samples by Çamurcuoğlu.

The particles of the light greenish blue sample 16308 are relatively large, in fact larger than the deeper blue coloured samples. The results of particle size analysis show that the three blue samples are of similar size ranges, indicating similar processing technique and tools. The lighter colour of 16308 has larger particle sizes, showing that the lighter colour is not a result of finer particles as suggested by Çamurcuoğlu (2013, Table 18.3). Having ruled out particle size as a cause of colour difference in lightest sample of blue, the composition of the mineral matrix was investigated to address this issue.

XRF (see Figure 3.12) showed primary peaks for copper (Cu) at the K-alpha (Kα) at 8 keV and K-beta (Kβ) at 8.9 keV. The strong secondary peaks for iron (Fe) in the archaeological samples added mineral vivianite, which forms near copper deposits, as a potential characterisation. Chemical analysis did not show peaks for chlorine, which would indicate the presence of atacamite, or other green copper salts listed in

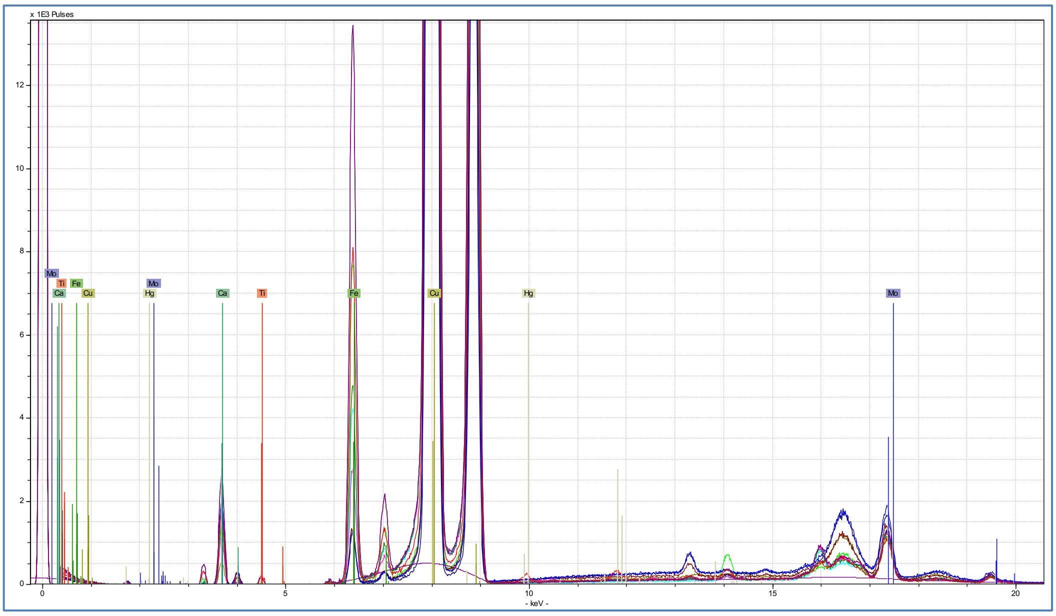


*Figure 3.12 XRF spectrum for unit 7575 showing a composite of 10 runs with each a different colour line. The most intense peak is for copper at Kα at 8 keV and Kβ at 8.9 keV. The red line shows a trace peak for mercury ~9.9 keV.*

Table 1.1.

FT-IR results (see Figure 3.13) for the archaeological samples most closely matched those expected for mineral azurite. The fundamental vibrations in FT-IR of the carbonate groups for azurite are at 1490, 1415, 1090, 837, and 817cm$^{-1}$, and O-H out of plane bending modes produce the strongest peaks at 3425 and 952cm$^{-1}$, respectively. (Roy 1993, 30). Figure 3.13, with the overlapping spectra for all for samples, shows the most intense peak at 1415cm$^{-1}$ with peaks in the expected places at 1490, 1090, ~835, and ~815cm$^{-1}$; the peaks expected at 3425 and ~950 are also present. Figures 3.14-3.17 show spectra for each sample with more detailed labels for each peak. In the results for each individual sample, the same overall spectral pattern is seen in all samples, with the peak wavenumbers of sample 7597 shifted slightly lower by ~10-15wn. XRD was used to confirm the primary and secondary mineral identifications. Figure 3.21 shows the reference pattern for azurite with peaks at the strongest characteristic lines expected for azurite and their respective intensities are at 5.15 (55), 3.52 (100), and 2.22 (70) Å (from *JCPDS Powder Diffraction File* 11-682 from the JCPDS International Centre for Diffraction Data, in Gettens and Fitzhugh 1993, 29).

Figure 3.20 shows X-ray diffraction results[15] on the four archaeological samples of azurite and reference samples of azurite and malachite from Kremer Pigmente. The MDL (minimum detection limit) is somewhat dependent on phase and the data quality, but for these samples it would have been approximately 1 wt%. The peak pattern and key peaks of the archaeological samples match that of the reference

[15] The data shown in Figure 3.20 is of good quality,but has been background corrected and corrected for small sample displacements.

*Figures 3.13-17 FT-IR results for blue archaeological samples; Figures 3.18-19 blue reference sample results; Figures 3.20-21 XRD results*

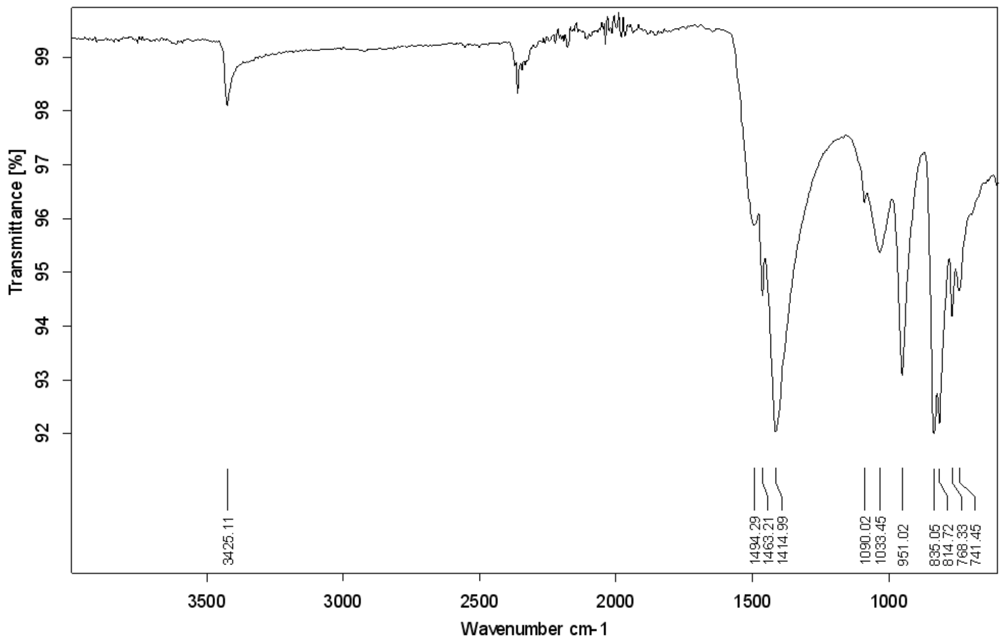



*Figure 3.13 FT-IR Spectra overlay of all four blue samples from RLAHA.*

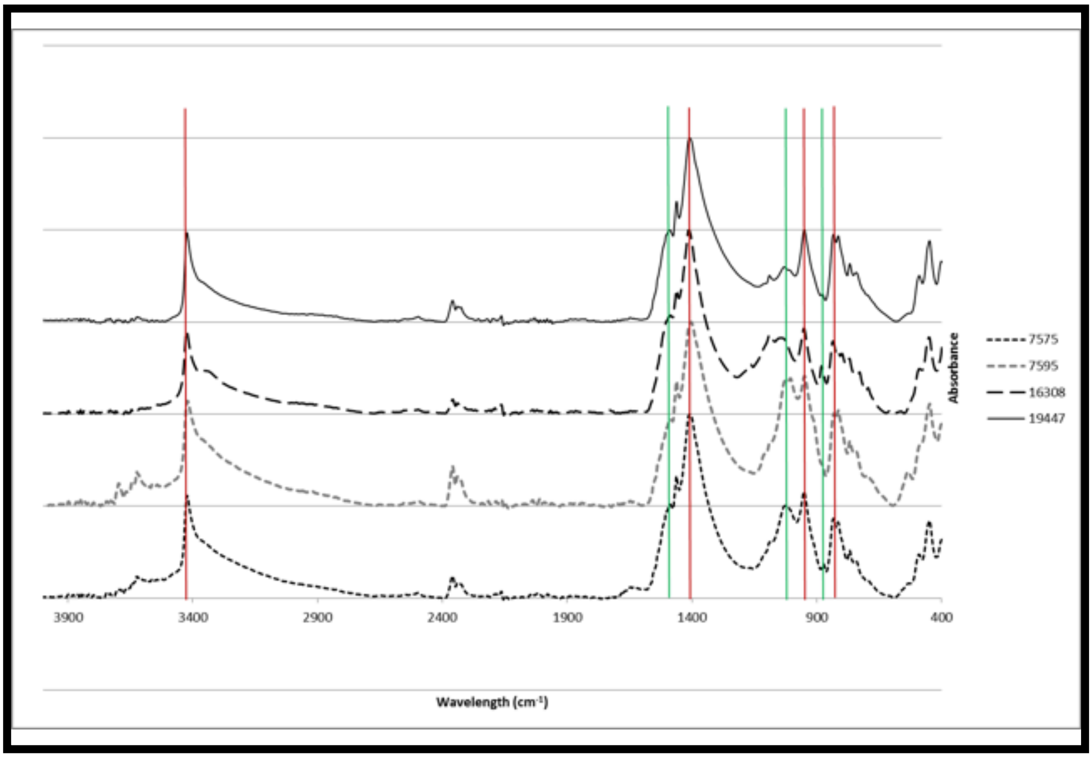



*Figure 3.14 unit 7575 blue mineral*

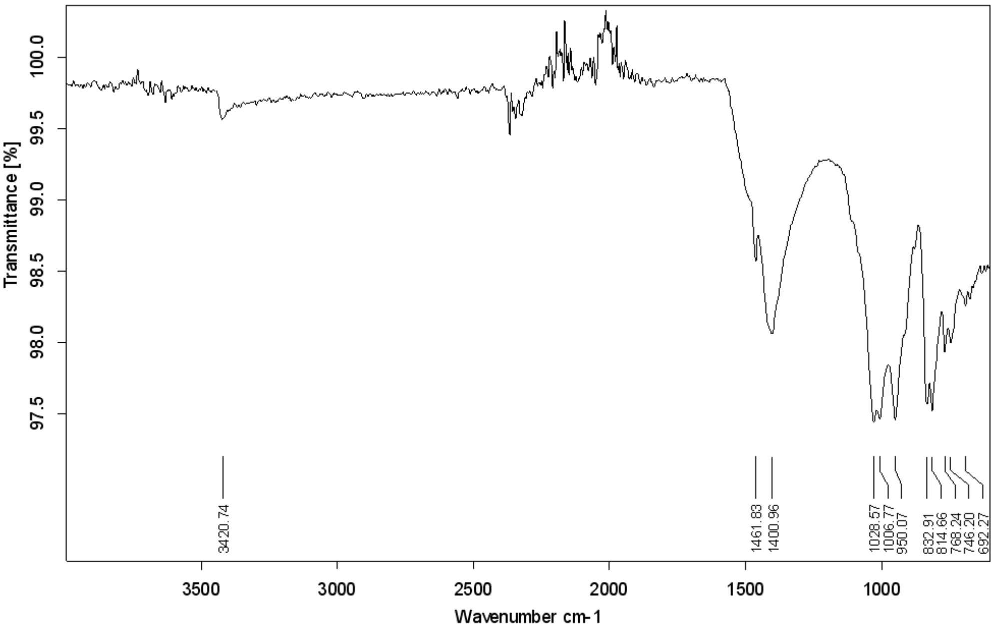



*Figure 3.15 unit 7597 blue mineral*

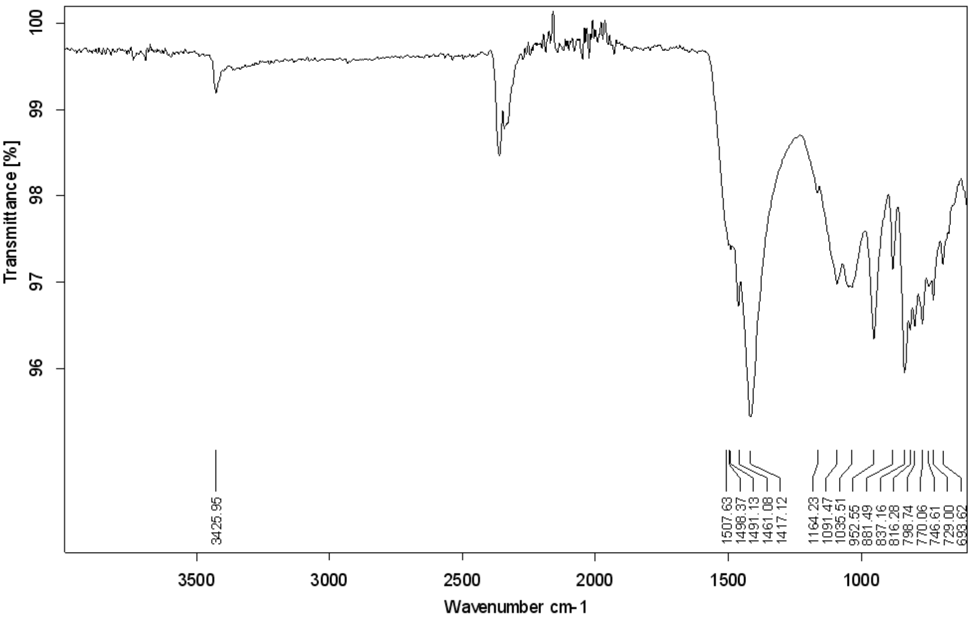



*Figure 3.16 unit 16308s4 light blue mineral*

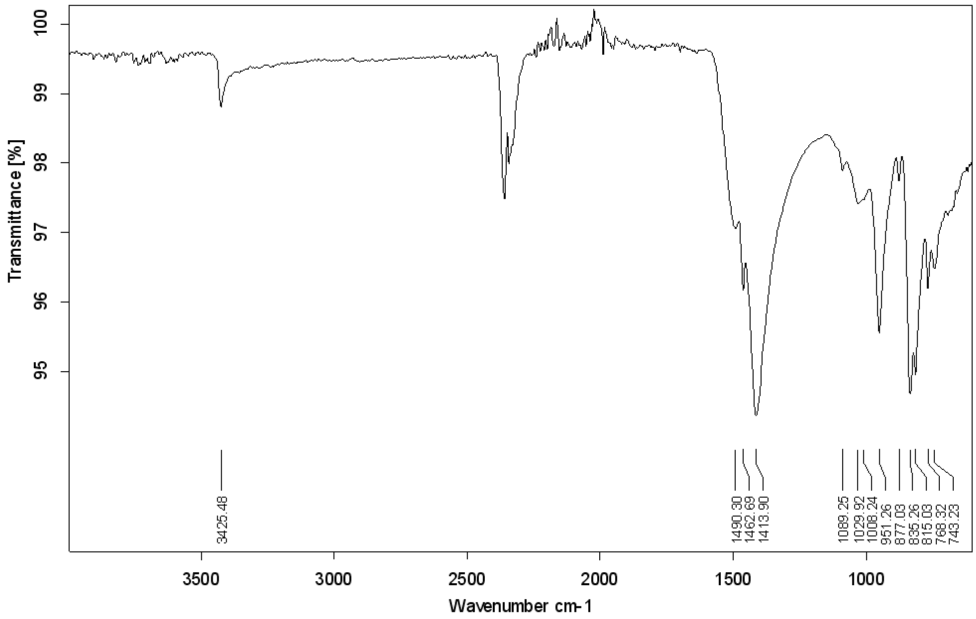



*Figure 3.17 Unit 19447s14 blue mineral*

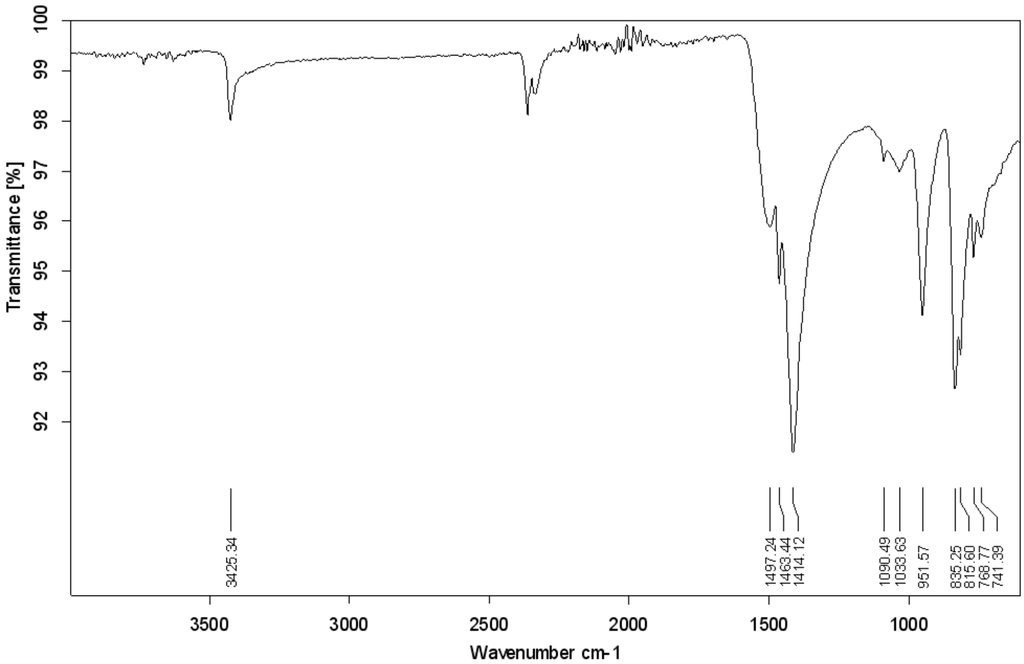



*Figure 3.18 FT-IR of azurite stone from Kremer Pigmente, #102005*

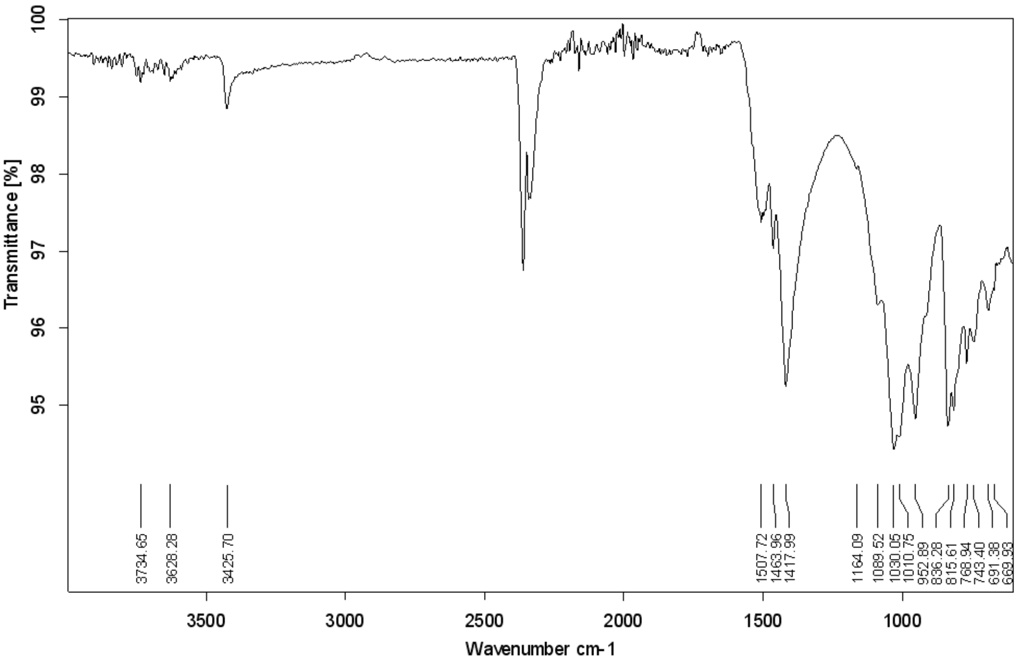



*Figure 3.19 FT-IR, azurite powder from Kremer Pigmente, order #10200.12050.108, standard grind 0-120$\mu$*

samples for azurite, with the peak of greatest intensity is at ~3.52 Å, and lesser intensities at ~2.22 and ~5.15 Å. Results for the archaeological samples were compared with the International Centre for Diffraction Data software PDF-2 http://www.icdd.com/products/pdf2.htm, and reference spectra from the Forbes collection (see Figure 3.21), confirming azurite as the primary mineral.

All four samples show some quartz, but no malachite. The quartz characterisation is confirmed in FT-IR spectra for each sample, with peaks at ~1407cm$^{-1}$ and a doublet near the 800 and 780cm$^{-1}$ range (Figures 3.14-17). With XRD, the light blue sample, unit 16308, is also a positive match for azurite and quartz with the additional mineral of dolomite. The findings of azurite in samples from units 7575, 7579, and 19447 in this study are in agreement with prior work. However, the findings in this study found that azurite was the primary mineral in the sample from unit 16308, not malachite, contrary to the findings of Çamurcuoğlu (2015).

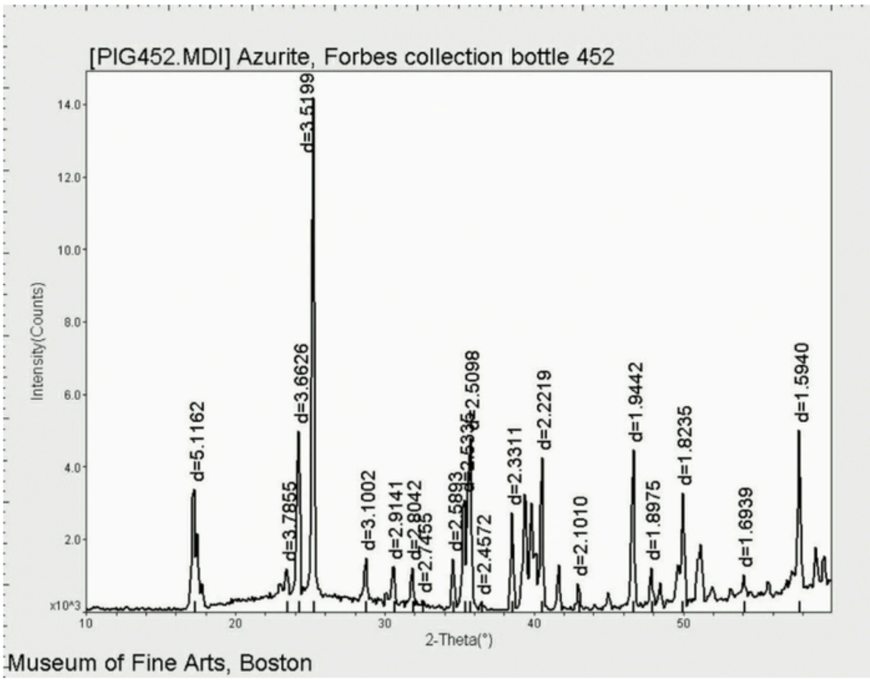



*Figure 3.20 Reference spectrum of X-ray diffraction of azurite. Sample from MFA Forbes collection: Azurite, Laurie F Specimen (bottle 452). Matched JCPDS files for azurite (72-0539). Source: MFA Scientific Research http://cameo.mfa.org/wiki/File:PIG452.jpg. Accessed May 2016.*

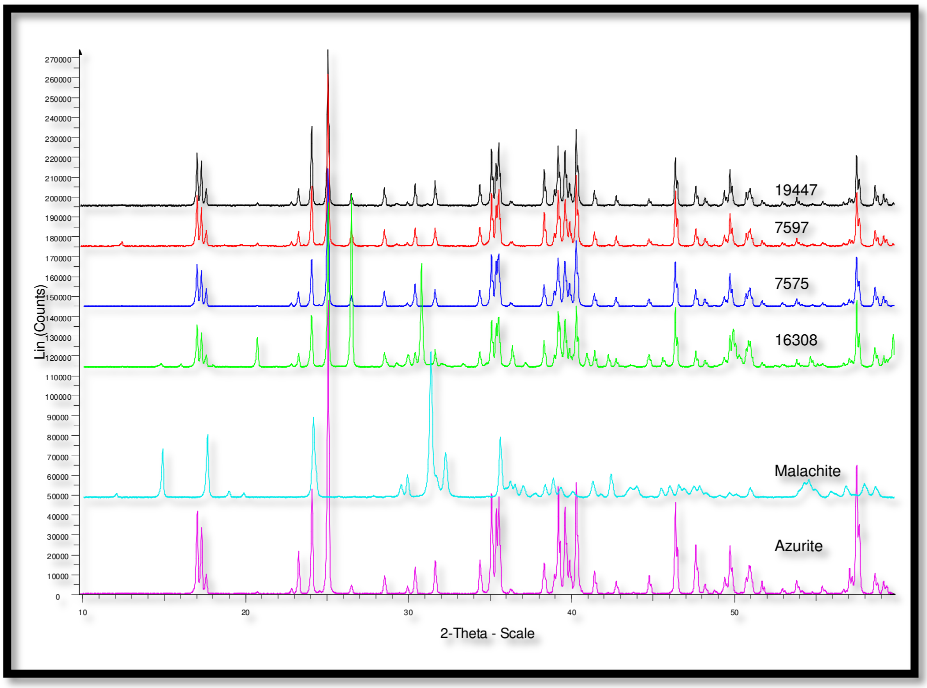



*Figure 3.21 X-ray Diffraction results for four blue powders from Çatalhöyük and powder reference samples from Kremer Pigmente: malachite standard (#10300.12050.104 grind 0-120$\mu$) and azurite FT-IR, azurite standard, (#10200.12050.108, grind 0-120$\mu$).*

### 3.2.2 Green

One sample of green mineral from unit 4225 was examined. XRF results (see Figure 3.22) showed primary peaks of copper (Cu) indicating a copper-based mineral. This eliminates the group of green earth pigments which do not contain copper and indicates one of the copper-based pigments from the group of copper salts, chrysocolla, or a copper carbonate. PLM examination showed the structure to be crystalline – ruling out the amorphous copper salts listed in Table 1.1 with a semi-crystalline particle structure.

Comparative FT-IR spectra in Figure 3.25 distinguished the green, copper-rich minerals malachite, chrysocolla, and atacamite; natural malachite results are characterised by a broad carbonate absorption between 1400 and 1500cm$^{-1}$ and a hydroxyl function at 3400cm$^{-1}$ with strong carbonate stretching bands at 1500 and 1400cm$^{-1}$. FT-IR results of the archaeological samples in Figure 3.24 are consistent with reference samples of the mineral malachite.

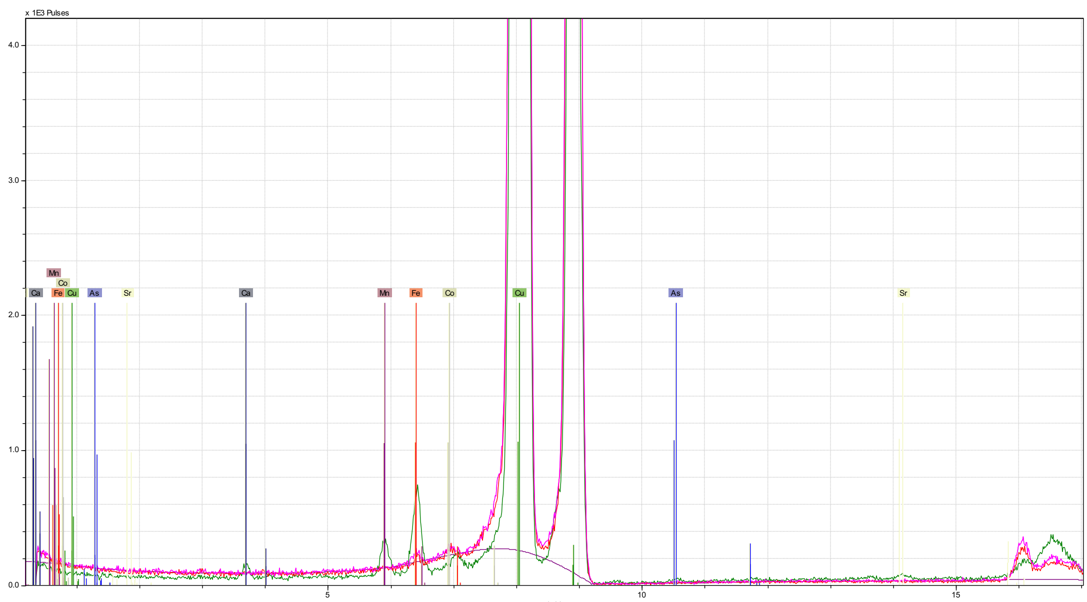



*Figure 3.22 XRF results of two readings (distinguished by red and green lines) from green pigment from u.4225 showing primary peaks for copper.*

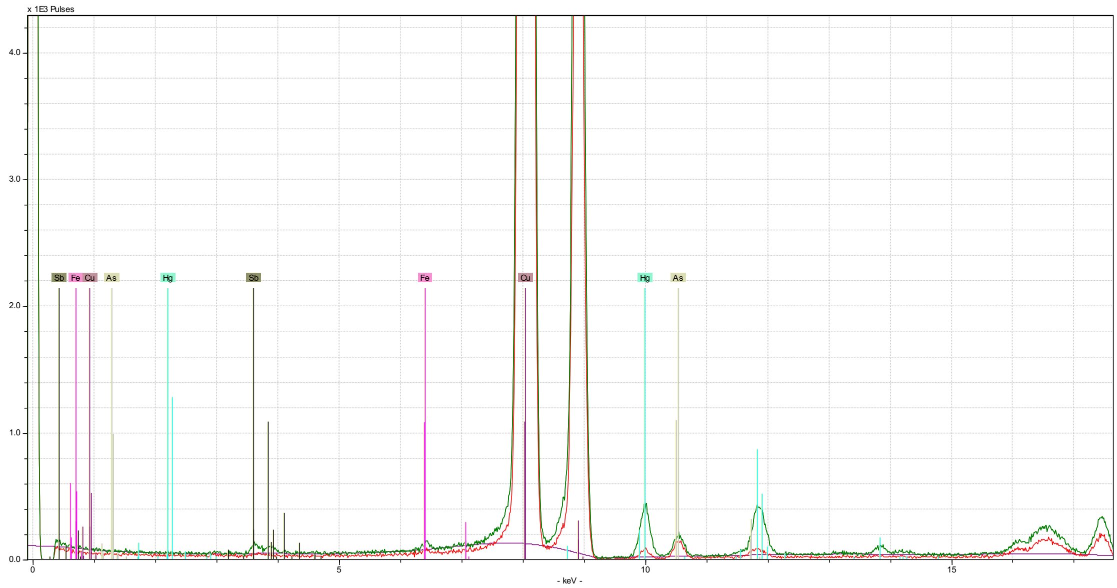



*Figure 3.23 Micro-XRF results for Kremer Pigmente reference pigments malachite, chrysocolla, and atacamite. Malachite (pink) and atacamite (orange) are nearly identical spectra, with major peaks for Cu and trace peak for Fe. Chrysocolla (green) also shows major Cu peak, the highest intensity Fe peak, with additional Mn, Ca.*

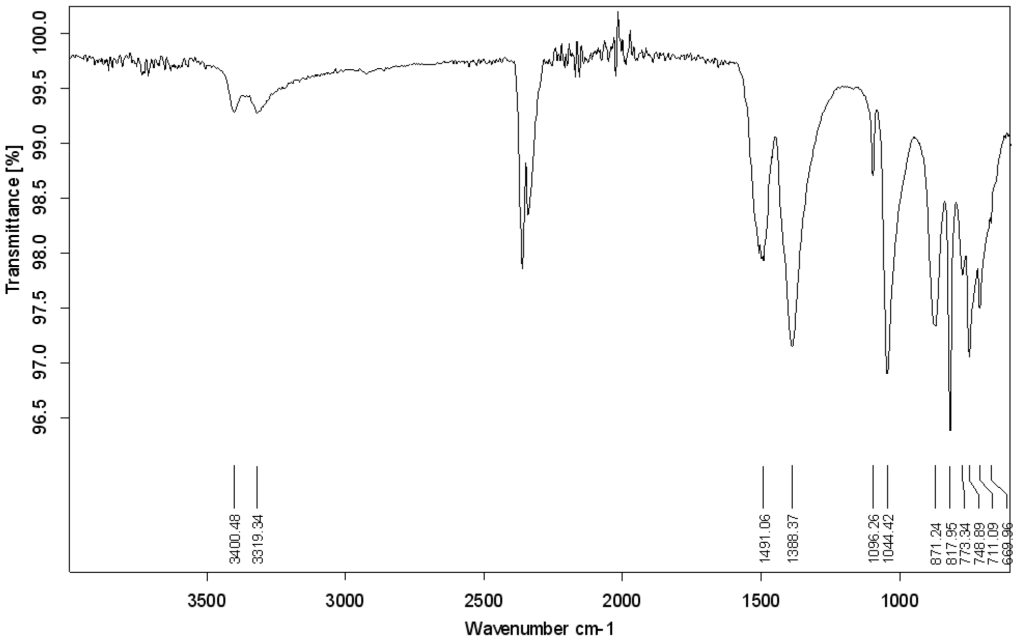



*Figure 3.24 FT-IR of green sample unit 4225.*

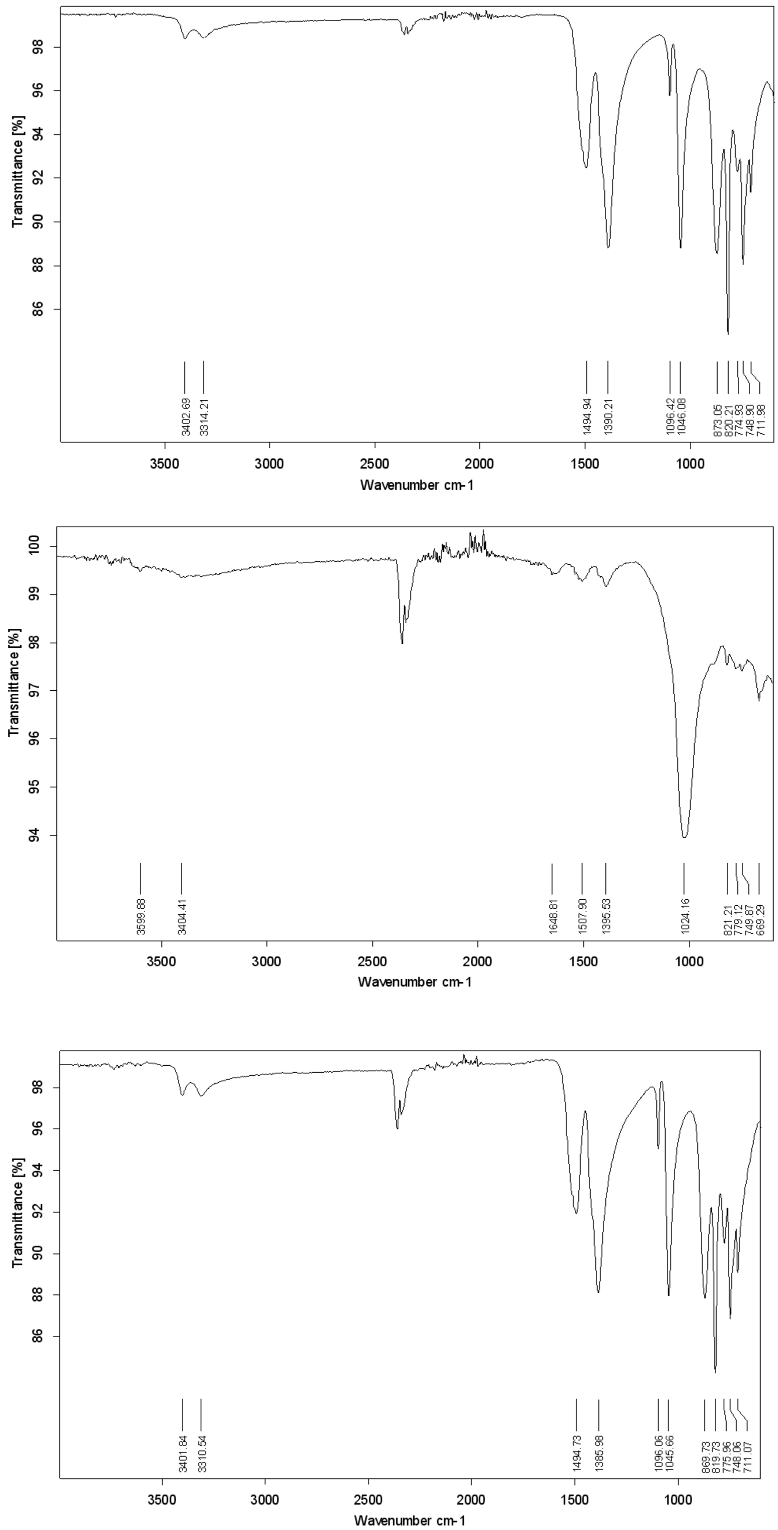



*Figure 3.25 Kremer Pigmente powder reference specimens: top left) malachite (#10300.12050.104 grind 0-120μ), top right) chrysocolla (copper silicate #10350.12050.104 grind 0-120μ), bottom left) atacamite (#103900.12010.104, 0-120 μ).*

## 3.2.3 Red and Yellow

### *3.2.3.1 Iron Oxides*

Fifty-two samples of red and yellow mineral pigment were analysed with XRF. Of these, all fifty-two samples were iron-rich with primary peaks for iron. Figure 3.26

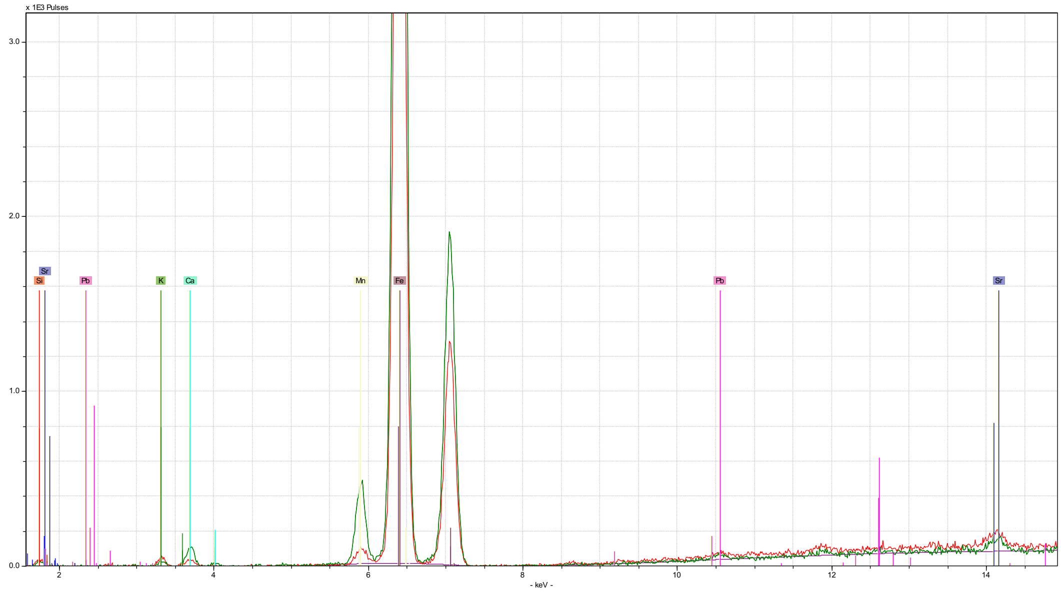



*Figure 3.27 XRF results for red iron oxide mineral showing primary peak of iron from unit 19457.*

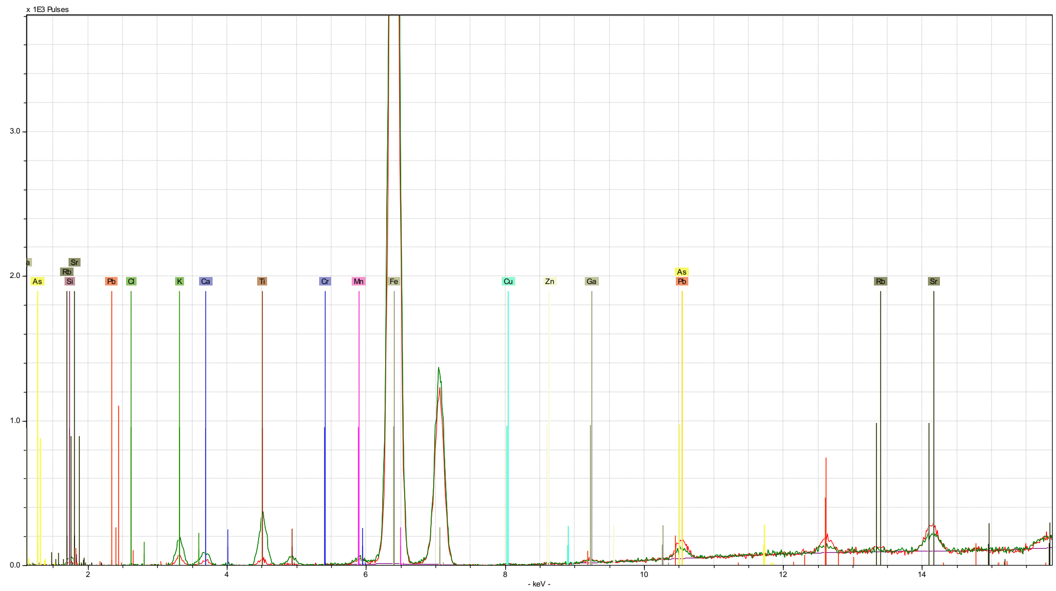



*Figure 3.26 XRF results for yellow iron oxide mineral showing a primary iron peak from unit 17532.*

shows an example of XRF findings for the red mineral from unit 19457. Figure 3.27 shows results for yellow iron oxide. Table 3.2 summarises the summary of XRF data for all red and yellow samples. The values in the table quantify the intensity of peaks relative to the primary iron peak of each sample. The value of the intensity of the iron peak on the y-axis has been normalised to 100; the values of other peaks have then been divided by that value to determine the percentage of the peak intensities for other elements. Table 3.2 also shows the calcium, manganese, and silica values relative to the primary iron peak. Calcium is the second most prevalent element in the data; the values for Ca are highest in yellow iron oxide samples and samples from painted wall plaster from units 5153, 18918s5-14 and 19700s5-7; or pigmented wall plaster from units 12456 and 11862. The trace manganese in rock-type samples 5349, 13365, and 19457 may indicate co-occurring manganese oxide in raw iron oxide samples. Silica is highest in two rock samples, 6250 and 13365, indicating accessory quartz-like minerals in the raw materials.

SEM results in Figure 3.28 show mapping images indicating the variety of particles in iron oxide sample from unit 14009; iron mapping shows particles rich in this element, with maps for oxygen, magnesium, silica and calcium. Figure 3.29 shows the image and accompanying spectrum for a particle in the same sample, confirming primarily iron and oxygen.

| Yellow pigments | Ca K12 | Fe K12 | Mn K12 | Si K12 |
|---|---|---|---|---|
| 5349_S5 | 23.9 | 100.0 | 11.0 | 0.0 |
| 5349_S10 | 11.9 | 100.0 | 1.4 | 0.0 |
| 15839_X12 | 127.5 | 100.0 | 1.1 | 0.0 |
| 17532_1 | 0.4 | 100.0 | 0.6 | 0.2 |
| 17485_S3 | 162.4 | 100.0 | 5.8 | 0.0 |
| 1993_1 | 126.8 | 100.0 | 2.6 | 1.0 |

| Red pigments | Ca K12 | Fe K12 | Mn K12 | Si K12 |
|---|---|---|---|---|
| 3290_S1_1 | 65.2 | 100.0 | 0.8 | 0.0 |
| 4407_1 | 7.6 | 100.0 | 0.6 | 0.0 |
| 4464_S13 | 9.8 | 100.0 | 1.2 | 0.0 |
| 4620_S1 | 9.9 | 100.0 | 0.4 | 0.0 |
| 4671_1 | 36.3 | 100.0 | 4.0 | 0.0 |
| 4947_S5 | 14.5 | 100.0 | 0.3 | 0.0 |
| 5153_S6 | 499.4 | 100.0 | 1.5 | 0.0 |
| 5214_1 | 11.2 | 100.0 | 0.3 | 0.0 |
| 5228_s4 | 8.5 | 100.0 | 0.4 | 0.2 |
| 5228_S3 | 0.6 | 100.0 | 0.3 | 0.0 |
| 6250_4 | 90.3 | 100.0 | 2.2 | 3.6 |
| 19223_S8 | 29.4 | 100.0 | 0.7 | 0.0 |
| 12867_3 | 0.1 | 100.0 | 0.2 | 0.2 |
| 13365_1 | 241.2 | 100.0 | 3.4 | 1.8 |
| 14009_S7 | 3.0 | 100.0 | 0.1 | 0.0 |
| 14009_S1 | 11.5 | 100.0 | 0.2 | 0.0 |
| 17048_3 | 11.7 | 100.0 | 0.5 | 0.7 |
| 17339_S12 | 0.1 | 100.0 | 0.1 | 0.0 |
| 18488_S3 | 0.1 | 100.0 | 0.5 | 0.0 |
| 18536_1 | 15.5 | 100.0 | 1.2 | 0.7 |

| | Ca K12 | Fe K12 | Mn K12 | Si K12 |
|---|---|---|---|---|
| 18544_1 | 27.4 | 100.0 | 0.5 | 1.3 |
| 18918_S5 | 58.4 | 100.0 | 1.1 | 0.0 |
| 18918_S6 | 103.8 | 100.0 | 1.8 | 0.0 |
| 18918_S7 | 71.3 | 100.0 | 1.0 | 0.0 |
| 18918_S8 | 57.4 | 100.0 | 1.6 | 0.0 |
| 18918_S9 | 62.8 | 100.0 | 0.7 | 0.0 |
| 18918_S10 | 47.2 | 100.0 | 1.1 | 0.0 |
| 18918_S11 | 72.5 | 100.0 | 1.0 | 0.0 |
| 18918_S12 | 40.9 | 100.0 | 1.1 | 0.0 |
| 18918_S13 | 39.0 | 100.0 | 0.4 | 0.0 |
| 18918_S14 | 45.9 | 100.0 | 0.9 | 0.0 |
| 19306_1 | 8.3 | 100.0 | 0.2 | 0.3 |
| 19457_1 | 0.5 | 100.0 | 1.4 | 0.3 |
| 19700_S5 | 73.1 | 100.0 | 1.2 | 0.2 |
| 19700_S6 | 8.8 | 100.0 | 0.2 | 0.0 |
| 19700_S7 | 78.1 | 100.0 | 0.4 | 0.1 |
| 4464_S14 | 6.8 | 100.0 | 0.9 | 0.0 |
| 1525_S8 | 7.1 | 100.0 | 0.1 | 0.0 |
| 4194_S1 | 4.0 | 100.0 | 1.0 | 0.0 |
| 5575_S3 | 15.2 | 100.0 | 57.1 | 0.1 |

| Late Levels, IST Area, Pink plaster, cake, & rock | Ca K12 | Fe K12 | Mn K12 | Si K12 |
|---|---|---|---|---|
| 12487_1 | 0.1 | 100.0 | 0.1 | 0.0 |
| 12487_S7 | 0.1 | 100.0 | 0.2 | 0.0 |
| 12456_S25 | 401.4 | 100.0 | 1.0 | 0.0 |
| 11862_S6 | 643.1 | 100.0 | 4.1 | 0.3 |
| 11862_S9 | 46.4 | 100.0 | 1.3 | 0.0 |
| 19808_1 | 1.2 | 100.0 | 0.2 | 0.1 |

*Table 3.4 Summary of XRF results for red and yellow mineral pigments. Numerical values are percentages of peak intensities relative to the iron peak.*

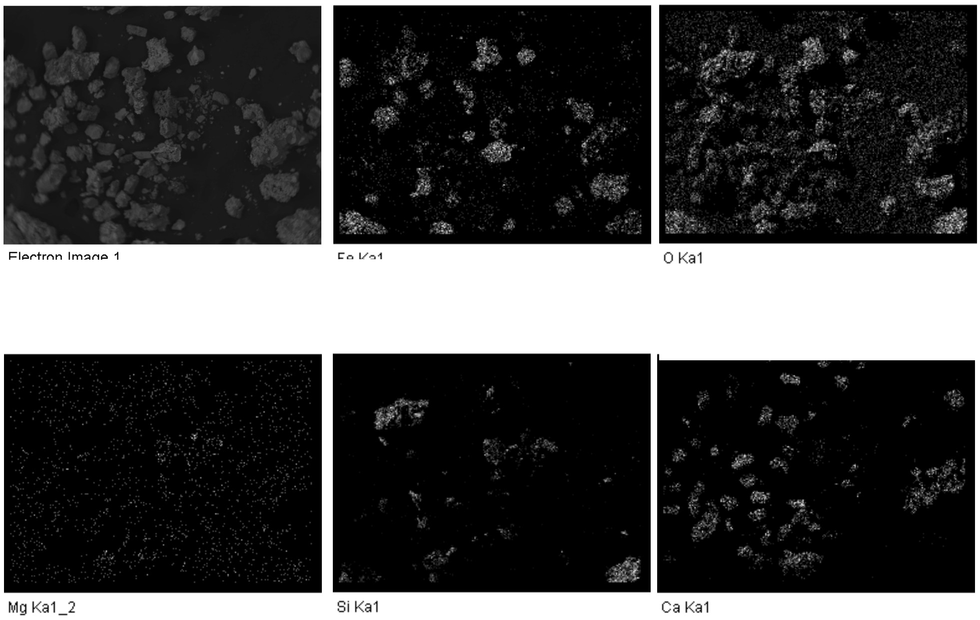



*Figure 3.28 SEM-EDS results for red iron oxide in sample from unit 14009. Element mapping of the sample showing iron present in several particles, with the electron image in the top left, iron in the top middle and oxygen in the top right with magnesium, silica, and calcium from left to right on the following row.*

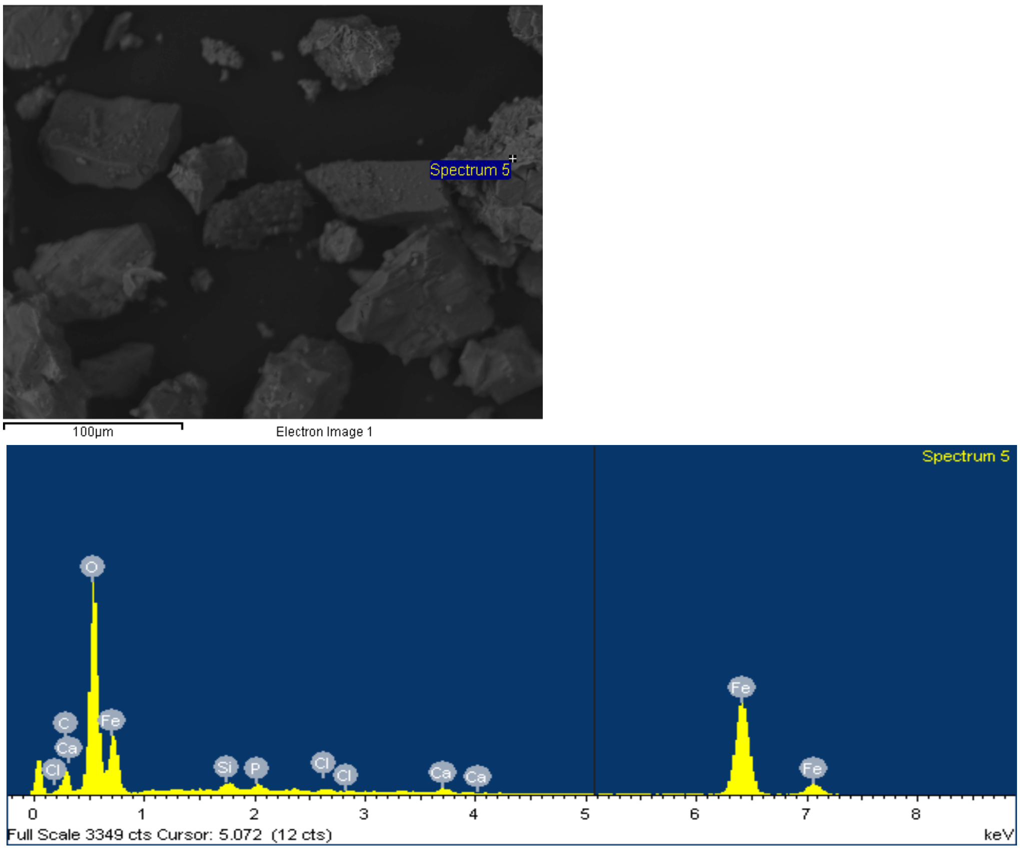



*Figure 3.29 Photomicrograph (middle) of an iron oxide particle also from unit 14009 with elemental spectrum (botom) showing iron and oxygen.*

In addition to sample characterisation, XRF and FT-IR spectra were collected from the ochre samples with the intent to create an archive of results for future study. The spectra are printed in Appendix VI and the raw data in full is in accompanying CD digital files. It was understood at the time of sampling that permission to export archaeological samples from the Cultural Ministry of Turkey was growing more difficult and may not be at all possible in future season. In addition, the 25-year permit for the ÇRP team was to expire in 2018. Therefore, it was vital to utilise the archaeological materials while they were available. The technical examination data of this is archived with macrophotography and all spectra in the CD accompanying the thesis. Hardcopies of the FT-IR spectra and summary tables for XRF are included in Appendix VI and SEM results in Appendix VIII.

### *3.2.3.2 Cinnabar*

XRF results were examined for evidence of mercury peaks which may indicate cinnabar (HgS), or arsenic peaks for orpiment or realgar. No rock, powder, or painted

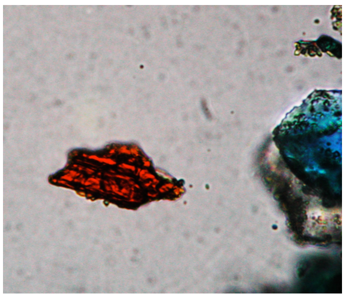


*Figure 3.30 Reflected light 500x unit 16308 with a red-orange particle within blue powder pigment.*

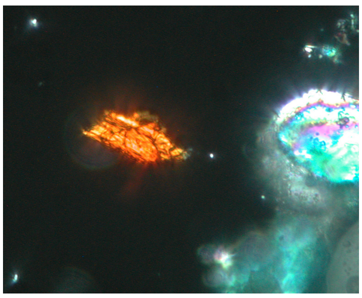


*Figure 3.31 PLM 500x under crossed polars shows a bright orange colour, angular particle shape with striations.*

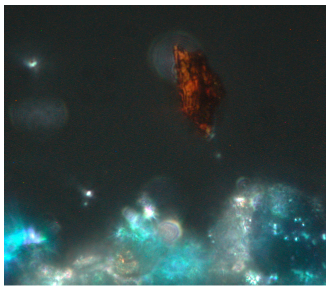


*Figure 3.32 PLM 500x under crossed polars, rotation of the stage shows straight extinction at a 45°angle, a characteristic of cinnabar and haematite.*

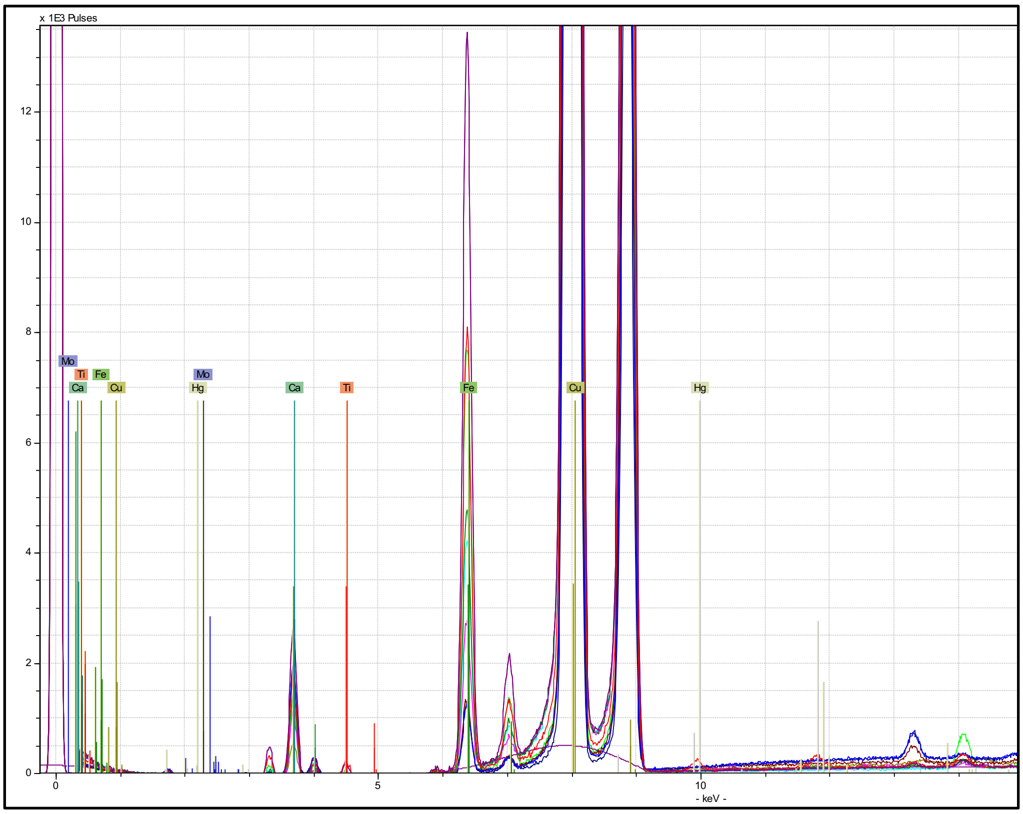



*Figure 3.33 XRF from blue sample 7575 showing trace peaks for mercury.*

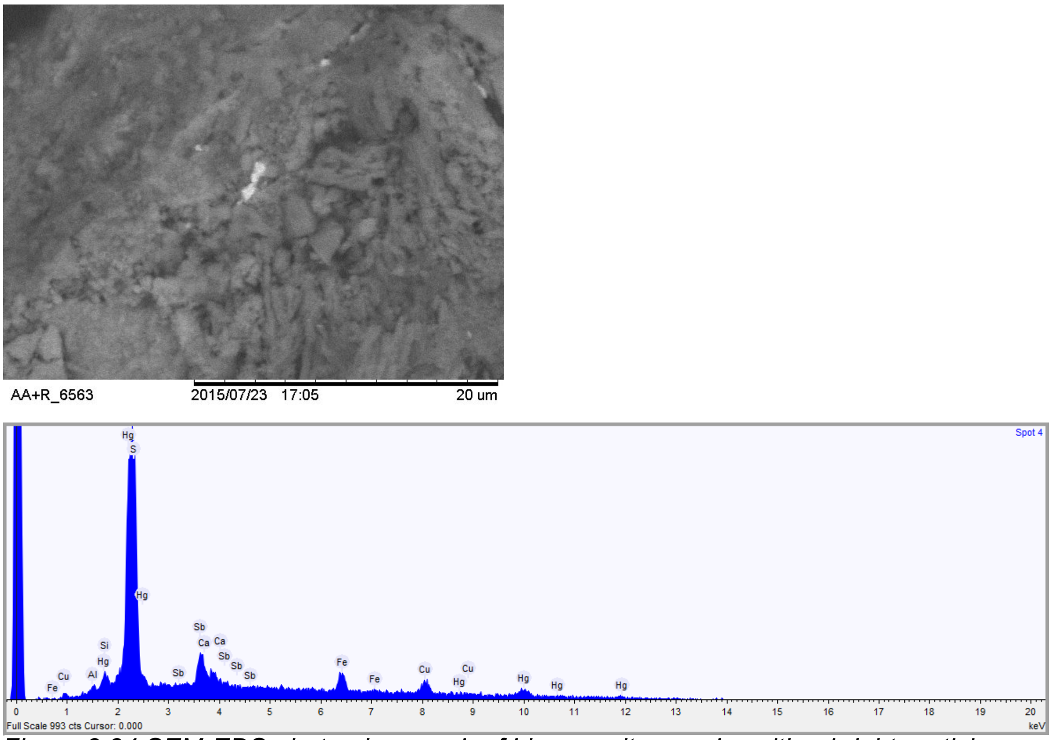



*Figure 3.34 SEM-EDS photomicrograph of blue azurite powder with a bright particle, indicating a relatively heavier atomic weight (middle figure). Element analysis confirms the presence of mercury, a constituent of cinnabar (bottom figure).*

red samples are found to be primarily cinnabar; red samples do not show conclusive results for mercury in anything other than trace peaks. In blue samples, a few red particles are observed in the PLM examination; they have red particles with straight extinction in particles, a characteristic feature found in cinnabar and iron oxide (Figures 3.30-32)

These were further investigated with XRF; it was found that samples 16308 and 7575 show peaks for iron and trace mercury peaks (See Figure 3.33). These results could indicate secondary iron oxide and trace amounts of cinnabar in the samples. To distinguish these, SEM-EDS confirms the red particles in blue samples were cinnabar (Figure 3.34).

## 3.3 Chaîne Opératoire of Artists' Colours

In the chaîne opératoire, artists' colours are selected from the landscape during the procurement stage. As raw materials, *minerals* and *rocks* are the first link in the chain of events of pigment use. The subsequent processing stage for natural minerals involves grinding into a *powde*r. Washing and levigation may also be used to process pigments to filter and collect the most desirable particles. These are collected and kept in containers such as shells or pouches. A type of pressed mass of pigment powder found in archaeological specimens at Çatalhöyük is a pigment *cake;* this refers to a coloured powder pressed into a lump to store and keep the pressed mass in a coherent form, perhaps for storage or to include in a burial, but it would not have been used as a tool to apply colour directly. Or, when evidence is present that the pressed cake was coherent enough to hold together while in the hand and could be used to apply colour directly to the wall, the term used here is *crayon*.

## 3.3.1 Rocks

A selection of rocks is presented here to highlight the raw materials used in the painting process. Two red rocks and one yellow rock were selected to highlight this sample type. They illustrate the natural mix of minerals in the composition of iron oxides, discussed in Chapter 1 with co-occurring minerals listed in Table 1.1. The technical analysis of each sample also shows the variation in readings that are possible, depending on which area of a sample is analysed.

Figure 3.35 shows a red rock with white and dark, near black, areas. The XRF reading from the red area is higher in iron, with the reading in the dark area higher in manganese (Figure 3.36). FT-IR readings from two different areas indicate different accessory


*Figure 3.35 (Top left) Red rock from North area, B. 108, unit 19457, showing a red body colour with (top right) white and dark coloured areas at 10x magnification.*

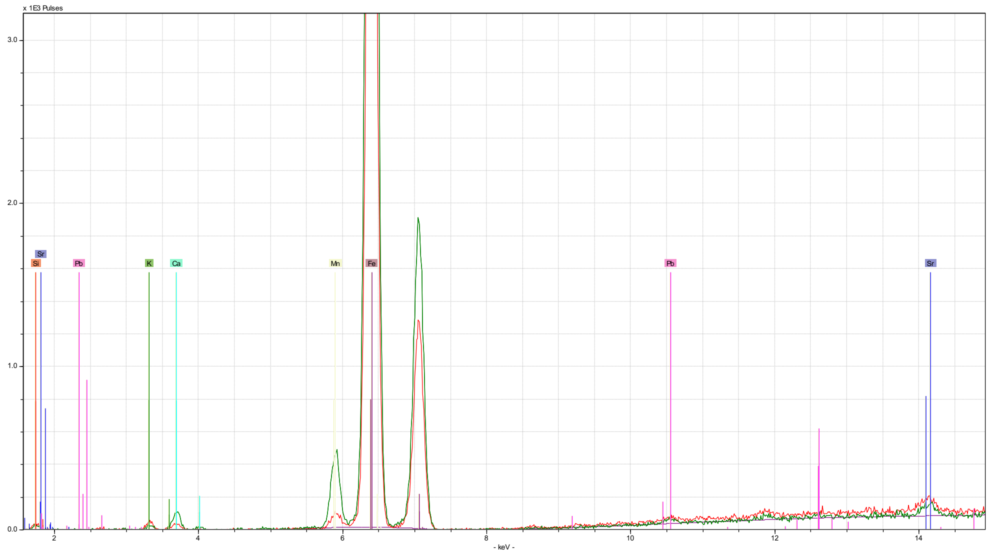
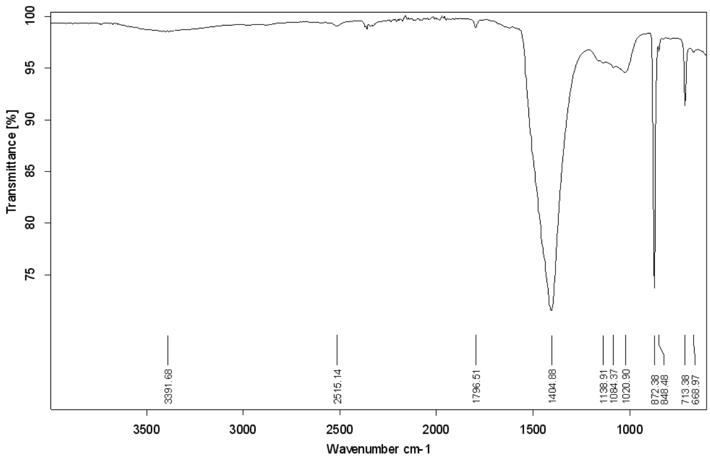



*Figure 3.36 XRF spectrum for unit 19457 with reading 1 (red line) of the red part of the sample high in iron. Reading 2 (green line) from the dark material in the sample is high in Mn, indicating the it to be a manganese-rich mineral such as manganese oxide.*



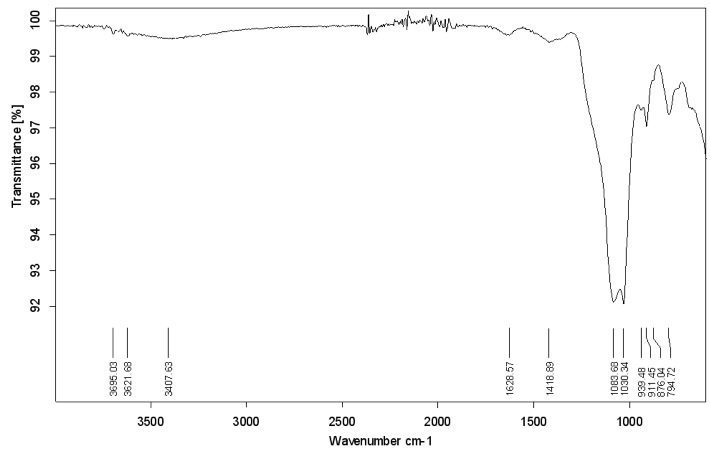




*Figure 3.37 FT-IR spectra unit 19457 (middle) reading from the white area of the rock, with peaks at 1404cm$^{-1}$ for calcite and 1084cm$^{-1}$ which may indicate quartz, and (right) from the red area of the sample with stronger doublet peaks near 1080cm $^{-1}$ for possible quartz, but no calcite peak.*

minerals; the white area of the rock has peaks, indicating a calcite-like material, with the red area reading with peaks consistent with a quartz-like accessory mineral.

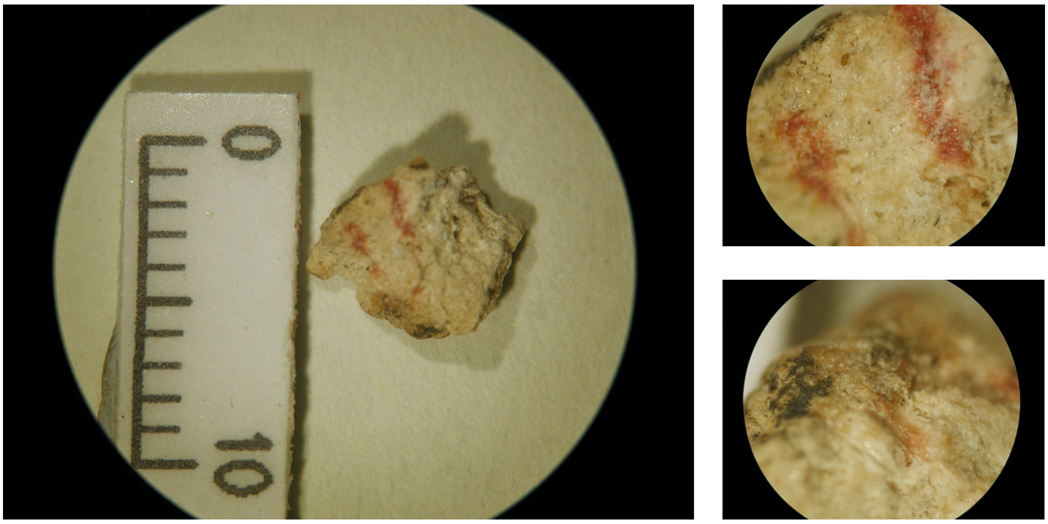



*Figure 3.38 (Left) Rock from the North area space 88, unit 6250. 10X magnification shows (upper right) red stripes and (lower right) areas of black.*

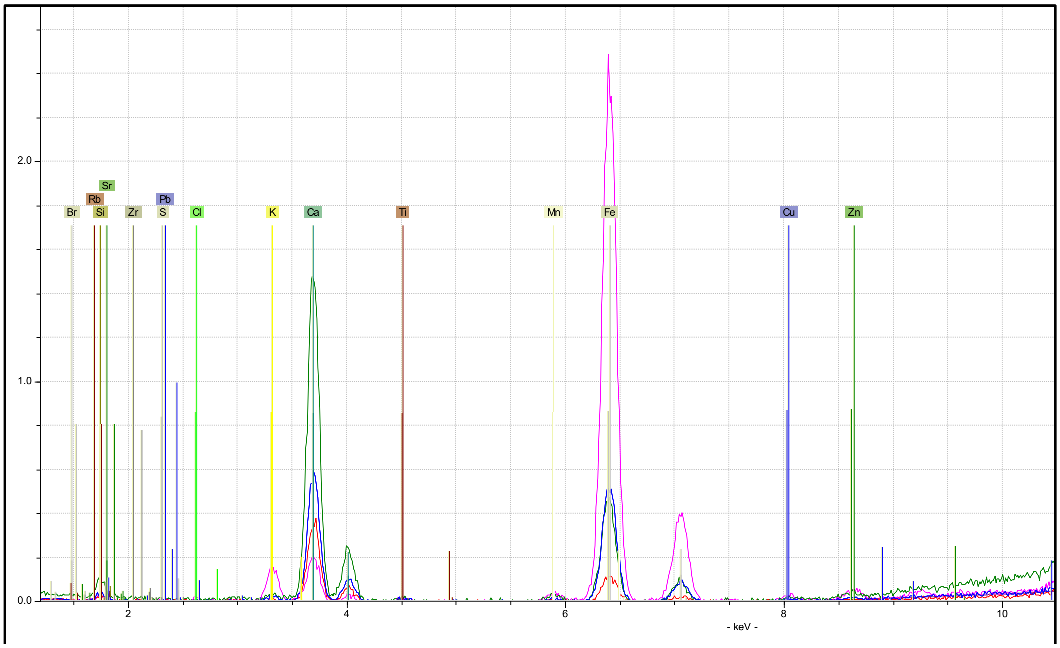



*Figure 3.39 XRF of four areas of the 6250 rock. Reading 1 (pink line) is from the red area of the rock with primary peaks for iron; reading 2 and 3 (green and red, respectively) are from the dark/black area of the rock with higher manganese and lower iron peaks; reading 4 (blue line) is of the the white area with higher calcium peaks.*


*Figure 3.40 Yellow rock from the TP area, space 372, unit 15839.*

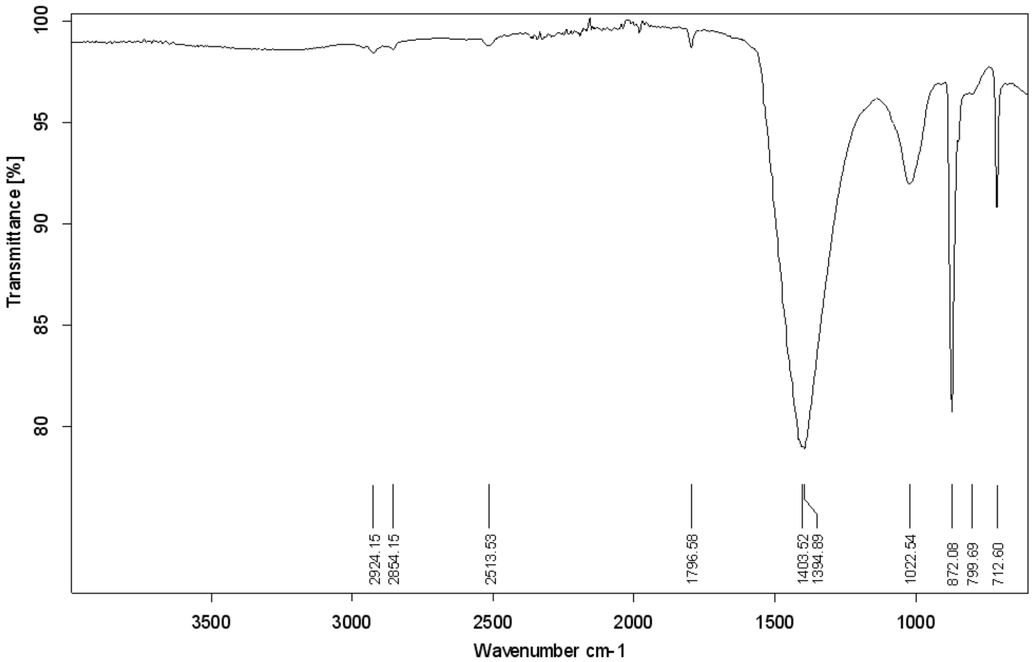



*Figure 3.41 FT-IR results for yellow powder from the rock, unit 15839. Hydroxyl bending peaks for goethite are at 872 and 799cm$^{-1}$ and a peak for calcite at 1403cm$^{-1}$.*

Figure 3.38 shows a rock from the North area, unit 6250, with a white body, red-stripes, and dark areas. Each area was analysed separately with XRF, with each reading indicating the compositional differences within the sample. Figure 3.39 shows that the red area of the sample has iron as the most intense peak, most likely from the red iron oxide, whilst the dark spots show manganese peaks, indicating a manganese oxide accessory mineral. The white body has high calcium peaks, reflecting the calcium-based body mineral.

Figure 3.40 shows one of the few yellow samples from the South area in the Çatalhöyük pigment archive. It comes from the Late Level occupation in the area excavated by Team Poznan (TP). XRF in Table 3.2 shows the primary peak for calcium and a secondary peak for iron. Figure 3.41 shows peaks consistent with calcite mineral being present in FT-IR readings.

These three rock samples illustrate the complexity of raw materials from the initial stage of the chaîne opératoire. It is analytically useful when examining the final stage of paint layers to first consider the raw materials and the multiple constituents they can contribute. Especially in archaeological pigments that are not as highly processed, filtered, and purified as modern pigments can be, minerals from which pigment and then paint layers are made are in a more rough, natural state when they are then processed with grinding, and sometimes levigation. This less refined raw material and multiple accessory minerals can result in more complex spectra from analytical techniques.

## 3.3.2 Crayon

A particularly interesting sample demonstrates the practice by Neolithic painters at Çatalhöyük to compress pigment powders into shape to be able to hold in the hand. This is the first proof at Çatalhöyük of the technique of making crayons. Figure 3.42 shows the flat base of the crayon with a second flat surface at a nearly ninety degree


*Figure 3.42 The red ochre crayon provides evidence of pigment processing in the open courtyard in level V (Hodder P) from unit 17339. The crayon was compressed from ground pigment, then held in the hand, with the curved edge, and applied to a wall, forming a flat surface. The picture shows the flat surface of the crayon with a second flat edge along the base at a 90-degree angle.*

angle along the base. Opposite the flat surface is a rounded, convex surface which would have fit into the palm of a hand. Rubbing of the crayon along a wall would produce the flat surfaces. The sample pictured in Figure 3.42 was excavated from an open courtyard in level V in space 333. Figure 4.43 shows space 333, unit 17339 is an open courtyard-type area between buildings, likely to be a processing area for grains and, with this evidence, perhaps pigments as well.

Table 3.2 showed the XRF analysis of this sample has primary peaks for iron. Figure 3.44 shows FT-IR results with peaks at 1079 and 795cm$^{-1}$ consistent with quartz and

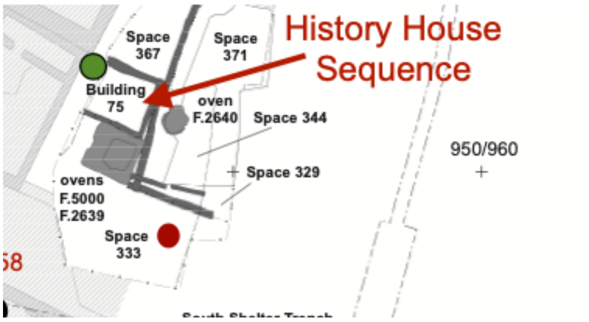



*Figure 3.43 Detail of GIS map for level V with the findspot for the crayon in Space 333.*

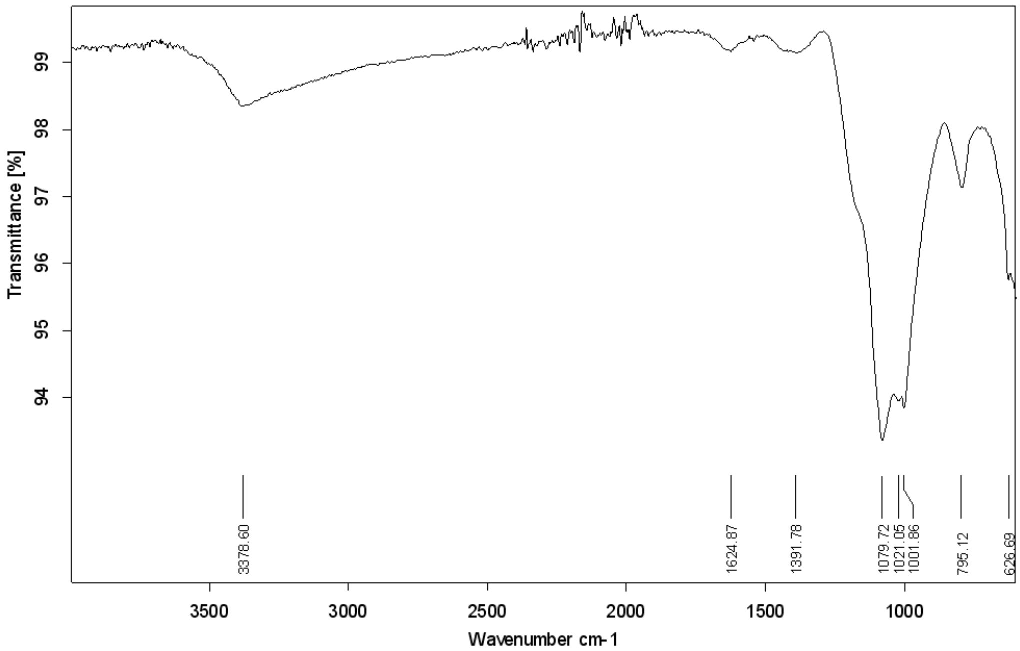



*Figure 3.44 FT-IR spectra for the crayon from space 333 with peaks at 1079 and 795cm$^{-1}$ consistent with quartz and the Fe-O peak at 630cm$^{-1}$.*

the Fe-O peak at 630cm$^{-1}$. SEM-EDS confirm Fe and O (in iron oxide) with Si (quartz) in a particle from the sample (Figure 3.45). Technical analysis of the sample confirms it to be a relatively pure iron oxide with a quartz-like accessory mineral.

### 3.3.3 Pigmented Plaster

An unusual technology for pigment use was found in the Late levels. This is the only case of pigment mixed directly with wall plaster. This pigmented wall plaster was

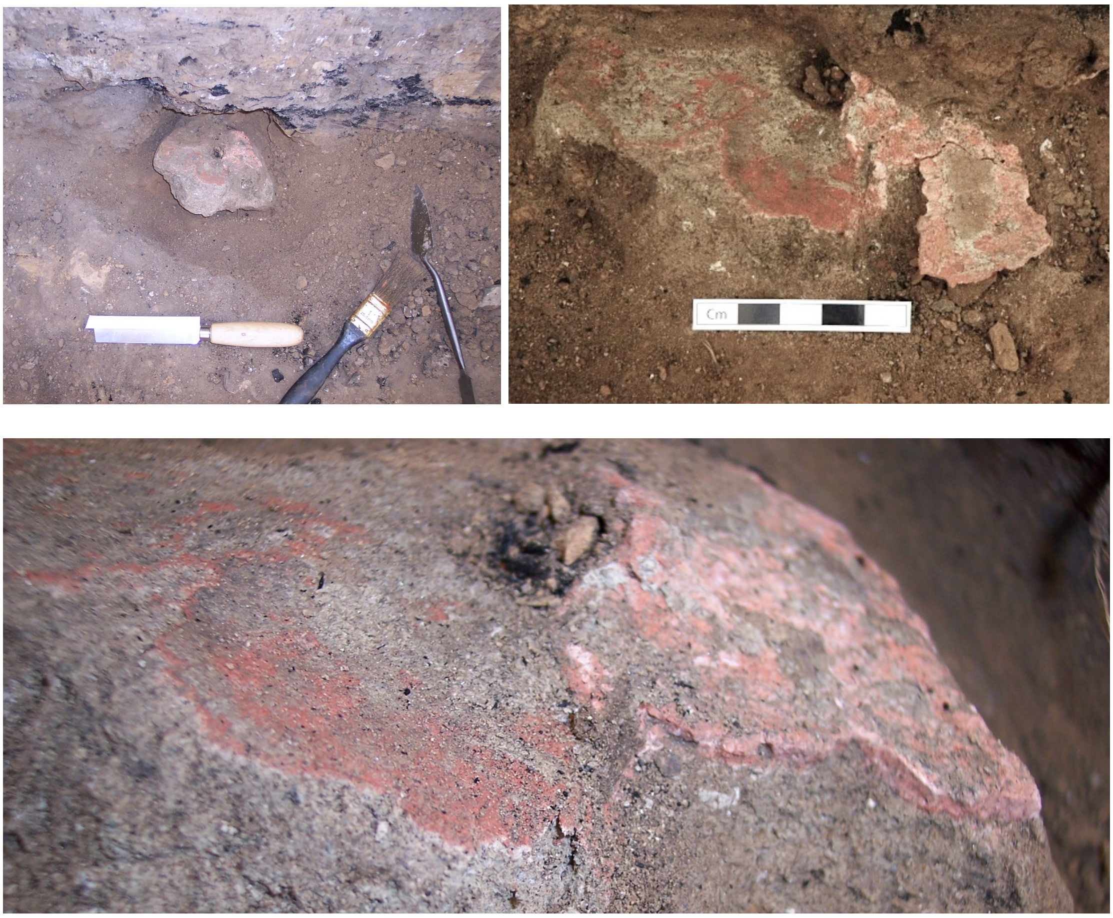


*Figure 3.45 Pigmented plaster in situ from building 63, unit 11862. (Top right) Working shot of excavating the articulated plaster, (top left) the plaster in situ, and (bottom) detailed pictures of the pink plaster. Photos: Author's own.*

| **Late Levels IST Area Pink plaster** | **Ca K12** | **Fe K12** | **K K12** | **Mn K12** | **S K12** | **Si K12** |
|---|---|---|---|---|---|---|
| 11862_S6 | 643.1 | 100.0 | 6.1 | 4.1 | 10.6 | 0.3 |
| 11862_S9 | 46.4 | 100.0 | 23.1 | 1.3 | 1.1 | 0.0 |

*Table 3.5 Summary of XRF results for pigmented plaster from building 63.*

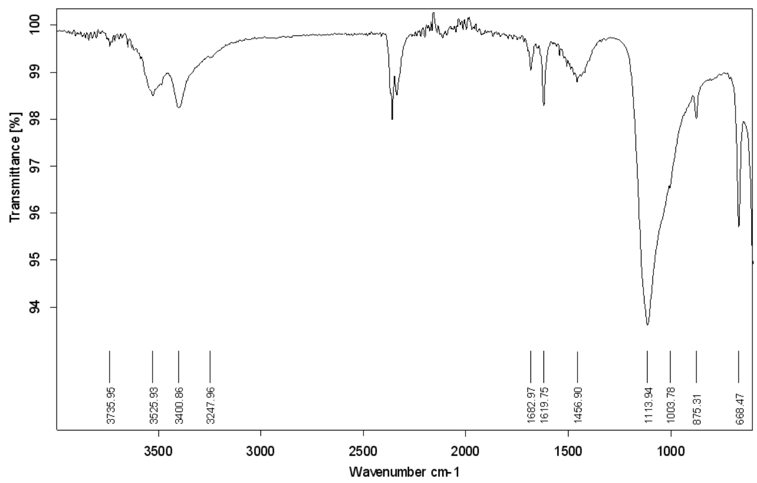



*Figure 3.46 FT-IR spectrum from unit 11862 show peaks at 1113, 1619, and 669cm$^{-1}$ consistent with gypsum.*

found in building 63 in the area excavated by the Istanbul University team (Figure 3.46)

Elemental analysis showed the pigmented plaster contains primary peaks for calcium, with secondary peaks of iron with less intense peaks of potassium and sulphur, as shown in Table 3.3. FT-IR showed peaks consistent with gypsum.

## 3.3.4 'Heirloom' Plaster Painted Plaster Fragment

During excavations while I was working on the on-site archive, an excavator called me over to inspect a house deposit, that is, a collection made when Neolithic peoples install items of significance under floors and platforms, in Building 96 (Middle Levels). During the life of the Neolithic building, a large plaster fragment was taken from an earlier

building and placed beneath the floor as a sort of 'heirloom', perhaps of a person or place, to bring into a new building. What caught the eye of the excavator was that the exposed corner of the fragment was red when she first excavated it. But, throughout the day, the colour changed from red to a dusty grey, darker than the

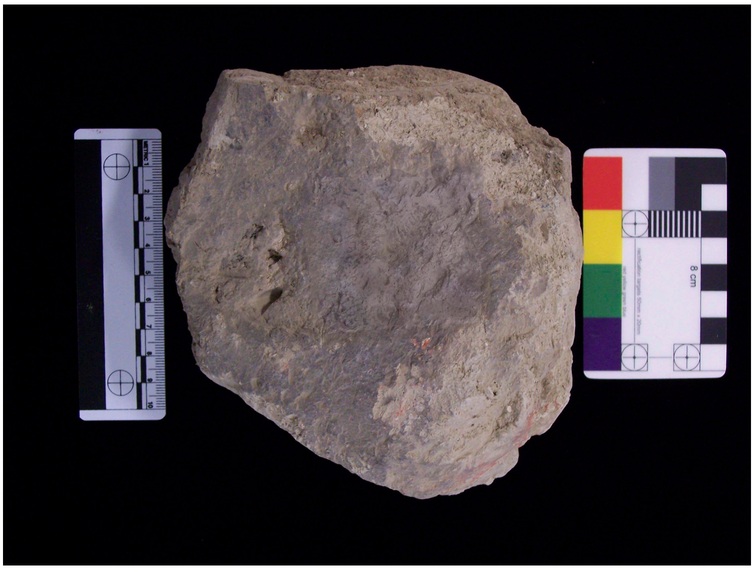


*Figure 3.47 Macrophotograph of painted plaster fragment buried under building 96, level VII as a house deposit. The painted surface turned from red to black over two days after excavation.*

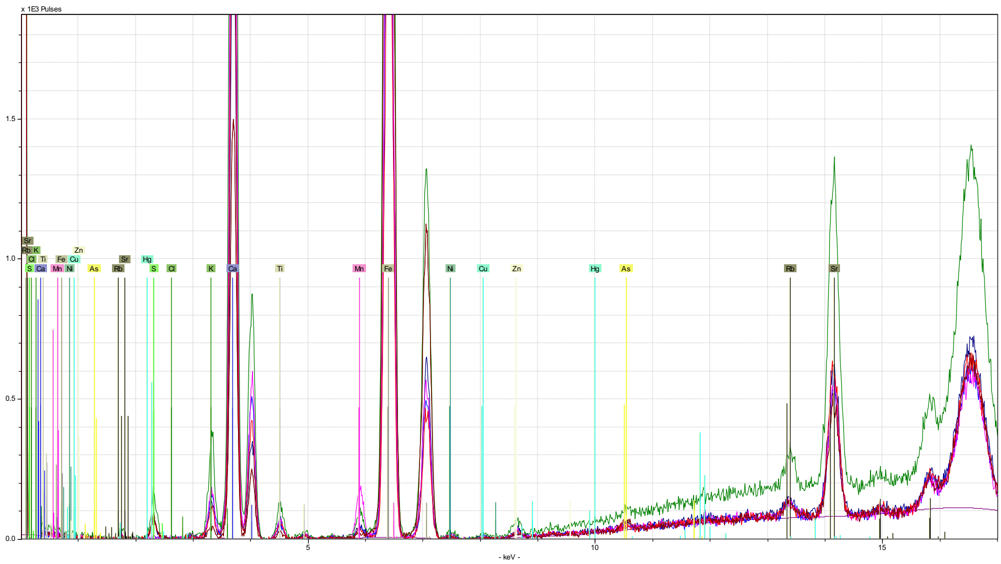



*Figure 3.48 The result for the surface of unit 19700. Results show intense peaks for iron and calcium, most likely attributable to iron oxides in the paint layer and a calcium-based plaster, with a low intensity peak for mercury, indicating possible cinnabar within the mixture.*

underlying mudplaster. I thought this could simply be a thin layer of paint covered the surface and was wiped away in the excavation process. But I was aware of Mellaart's archive reports in which he recalls this colour change from red to grey, most notably in the figures of the famous 'Hunting Shrine' murals in V.III. The phenomenon of pigment colour change from red to grey upon excavation was also confirmed by conservator Pamela French in our personal communication in 2012. In the 1960s, French was a student conservator from UCL who worked on the Çatalhöyük murals on-site and again later in the Museum of Anatolian Civilizations in Ankara. (See French 1968, 1974).

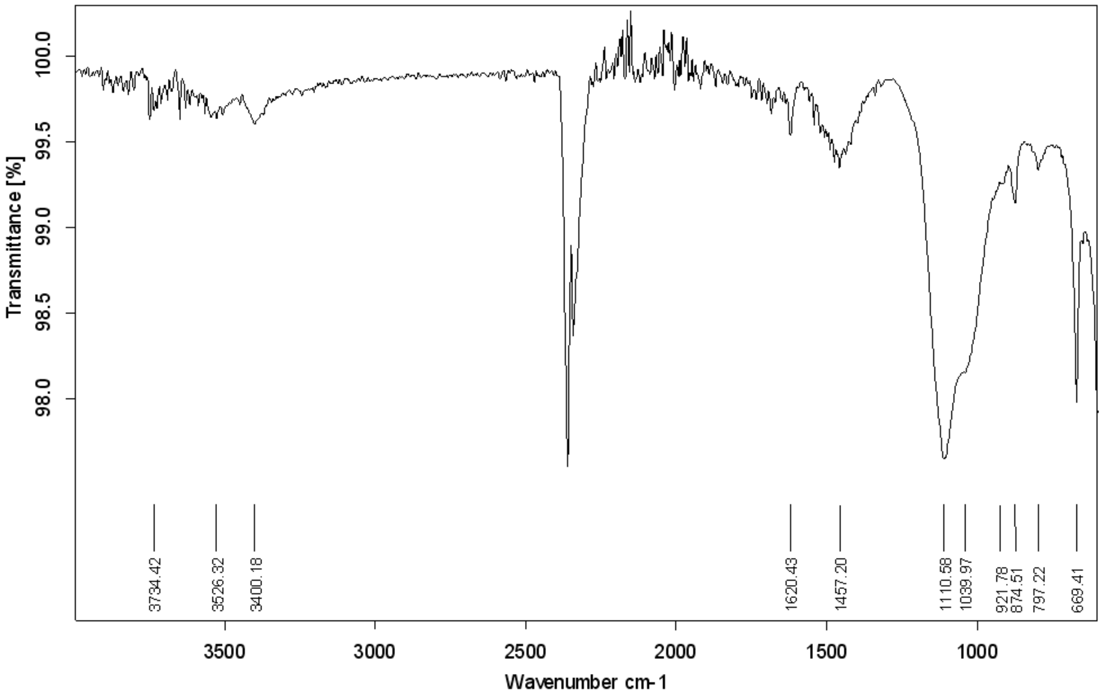



*Figure 3.49 FT-IR analysis of the surface of 19700 showing peaks consistent with gypsum at 1110, 669, and 1620cm$^{-1}$; see reference spectrum Figure 3.3.b.*

To investigate, I finished the excavation of the fragment to observe if the rest of the surface changed colour. Indeed, the freshly excavated surface was bright red then faded to a dark grey. Inspection showed under the surface colour, now grey, were an additional four bright red paint layers with white plaster in between. The plaster fragment was exported for analysis. See Figure 3.49. XRF analysis of the plaster surface and bulk powder removed from the surface were positive for Fe and Ca, the constituents of the red iron oxide (see unit 19700 samples in Table 3.2), with slight traces of Hg and S, the components of cinnabar (HgS) (Figure 3.49). With XRF and SEM-EDS, mercury on the surface of the fragment and on the painted layer was difficult to detect, with the primary peaks indicating iron and calcium. Traces of chlorine, as is often associated with darkened sulphide surfaces (see Section 1.2.5), was not detected with XRF.

Figure 3.49, FT-IR detects peaks consistent with gypsum on the painted surface. This is consistent with analysis in archaeological wall paintings which have found gypsum co-occurring on darkened layers of red painting (Cotte 2006; Neiman et al 2015; see Figure 3.3b for gypsum reference spectrum). Future work is advised to investigate this interesting sample in more detail. Unfortunately, resources were not available for additional time and instrument access; XRD and SEM-EDS analysis would prove the most useful to detect compounds associated with the darkening.

### 3.3.5 Archaeological blue bone: pigment staining or diagenesis?

Faunal experts at Çatalhöyük were interested in determining the cause of the blue colouration observed on some animal bone samples. It was possible the bone was stained with blue azurite pigment, or that the colour was part of a natural post-deposition process. I tested the samples for evidence of copper or other unusual element that may indicate intentional staining instead of diagenesis.

*Figure 3.50 Archaeological animal bone samples with a blue hue from unit 18552 (left) and unit 18545 F. 43 (right).These were analysed to determine if the source of the colour was pigment staining or diagenesis.*

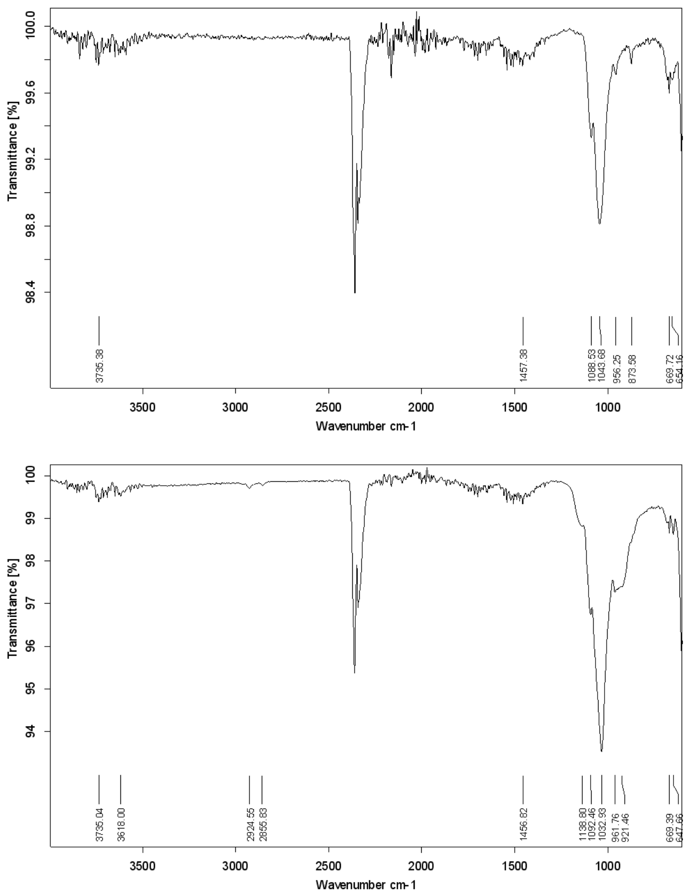



*Figure 3.51 FT-IR results (units 18552 top, 18545 middle) are positive peaks in the 1025cm$^{-1}$ and 1088cm$^{-1}$ range as expected for bone and negative for peaks expected if azurite were present and causing colouration, seen in reference spectra below.*

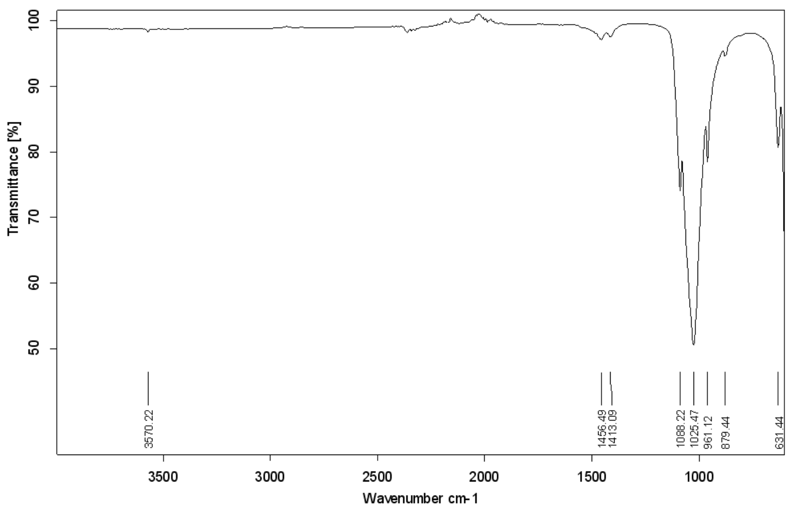



*Figure 3.52 Reference spectra from Kremer Pigmente for bone ash #58920.12100.136, showing peaks at 1025cm$^{-1}$ and 1088cm$^{-1.}$*

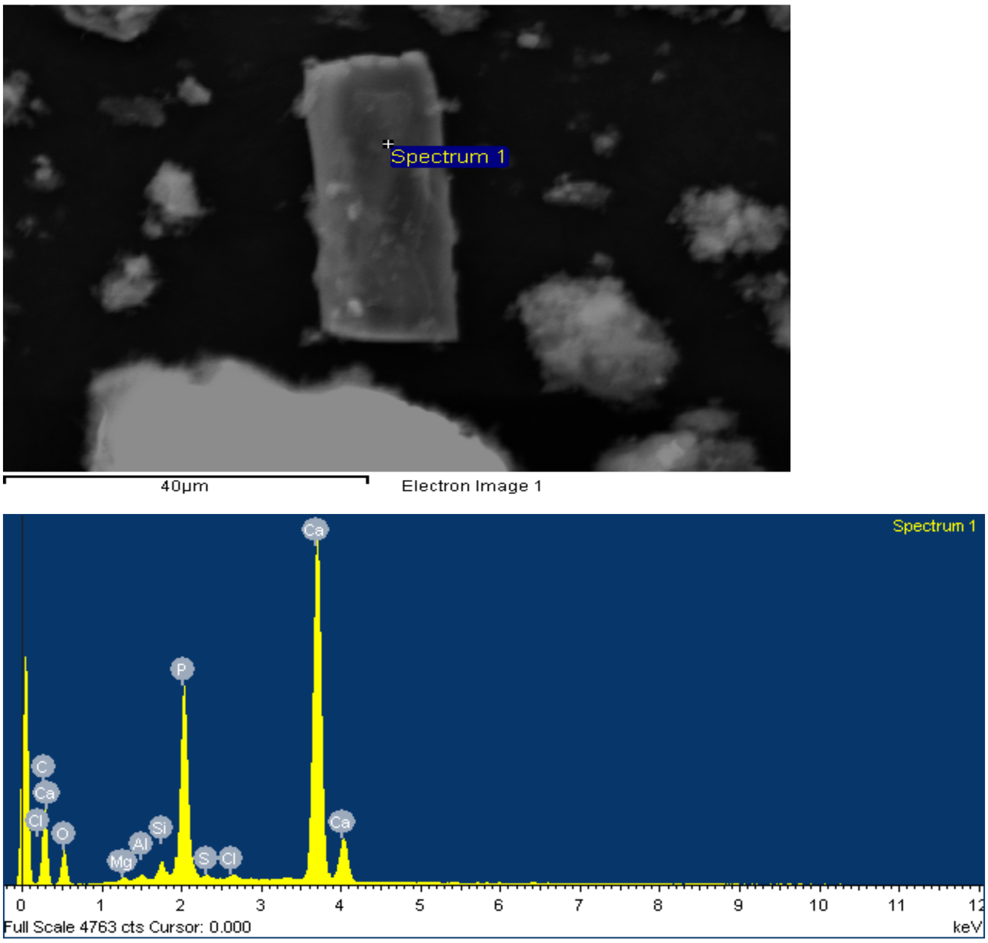



*Figure 3.53 SEM-EDS for blue coloured archaeological bone from unit 18536. Elements of calcium and phosphorus, components of inorganic bone, are present in the elemental mapping. No iron peaks were found in the sample, indicating the colouring is from a diagenetic process, rather than added copper pigments.*

Figure 3.50 shows two examples of coloured bone. FT-IR results in Figure 3.51 show the staining observed on archaeological bone is consistent with reference samples for bone in Figure 3.52. The FT-IR results do not show peaks from blue colouring agents such as azurite. SEM-EDS elemental analysis, Figure 3.53, shows the expected peaks for bone, calcium and phosphorus; no copper was detected. The results of bone particles match that expected of the inorganic components of bone, with no additional peaks, such as copper from a copper carbonate, to indicate other components. This indicates the blue hue of the bone is from natural causes such as burning prior to deposition or diagenesis, but not by intentional staining with blue pigment by Neolithic peoples.

## 3.4 Summary

The technical analysis of pigments illustrated the complex nature of the raw materials used in archaeological wall painting. First, museum specimens showed the diversity in composition and the resulting appearance of minerals that prehistoric peoples would have curated from their environment for use as colours on their paintings and bodies. Azurite museum specimens show the co-occurrence of malachite and iron oxides. Examining cinnabar specimens demonstrate the importance of chemical analysis, as identification by eye can be deceiving; the colour of some cinnabar specimens can appear similar to iron oxides.

Analysis of blue colours illuminate the composition of samples and its influence on overall colour. Particle size analysis showed that the lightest blue sample from unit 16308 was not, in fact, the most finely ground, which would be expected if a fine particle size were the cause of the lighter hue, relative to other samples. Accessory minerals were found to be the cause of the lighter colour in sample 16308, with additional dolomite present in only this sample. These findings are contrary to prior reporting by Çamurcuoğlu (2013, 2015) that this sample is malachite and that the lighter in colour is due to smaller particle sizes.

The compositions of red and yellow iron oxides were found to contain silica and calcium-based accessory mineral such as quartz and gypsum. This is consistent with prior reporting by Çamurcuoğlu (2015). New findings report manganese oxide in raw materials and painted layers. The question regarding blue staining on animal bone was answered, determining no pigment was present and the colour is most likely due to a post-depositional, diagenetic process.

The chaîne opératoire of painting at Çatalhöyük was illustrated with selected samples of rocks, and unique new findings of a pigment crayon and pigmented plaster.  An 'heirloom' painted plaster from the Middle levels showed the Neolithic practice of removing parts of buildings to deposit in the next generation of houses was practiced at this level. The interesting colour change of the surface of the fragment along with the technical analysis indicate the pigment was cinnabar. The composition of all selected samples was reported.

# CHAPTER 4 COLOUR IN TIME AND SPACE

## 4 Introduction

As was explained in Chapter 1, this thesis addresses the primary question, 'What can we understand of Neolithic peoples from their use of artists' materials?'. To address this question in a robust and holistic manner, the last section examined colourants on a microscopic scale with technical analysis. In this section, the lens of examination focuses on the macroscopic. Archaeological evidence is examined to see the broader story of colour use over the ±1,100-year occupation.

Sources of data for this chapter include archival excavation reports from 1961-6 and the ÇRP database from 1993-present, monographs by Mellaart (1967) and Todd (1976), and empirical data collected by the author from the survey of the on-site ÇRP archive of pigment samples. These are brought together for the first time to merge findings from Mellaart's excavations in the 1960s and the current ÇRP campaign and give a full picture of the chronology and uses of pigments at Çatalhöyük.

Section 4.1 presents colourant chronology in Table 4.1, Master Table of Pigment Use, which gives details of the use of colourants in wall paintings and all other contexts in each of the chronological levels. In Section 4.2, the spatial analysis of pigment use is synthesised to establish a comprehensive and up-to-date body of evidence.

In Section 4.1.3, evidence for copper artefacts is tracked alongside the results for rare pigments to investigate their relationship on-site. The results of chronological use of pigments are summarised in Table 4.2; of rare pigments and copper artefacts in Tables 4.3 and 4.4; and of spatial data in Figures 4.3 through 4.16.

Of particular interest in the palette is the chronology of the use of blue at Çatalhöyük. It has been claimed, but not substantiated, that this is the first use of blue pigments in human history. Section 4.1.3 gives results for investigating the question, ‘is azurite at Çatalhöyük the first documented use in human history?’.

Section 4.3 examines art in the context of the well-established theme of history as a strong element of culture at Çatalhöyük. A sense of history and long-term memory is evidenced by Neolithic peoples’ use of architecture and the long occupations of history house locations observed by Hodder and Pels (2010). From these results, we examine whether there is a strong or weak correlation between art and houses with long sequences of occupation verses all houses; this throws light on the nature of the connection of history with art in Neolithic culture at Çatalhöyük.

Lastly, Section 4.4 addresses the research question regarding sources of rare pigments. The scale of investigation is broadened out from Çatalhöyük to Anatolia. Mineral sources from which rare pigments could be procured in the Anatolian landscape are mapped in relation to Çatalhöyük and the locations of other connected Neolithic sites. From the chronology of pigment use, examination of the archaeological record, and mapping the landscape for potential sources of copper in the Neolithic, evidence points to new insights.

# 4.1 TIME: Chronology of Colourants

## 4.1.1 The Master Summary of Colours

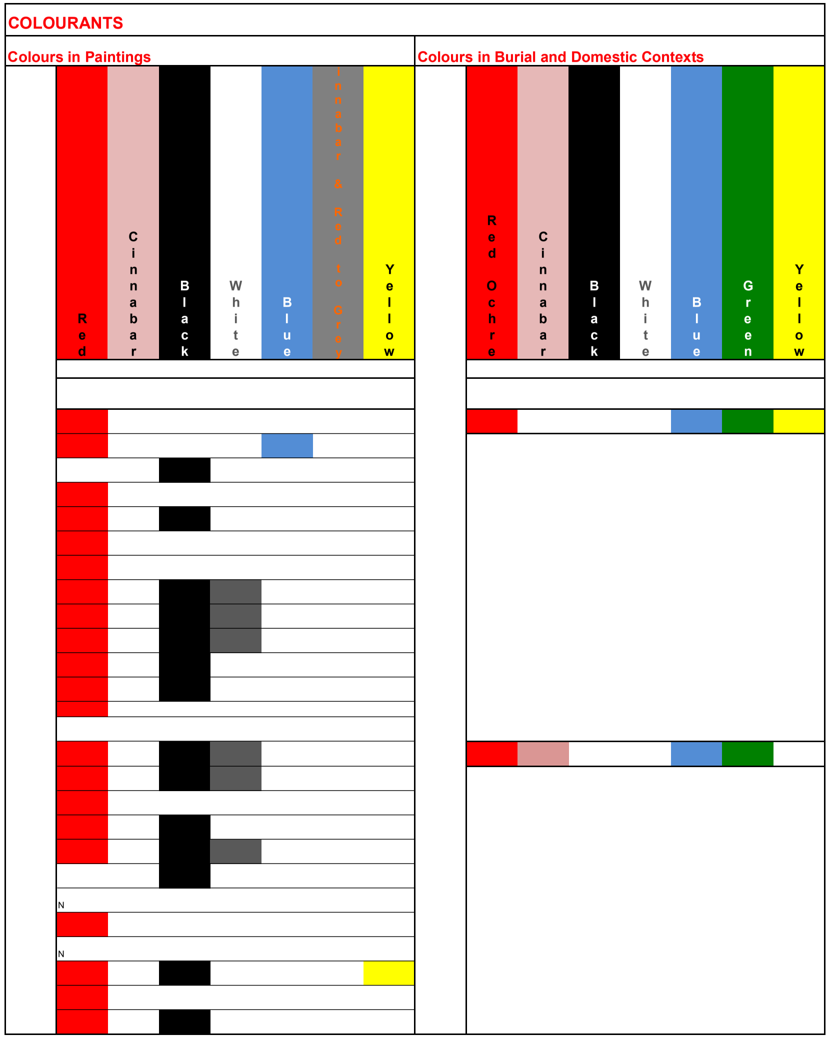
Table 4.1 shows results for colours found in each of the wall paintings in columns one and two, and summarises colours found in burials and domestic contexts per

*Table 4.1 Master Table for Colourants in Paintings, Burials, and Domestic contexts. More detailed dates for each building, if available, are to the right of the building field. Sources for Radiocarbon dates: *Chronology from, Cessford 2005, Hodder, Chapter 1, Fig. 1.5 CH vol. 9. **Chronology from Bayliss et al 2015. *** Chronology from Marciniak and Czerniak (2015), TP Areas correspond to Levels 0-III.*

| Early Levels XII-VIII | ID | BLDG number | Wall Orientation | COLOURANTS: Colours in Paintings: Red | Cinnabar | Black | White | Blue | innabar & Red to Grey | Yellow | Colours in Burial and Domestic Contexts: Red Ochre | Cinnabar | Black | White | Blue | Green | Yellow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South I. X | | below 1 1 | none | | | | | | | | | | | | | | |
| [illegible]035-6,920 cal BC** | | | | | | | | | | | | | | | | | |
| South K. IX | | 2 | 2 N | | | | | | | | | | | | | | |
| 6,950-6,550 cal BC | | 3 | 2 E | | | | | | | | | | | | | | |
| | | 4 | 8 N | | | | | | | | | | | | | | |
| South L. VIII | | 5 | 2 NW | | | | | | | | | | | | | | |
| 6,710-6,550 cal BC | | 6 | 8 E | | | | | | | | | | | | | | |
| | | 7 | 14 N | | | | | | | | | | | | | | |
| | | 8 | 14 E | | | | | | | | | | | | | | |
| | | 9 | 25 NE | | | | | | | | | | | | | | |
| | | 10 | 27 W | | | | | | | | | | | | | | |
| | | 11 | 27 W | | | | | | | | | | | | | | |
| | | 12 | 31 NE | | | | | | | | | | | | | | |
| | | 13 | 31 E | | | | | | | | | | | | | | |
| | | 14 | 31 W | | | | | | | | | | | | | | |

## Middle Levels South VII-VIB

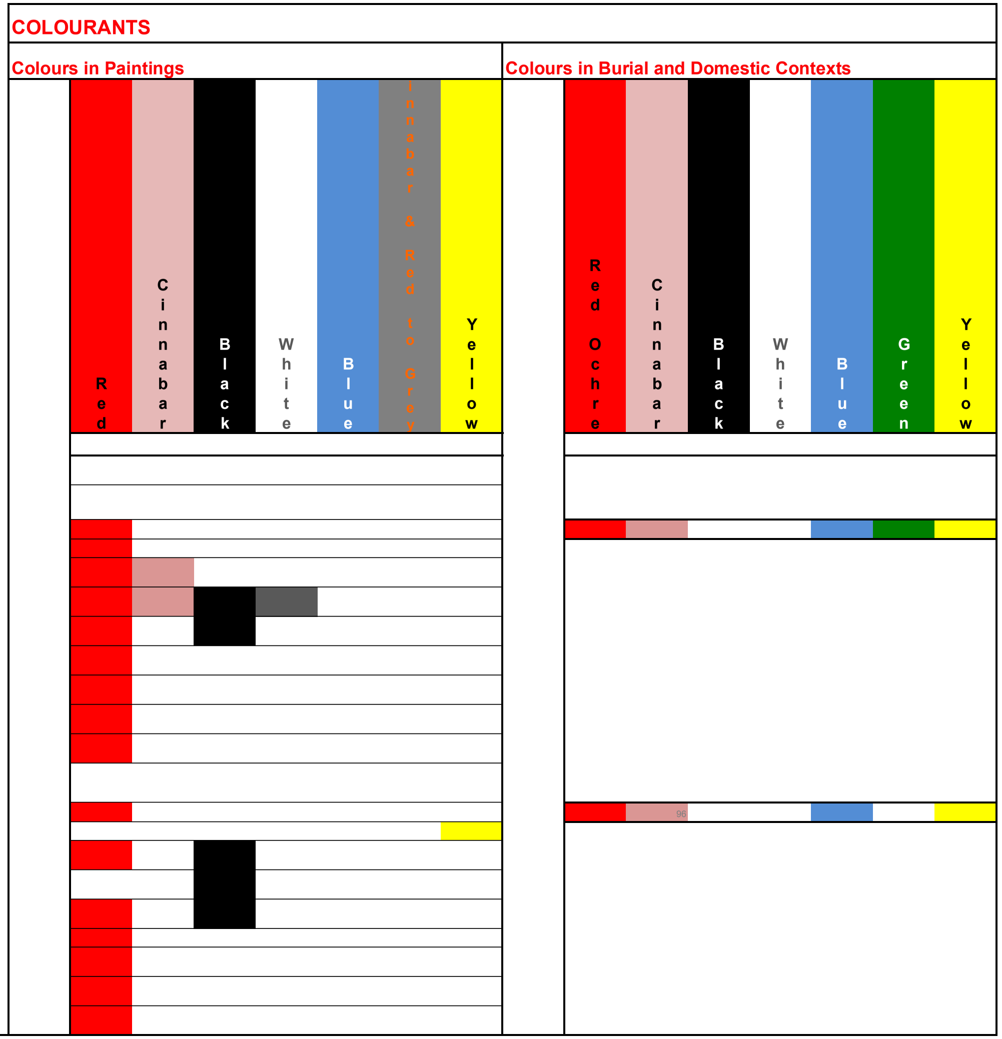
| | ID | BLDG number | Wall orientation |
|---|---|---|---|
| South M.VII | 15 | 1 | E |
| 6,610-6,500 cal BC* | 16 | 1 | SW |
| | 17 | 8 | N |
| | 18 | 8 | E |
| | 19 | 8 | NW |
| | 20 | 14 | N |
| | 21 | 21 | N |
| | 22 | 21 | N |
| | 23 | 21 | W |
| | 24 | 23 | E |
| | 25 | 44 | N |
| | 26 | 44 | E |
| | 27 | none | N |
| SOUTH N. VIB | 28 | 1 | N |
| 6,490-6,380 cal BC* | 29 | 1 | E |
| | 30 | 3 | none |
| | 31 | 5 | none |
| | 32 | 8 | E |
| | 33 | 15 | N |
| | 34 | 31 | E |
| | 35 | 31 | S |
| | 36 | 31 | W |
| | 37 | 44 | N |
| | 38 | 45 | none |
| | 39 | 50 | E |



## Middle Levels North G VIB and South VIA

| | ID | BLDG number | Wall orientation |
|---|---|---|---|
| **NORTH G** 6,490-6,380 ca | 40 | 132 | E floor |
| | 41 | 119 | NE |
| | 42 | 49 | N |
| | 43 | 49 | W |
| | 44 | 49 | NW |
| | 45 | 52 | NE |
| | 46 | 59 | N |
| | 47 | 77 | N |
| | 48 | 77 | E |

| | ID | BLDG number | Wall Orientation |
|---|---|---|---|
| **SOUTH O. VIA** 6,490-6,380 cal BC* | 49 | VIA-B.8 | N |
| | 50 | VIA-B.8 | W |
| | 51 | 50 | E |
| | 52 | 63 | E |
| | 53 | 66 | E |
| | 54 | 80 | NE |
| | 55 | 80 | E |
| | 56 | 96 | N |
| | 57 | 96 | E |



## Late Levels South V-III-TP, North H

**COLOURANTS**

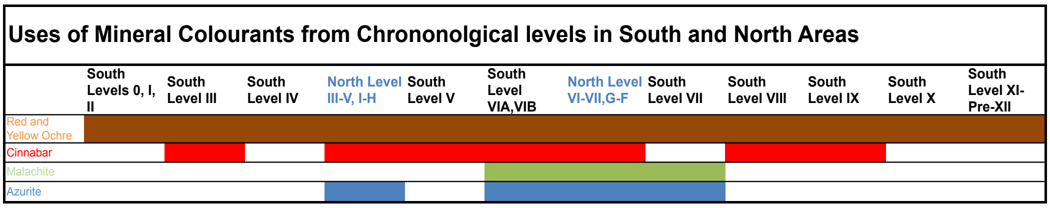
| | ID | BLDG number | Wall Orientation | Colours in Paintings: Red | Cinnabar | Black | White | Blue | innabar & Red to Grey | Yellow | Colours in Burial and Domestic Contexts: Red Ochre | Cinnabar | Black | White | Blue | Green | Yellow |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SOUTH P. V | | 58 | 1 N | | | | | | | | | | | | | | |
| 6,330-6,220 cal BC* | | 59 | 1 E | | | | | | | | | | | | | | |
| | | 60 | 1 S | | | | | | | | | | | | | | |
| | | 61 | 1 W | | | | | | | | | | | | | | |
| | | 62 | 1 NW | | | | | | | | | | | | | | |
| NORTH I | | 63 | 55 N | | | | | | | | | | | | | | |
| 6,450-6,090 | | 64 | 55 S | | | | | | | | | | | | | | |
| SOUTH IV | | 65 | 1 E | | | | | | | | | | | | | | |
| 6,450-6,250 cal BC* | | 66 none | none | | | | | | | | | | | | | | |
| SOUTH III | | 67 | 1 N | | | | | | | | | | | | | | |
| 6,380-6,269 cal BC | | 68 | 1 E | | | | | | | | | | | | | | |
| | | 69 | 1 S | | | | | | | | | | | | | | |
| | | 70 | 8 NE | | | | | | | | | | | | | | |
| | | 71 | 8 E | | | | | | | | | | | | | | |
| | | 72 | 8 W | | | | | | | | | | | | | | |
| | | 73 | 13 N | | | | | | | | | | | | | | |
| SOUTH III-II - TP | | 74 B. | 121 E | | | | | | | | | | | | | | |
| 6,335-6180 cal BC*** | | | | | | | | | | | | | | | | | |
| 6,350-6,180 cal BC*** | | 75 | 72 NWS | N | | | | | | | | | | | | | |
| | | 76 | 72 burial | | | | | | | | | | | | | | |
| Level III-II TPC | | 77 | 122 E | | | | | | | | | | | | | | |

level in column three. The text in Section 4.2 presents results for colourants in architecture (Buildings), and domestic contexts (Bodies and Burials), respectively. For a complete list of specific references used in the Master Table, maps, and the following section 'Buildings, Bodies, and Burials', see Rare Pigment Chronology Table 4.3.

## *4.1.2 The Colour palette over time*

The following section summarises the detailed data on the Master Pigment Table 4.1.

*Table 4.2 Colour Chronology*




### *4.1.2.1 Early Levels*

As can be seen in the brief summary of colour chronology in Table 4.2, red and yellow ochres occur from the first architectural plasters through to the latest levels of the occupation, from ±7,100-5,950 BC. Red iron oxides were locally available and ubiquitously used as flat applications on floors or walls or in designs. At level VIII, beginning ~6,700 BC, the palette of colourants expands with the first reported cases of a pigment sourced off-site; this is the brilliant red mineral cinnabar. Cinnabar continues to be used for at least the next four hundred years in painting, sometimes mixed with red ochre in South and North Area paintings or covering the skulls of secondary burials, up to level III.

### *4.1.2.2 Middle Levels*

Table 4.2 shows that unlike earth pigments, rare colours were not used throughout the life of the site; they have definite start and end dates. To date, evidence shows copper-based green and blue pigments malachite and azurite were only in use for a relatively short period of time, roughly three hundred years in levels VII and VI, radiocarbon dated from ~6,600-6,300 cal BC. These Middle levels are considered a time of great change, often referred to in ÇRP literature as 'The Transitional Levels', as most artefact types show significant developments at this time. The artists' pigments are no exception. As Section 4.4 on the landscape and mineral sources shows, sites to procure azurite and malachite are a marked distance from Çatalhöyük, and quite rare in the landscape relative to the plentiful and locally available iron oxides. This new development in the pigment palette shows trade over great distances, considerable exploration of the landscape, and a culture with a high value on innovative artistic practice.

#### *4.1.2.3 Late Levels*

The pigment evidence in Late Levels points to a reduction in exploration of the landscape for new materials. No new colours enter the palette after the Middle levels, and the blue and green pigments that come from the most distant sources have not been found in these levels. The only rare pigment at this time is cinnabar, with the closest source about 20km north; as we have pointed out, it is used sparingly in mixtures made up primarily of red ochres.

Some innovation is still present in Late levels with a unique pigmented wall plaster found in the Istanbul University excavation area; this new wall art technique, presented in the previous chapter, used the locally available red ochre mixed with a gypsum calcite-based plaster to make pink-coloured plasters for wall decoration. Other than this, this period is marked by less activity in artists' pigments relative to the Middle period.

Table 4.2 shows an increase in the range of pigments in use from the Early to the Middle periods, with a marked reduction in the Late Levels. The next few sections on rare pigments present the trends of use of this subset of materials as well as what these trends indicate about the relationship of Neolithic peoples to their art practice and the landscape from which their artists' materials were sourced.

### 4.1.3 Rare Colours Chronology at Çatalhöyük

This section considers all known cases of rare materials with a view to better understanding the manner in which Çatalhöyük peoples used these precious colours. This data of the 'who, what, and where' of rare artists' materials is gathered with the aim of giving scholarship a better indication of why Neolithic peoples found particular people, places, or events valuable enough to colour with these exotic substances.

Rare artists' materials are defined here as cinnabar, azurite, malachite, and copper artefacts. As observed in mineral samples in Section 3.1, the appearance of rare pigments is vibrant and saturated relative to the duller, matte earth colours. The red of cinnabar has a high refractive index that renders a quartz-like brilliance. The blue and green colours of azurite and malachite, the colours of the sky and the water, concentrated into these solid, tangible powders, were unlike any other substance Neolithic people saw day-to-day.

On the following page, Table 4.3 lists results of archival research to establish all known occurrences of the rare artists' materials from both Mellaart and ÇRP phases of excavation to date. Data is sourced from reports of Mellaart's excavations in *Anatolian Studies* from 1961-6, ÇRP team archive reports from 1993 to the present, the recent metallurgical study by Birch et al (2013), conservation reports by Catherine Myers (1998) and Çamurcuoğlu (2012, 2013, 2015), and direct observations during my fieldwork for this study examining samples in the pigment archive on-site at Çatalhöyük. Each occurrence listed below is also plotted on GIS maps (Figures 4.3 through 4.16).

*Table 4.3 Summary of Rare Artists' Materials, specifically all cases of Rare Pigments and Copper Artefacts from Mellaart and Hodder Excavation Phases.*

| **Mineral and Context** | **Level, Location, Excavation Phase, Source of Data.** |
|---|---|
| **CINNABAR: RED** | |
| Cinnabar. In one specific mention, a ~17 year old female secondary burial, cinnabar covered the skull and red ochre covered the body. | Early Level. Building E.IX.1. (*AS* Mellaart 1964, 93) **HH*** |
| Cinnabar in a fire installation. | Early Levels. South Area. Mellaart IX, Hodder Level K. Building 2, space 117, unit 3620. (Myers Conservation Report 1998) |
| Cinnabar on skull. Cinnabar residue on shell near skull posterior. | Early Levels. North Area. Mellaart IX-VIII. Hodder F. Building 131*** (under B. 5) space 154, skull 22196, unit 22194. Shell X find 6. (ÇRP 2016 Hodder, 10, Fig. 5 and Haddow, 89, Fig. 2) **HH** |
| Cinnabar in wall painting of geometric figures painted on platform edge of 'Red Shrine'. (Context derived from matching Image of painting in article to ID 13) | Early Levels. South Area. Mellaart VIII, Hodder N. Building 31. (XRF performed by Zararsiz et al. 2008, 449, Figures 4a-c) |
| Cinnabar covering platform and walls in 'Red Shrine'. (Catalogue ID 12) Cinnabar staining on skeleton of a female infant burial in same building. | Early Levels. South Area. VIII. Building 31. (Pre. Report Mellaart 1966b, 181-182; Pl. XLVIII(b)) |
| Cinnabar reported on a layer of painting on the pair of leopard reliefs. | Early Levels. South Area. VIII. Building 27. (*AS XVI* Mellaart 1964, Pl. XLV) (Catalogue ID 10). |
| Cinnabar painted onto a female skull. | Middle Levels. South Area. VIB.20. (Mellaart 1963, 93; 1967, 207, Fig. 97) (XRF results of skull reported by Carter 2009 Archive Report, 127) |
| Cinnabar painted onto female skull. | Middle Levels. South Area. Building E.VI.20. (*AS* Mellaart 1964, 93) |
| Cinnabar on fragment of wall painting, excavator notes it may be connected to wall painting on same wall, unit 13669, discovered in 2006. | Middle Levels. North Area. VII-VI. Hodder G. Building 49, Space 100. Unit 16694/Sample 1. (Çamurcuoğlu 2015, 142, Fig. 77-78) |
| Wall painting with cinnabar and red ochre. | Middle Levels. North Area. Hodder G. Building 49, Space 100, wall 1661. Unit 13669/ Sample 2. (Çamurcuoğlu 2015, 141, Fig. 76) |
| Cinnabar on northwest wall plaster. | Middle Levels. North Area. Hodder Level G. Building 3, space 86. Unit 2228. (Myers Conservation Report 1998) |
| Cinnabar in wall painting fragment of human figure. (An unspecified painting fragment is pictured in the 2008 article. | Late Levels. South Area V or III. (XRF performed by Zararsiz et al. 2008, 448, Figures 2a-b) It is from one of two Late level Hunting Shrines in Buildings V.1 or III.1. See Catalogue ID 61 or 68) |
| Account of a red pigment turning to grey on human figures in the Hunting Shrine. | Late Levels. South V, Hunting Shrine F.V.1. (Mellaart 1964, 183; Todd 1976, 42) |
| Cinnabar painted under cranium of unsexed adult skull in a multiple burial. | Late Levels. North Area. Unstratified. Building 108****, Space 84. Unit 17535 Sample 1. Sk. 17533. (Çamurcuoğlu 2015, 142, Fig. 75) |
| A cinnabar was applied to a skull, feint impression of the textile and a distinct line of the cloths edge indicate application with a cloth. | Late Levels. South III. Building III.1, (Mellaart 1963b, 5, Pl. XXV*a*). |
| Cinnabar painted on plaster. Fragmentary remains of design, no discernable figure or motif. | Late Levels. North Area level H. Building 60. Space 278, unit 13453 Sample 3. (Çamurcuoğlu, 2013, 320; Çamurcuoğlu 2015, 142, Fig. 73-74) **HH** |

| Mineral and Context | Level, Location, Excavation Phase, Source of Data. |
|---|---|
| **COPPER BASED PIGMENTS AND ARTEFACTS** | |
| **AZURITE: BLUE** | |
| 10 skeletons male and female with blue pigment as burial goods. Blue colour was typically found near the bottom of the skull, adhering to the neck and clavicles. Three of these burials occur with 'cosmetic kits' with bone tool applicators and obsidian mirrors. | Middle Levels. South Area. Levels VII and VI. (Mellaart 1964, 94; 1967, 208) |
| Azurite in wall art blue on sunken relief. (ID 16) | Middle Level. South Area. E.VII.1. (*AS* Mellaart 1964, 55, 94, Figure 16 reproduction; Figure 14 reproduction drawing, Pl. XIa black and white photograph; Mellaart 1967, 151; Todd 1976, 37) **HH** |
| Azurite and red pigment in a burial. | Middle Level. South Area. E.VII.1. (*AS* Mellaart 1963, 95) **HH** |
| Azurite powder in a shell with a bone tool in infant burial. | Middle Levels. South Area. Mellaart VII.6. Burial excavated in 1995 and again in 1999 by Shahina Farid. Unit 4215, Space 168. Hodder. (1995 ÇRP Archive Report) (Çamurcuoğlu 2015, Fig. 84) |
| Azurite in burial with obsidian mirrors. | Middle Levels. North Area. Level G. East boundary of Building 1, space 77, units 20450 and 19557. Burial F. 3630 and F. 3684. Hodder. (2012 ÇRP Archive Database; Unit sampled by author during 2012 season) **HH** |
| Azurite powder coherent lump with bone tool in adult female burial. | Late Level. North G. Building 102, Space 17, unit 16308 / X2. Burial F. 3010. (2007 Archive Report; Çamurcuoğlu 2015, Fig. 86) |
| Azurite powders in fill of multiple burials of females and two other fragmentary skeletons. | Late levels. North Area I. Space 1003. Unstratified, unit 7575/ X19. Space 1003. Burial F. 1208. Hodder. (Çamurcuoğlu 2015, Fig. 85) |
| Azurite lump in fill of a multiple burial. | Late levels. North Area I. Space 1003. Unstratified, unit 7597 / X1. Space 1003. Burial F. 1202. Hodder. (2003 Archive Report; Çamurcuoğlu 2015, Fig. 83) |
| Azurite included amongst the list of pigments from site, namely ochre, haematite, charcoal, and azurite. | No context given. Authors of publication were wall painting conservation experts. James Mellaart sent them samples from the site by in the 1960s. (Mora, Mora, and Phillipot 1984, 73) |
| **MALACHITE: GREEN** | |
| Malachite deposited between walls, analysed in this study, unit 4225. | Middle Level. South Area. Mellaart E.VII.1, Hodder South M, Building 8, space 165. (On site pigment archive) **HH** |
| A total of 7 copper mineral samples not noted by Mellaart, but located by recent study of copper materials. | Middle Level. South Area. E.VII.10. Hodder South M, Building 24. From sample numbers CHM 5-8 and CH2 in Radivojević *et al.* (2017) Tables 1 and 2, Figure 1. **HH** |
| Malachite in 3 burials. In 1 of 3 burials, green colour covers bones of secondary burial. In 1 of 3 burials, green covers the eyebrows of a female skull; malachite with obsidian mirror and bone points occurs in E.VI.20. | Middle Levels. South Area. Levels VII and VI. (1 of 3 in E.VI.20) (*AS* Mellaart 1964, 93-95; Mellaart 1967, 208-209) |
| Two copper minerals from grave 2 (re)analysed in recent study. | Middle Level. South Area. Mellaart VIB. E.VIB.8. (Mellaart 1967, 81, Table 13) Hodder South N. From sample numbers CHM 3-4 and CH2 in Radivojević *et al.* (2017) Tables 1 and 2, Figure 1. **HH** |
| Three samples of copper minerals from grave 5 in central platform (re)analysed in recent study and 1 sample of potential 'slag' as analysed by Neuninger *et al.* 1964 and refuted by Radivojević *et al.* 2017. | Middle Level. South Area. Mellaart VIB. A.VIB.1. (Mellaart 1967, 81, Table 13) Hodder South N. From sample numbers CHM 9-12 and CH6 in Radivojević *et al.* (2017) Tables 1 and 2, Figure 1. **HH** |

| Mineral and Context | Level, Location, Excavation Phase, Source of Data. |
|---|---|
| **MALACHITE: GREEN (CONT.)** | |
| Malachite in burial context with obsidian mirrors, bone applicator, and red pigment in baskets. | Middle Level. South Area. Level VI. (*AS* Mellaart 1964, 93, 95, 114) |
| Malachite powder in a coherent lump cake with a bone spatula in burial with one child and two adults. | Middle Levels. North Area. Hodder G. Building 3, space 86, Burial F. 757, unit 8184. (ÇRP database 2001; Çamurcuoğlu 2012, 255) |
| Malachite. **Incorrect characterisation**: this sample was re-examined in this analysis and found to be azurite.) | Middle Levels. North Area Hodder G. Building 102, unit 16308. (Çamurcuoğlu 2015, 149, Fig. 87) |
| **COPPER ARTEFACTS: GREEN** | |
| Copper beads of native copper hammered into sheets, cut to strips, and rolled into beads. Burial contexts. | Early and Middle Levels IX, VIII, and VII. South Area. Specific mention of beads in Level IX, Building 17, **HH**. (*AS* Mellaart 1963, 99; 1964, 111; 1966, 183; Neuninger et al. 1964) |
| Copper tubes and copper oxide residue over the surface of the wooden pegs used as form around which to shape copper sheets. | Middle Level VII. South Area. (*AS* Mellaart 1964, 114; Mellaart 1966, 183; Neuninger et al. 1964.)) |
| Copper rings on female and male skeletons. | Middle Level. VIB. South Area. Finger rings in A.VI.1. (*AS* Mellaart 1964, 93, 95, 114) **HH** |
| Copper tituli, copper beads, pendants, and finger rings. | Middle Level. VIB. Building 5, 25. South Area. (*AS* Mellaart 1963, 44, 99-101; 1964, 93, 95 and 114; 1967, 81, Table 13) |
| Evidence of copper melting, partially vitrified copper ore, not native copper, possible slag. | Middle Level. South Area. VIA. Building E. VIA.1. (*AS* Mellaart 1964, 114; 1967, 217; Neuninger et al. 1964) **HH** |
| Two copper beads from burial (re)analysed in recent study. | Middle Level. South Area. Mellaart VIA&B. E.VI.31. (Mellaart 1967, 81, Table 13) Hodder South N, Building 24. From sample numbers CHM 29-30 and CH1 in Radivojević *et al.* (2017) Tables 1 and 2, Figure 1. |
| Complete copper ring found in midden. | Late Levels. South Area. V. Above Building 75, unit 16248.x1. (Birch et al. 2013) **HH** |
| A dozen beads from grave in the northern corner. | Middle Level. South Area. Mellaart VIB. Shrine 61. (Mellaart 1967, 81, Table 13) Hodder South N. From sample numbers CHM 13-16 and CH1 in Radivojević *et al.* (2017) Tables 1 and 2, Figure 1. **HH** |
| Copper-based bead fragments. | Late levels. North Area I. 7575.x17 (Birch et al. 2013) |
| Copper Armband. | Late levels. North Area. Unstratified, unit 7597. Space 1003. Burial F. 1202. Skeleton 7557. Hodder. (2003 Archive report, 21-22) |
| Native copper piece under North platform. Analysis reported in this study chapter 3. | Late Levels. South Area. III, Hodder South R, Building 56, Space 121, unit 12867. (Copper sample in pigment archive.) **HH** |
| Copper pins and awls. | Late Levels. Level II. South Area. (*AS* Mellaart 1964, 95, 111, 114; 1967, 81, Table 13) |
| Ring fragments. | Late Levels. Level I-II. TP Area. TP.Q. Below or in B. 62. Unit 13079.x3. (Birch et al. 2013) |

* **HH**= The building in which the rare pigment is located is in a History House Sequence as identified by Hodder (2013b, Table 1.1 Çatalhöyük Building Categories Identified between 2000 and 2008)
** *AS*= Anatolian Studies
***Building 131 is recently excavated. No geospatial data is available on the ÇRP database. The building is located on subsequent maps using the description of it as between B. 77 and B. 1.
****Building 108 is recently excavated. No geospatial data is available on the ÇRP database. The building is located on subsequent maps using the description of it as between B. 77 and B. 52 and Sp. 90.

### *4.1.3.1 Early Levels*

In Table 4.3, we see that the use of rare pigments starts with cinnabar. The use of cinnabar in burials begins in level IX, and on wall paintings in level VIII, building 31 (Appendix I, ID12) in what Mellaart termed the 'Red Shrine'. In this building, cinnabar was used to cover the entire platform floor and walls in a striking red colour that must have been impressive in appearance in the Neolithic. This painted VIII.31 building demonstrates two things: 1) the arrival of an abundant amount of this mineral in Early levels, and 2) the start of the curation of artists' materials from greater distances.

Over the life of the site, from the evidence in Table 4.3, cinnabar is discovered early in the life of the site and used abundantly, with less and less availability through time and dwindling in the Late levels to use in only a few figures in a large composition like the Hunting Shrine.

### *4.1.3.2 Middle Levels*

Table 4.3 shows that each date of malachite and azurite found at Çatalhöyük falls in a narrow range of the occupation, levels VII-VI. These dates indicate when Neolithic peoples had access to the copper mining location or connection to trade of the copper materials[16]. Furthermore, the absence of finds such as ground stone or tools associated with processing green or blue minerals into powders indicates the pigment powders were processed by a third party prior to reaching Çatalhöyük; a search of the excavation reports shows no evidence of on-site processing such as the colour in a floor recess or a powder residue on ground stones. Therefore, off site processing is the most likely interpretation of the absence of evidence.

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[16] Although the argument can be made that the archaeological record only shows deposition, and that these artefacts could have been in circulation for long periods prior to burial.

The results of the findings of blue and green pigments differ from prior study; Çamurcuoğlu (2012, 255; 2015, 149) states that they occur from level VII onwards. However, detailed findings of the levels and buildings of copper-based pigments in Table 4.3 show that, to date, azurite and malachite were only excavated from levels VII and VI.

Evidence shows the reuse of painted plasters coloured with rare pigments in the Middle levels, the colour change plaster fragment painted with cinnabar found under building 96, level VII, as a house deposit. This fragment was likely to been retrieved in the Neolithic from the previous level when cinnabar was in abundance, possibly from the painted platform in the "Red Shrine" in level VIII building 31, pictured in Appendix I, ID 12.

#### *4.1.3.3 Late Levels*

The cinnabar use in Late levels in the South area indicates short supply in the hunting shrine in level III, as the pigment was used on only a few human figures on the large composition; and, even then, it was only mixed with red ochre to extend the colour. In the North Area, again, paintings mix cinnabar with red ochre as an extender. This indicates that smaller quantities must have been available at this time relative to level VIII, when a full platform and wall could be covered with the colour. The continued, but sparing, use of the colour indicates a preservation of it as a precious colour and indicates that it had a value and meaning separate from that of red ochre, so that including it in a colour mixture had a symbolic value.

Contrary to prior study, these findings indicate that cinnabar was distinguished as a separate colour – literally and figuratively – in the Neolithic. Çamurcuoğlu (2012, 254) suggested that mixtures of the two red pigments indicated that, "prehistoric artists did not know the difference between cinnabar and red ochre". However, given the relatively striking red colour of most cinnabar, and even in the case of more matte varieties seen in mineral specimens in Chapter 2, Figure 2.2, the exotic, distant, source of cinnabar would have set it apart. Handling properties differ between the two minerals as well; iron oxides have a clay-like smoothness with a lot of 'tooth', adhering to any surfaces it touches, whilst cinnabar is more crystalline, with particles which feel more like sugar crystals than clay. Cinnabar does not feel or handle in the same manner to the artisan as the clay-like ochre. While cinnabar particles will also adhere to plaster with or without a binder, it does not cohere in as thick a layer as ochre, but as a thin coating. Even without knowledge of the geographic source of the mineral, minimal experience of handling would distinguish the two. It is therefore unlikely that Neolithic artisans did not understand that cinnabar was a different kind of substance than the common red ochres.

### 4.1.4 The Artists' Pigment – Artefact Connection

The formation environment for azurite (Chapter 1, Figure 1.3) shows artefacts that are present at Çatalhöyük which all form in close proximity in copper ore deposits. These include powdered azurite and malachite - confirmed by technical analysis in this study - as well as iron-based pigments such as goethite and jarosite (Doherty 2009), native copper pieces used for beads, rings and armbands (Mellaart, 1964; Birch et al 2015) and copper formed into small pins, awls, and tubes (Mellaart 1964, 111). Moreover, the beads from level IX (1974:111), level VIII (1966:183), and level VII (1963:99; 1964:111), thought by Mellaart to be lead, were later determined by Sperl (1990) to be galena, also a mineral found in environments together with the copper-based metal and minerals.

The geological connection of these artefacts is also echoed in the order in which

Mellaart reported that they were excavated at Çatalhöyük. The copper and galena beads and rings immediately precede the deposition of azurite and malachite. The first copper beads and rings occur at the same time (1964, 114) in level IX (1974:111), level VIII (1966:183), and in level VII (1963:99; 1964:111). Azurite and malachite also occur simultaneously, starting in level VII and continuing through level VI. (Mellaart 1966:183).

### *4.1.4.1 Mineral Pigment Summary and Connection to Early Metallurgy*

Table 4.4 shows the presence or absence of artists' materials. The table is arranged to give a sense of the architectural levels as one sees them in a cross section of chronological layers, early to late levels, bottom to top. The chronological levels are listed in the first column. Column two shows iron oxide presence in each level, cinnabar in column three, malachite in column four and azurite in five. The last column shows the chronology of copper artefacts.

The vital connection shown by the pigment record is the procurement of pigments to early sourcing of native copper. Chapter 1 showed a schematic of the environment where native copper was sourced, such as the piece from unit 12867, pictured in technical analysis in Chapter 3 and archival references listed in the last section. peoples digging for native copper would also find the copper-based minerals azurite and malachite in the same location. Moreover, these copper deposits are covered with a gossan, a formation of bright-red iron oxide. Initially, in a virgin copper deposit, this bright red colour would get the attention of a prehistoric prospector. In fact, Native copper was used to make artefacts such as beads and finger rings. Neolithic looking at the timeline of development at Çatalhöyük, in this case, with copper

*Table 4.4 Summary of the Colour Palette and Copper Artefacts by Chronology*

| | Red and Yellow Ochre | Cinnabar | Malachite | Azurite | Copper Artefacts |
|---|---|---|---|---|---|
| **South Levels 0, I, II 6,300 - 6,000 cal BC** | | | | | |
| **South Level III 6,380 - 6,260 cal BC** | | | | | |
| **South Level IV 6,380 - 6,250 cal BC** | | | | | |
| **North Level III-V, I-H 6,350 - 6,260 cal BC** | | | | | |
| **South Level V 6,400 - 6,300 cal BC** | | | | | |
| **South Level VIA,VIB 6,490 - 6,380 cal BC** | | | | | |
| **North Level VI-VII,G-F 6,610 - 6,380 cal BC** | | | | | |
| **South Level VII 6,610 - 6,500 cal BC** | | | | | |
| **South Level VIII 6,710 - 6,550 cal BC** | | | | | |
| **South Level IX 6,850 - 6,650 cal BC** | | | | | |
| **South Level X 6850 - 6780 cal BC** | | | | | |
| **South Level XI-Pre-XII 7,400 – 6850 cal BC** | | | | | |

[1] Date Ranges for Chronological Levels from Radiocarbon Dating reported in: Hodder, I. 2013. Chapter 1, Fig. 1.5 In: *Substantive technologies at Çatalhöyük : reports from the 2000-2008 seasons*. London: British Institute of Archaeology at Ankara.

artefacts starting in levels XI and pigments first deposited in VII with both preceded by the presence of iron oxides, it may be the curation of the bright red pigment from the landscape which led to digging through the red gossan, resulting in the discovery of copper pieces and blue and green minerals for pigments. In the final section of this chapter, copper sources for copper-based metals and pigments are examined.

This thesis puts forward the idea that the early prospecting for metals in Anatolia was closely related to the early prospection for artists' pigments; furthermore, the prospection for mineral colours was likely to have led to uncovering the copper metal, initially used for personal adornment.

### 4.1.5 Neolithic Blue: Azurite in the Near East and Europe

Prior study by Çamurcuoğlu makes general statements about the occurrence of blue and green pigments; for example, 'azurite and malachite found at Çatalhöyük may be the earliest examples of these minerals found in pigment form' (2013, 317; 2015, 147, 149). More recent study of copper artefacts at Çatalhöyük carries forward this statement as fact (Radivojević et al 2017, 103). However, Çamurcuoğlu does not present solid substantiating evidence. In this section, results of the investigation of the archaeological record regarding the facts of this claim are presented.

The first use of malachite as an artists' pigment was not at Çatalhöyük. This study finds that malachite pigments first occurred in the Near East in the Natufian period and in Anatolia up to one millennium earlier than Çatalhöyük. Malachite occurs in the archaeological record earlier than azurite, with the first accounts as a painting material in the Near East in the Late Natufian period on a mask at the Nahal Hemar cave; also, malachite lumps are formed into artefacts such as copper beads at Rosh Horesha (Israel), and as pendants at Zawi Chemi (Shanidar, Iraq) (Bar-Yosef and Alon 1988; Bar-Yosef Mayer and Porat 2008; Solecki 1969).

In Anatolia, Maddin et al (1991; 1999) report the earliest substantiated use of malachite and native copper is from Çayönü Tepesi PPNA and PPNB levels. Evidence begins in phase two with architecture dated with $C^{14}$ to approximately 9,200-9,000 BC. This includes evidence of a courtyard workshop with malachite beads and powdered malachite debris in phase three with channelled building architecture dated to 9,000-8,600 BC (Braidwood et al 1981; Özdoğan & Özdoğan 1999, 14-16; Stech 2013, 60). In addition, native copper beads are found in contexts from the eighth millennium at Aşıklı höyük in Cappadocia (Yalçın and Pernicka 1999); and, nearer to Çatalhöyük in time and location, seventh millennium examples come from Can Hasan and Hacılar (Esin 1999; French 1962; 1967; Mellaart 1960; Yalçın 2000).

However, these results of archival research establish conclusively that no use of blue azurite is reported prior to Çatalhöyük. It is worth noting one caveat about the diagenesis of azurite. Azurite can alter such that it turns in to malachite, as the former is a polymorph of the latter. It is not impossible that what we now find as malachite in archaeological contexts is altered azurite. However, one can only take into account the available evidence. Taking excavated evidence at face value and assuming materials have not undergone a diagenetic process to alter the composition and colour, no other recorded case predates the accounts of powdered azurite in burials at Çatalhöyük, in level VII dated to ~6,610-6,500 cal BC.

*Figure 4.13 Azurite from Neolithic Giribaldi, France. Photo: Binder 2004, 71.*

For pigments and a grinding stone, see Figure 4.1. This research substantiates the evidence of the azurite at Çatalhöyük being the premier use of the blue mineral. This marks Çatalhöyük as highly significant in the history of artists' materials. These findings also reinforce the interesting and strong link forming between copper-based pigments and native copper or copper metal in the earliest cases of azurite. Two of the three earliest sites with azurite, Çatalhöyük and Ancient Kura, have azurite and copper beads in contemporary levels. (See Table 4.3 for details of rare pigments and copper artefacts at Çatalhöyük). This connection will be further investigated in the

*Figure 4.14 On left, azurite minerals and on right, a copper bead fragment from Neolithic Kura, dated to 5800 to 5,300 BCE with 14C-dating. Photos: Hanson, S. 2012, Ancient Kura 2010-2011, Figures 128-127.*

next section, Section 4.2, on the spatial relationships of these finds at Çatalhöyük, to see if they were found not only in contemporary levels, but in close proximity within each level or household.

By this reasoning, if green is the colour of the Natufian period and the origins of agriculture, then it appears that blue is strongly associated with the Neolithic. The results in this section demonstrate that for the first time, blue springs up in Neolithic sites in Anatolia, Europe, and the Middle East. But what is the connotation of the colour?

Bar-Yosef Mayer and Porat (2008) interpret the sudden rise of a specific colour in the Natufian as no accident. They hypothesise that the rise of people curating and trading green artefacts in the form of copper artefacts and green stones at this time in the Near East is connected to other technologies. These authors put forward the idea that the interest in the colour green in artefacts is strongly connected to and derived from the innovative practices of plant cultivation and botanical interest in the Near East. They further suggest that the colour green was related to fecundity in all aspects of life.

Neolithic blue may be strongly associated with blue as the colour of the water and the sky or linked to a new phase of landscape exploration and widespread trade. This is explored further in the final section of the chapter, Section 4.4. Preceding this final analysis, in the next section we examine how the colour was used in domestic and burial contexts to tease out what potential cultural associations people at Çatalhöyük had with their colours, especially the Neolithic blues.

## 4.2 SPACE: Buildings, Bodies, and Burials

The following GIS maps are marked with the findspots of rare colourants discussed in this chapter. All known rare pigment occurrences are plotted, as are notable red and yellow ochre examples. Red ochre is marked with a red circle, yellow ochre with a yellow circle, azurite with a blue circle, and malachite with a green circle, and cinnabar with a red circle ringed in black. A green circle ringed in black indicates houses in which copper artefacts were found. (See Table 4.4 for a detailed listing.)

All wall paintings are also annotated onto the maps. Each has a unique identification number in red text. The code, such as *ID 16, for the sixteenth painting in the catalogue, is placed on the map in the building where the image was found, number nearest the wall of its orientation. As listed in the Master Table 4.1 in Section 4.1, the image numbers are in chronological order, with the earliest painting as number *ID 1. Each painting ID number corresponds to the listing for it in the catalogue in Appendix I.

*Figures 4.3-4.16 Fourteen GIS maps are in chronological order from the earliest occupation at XII up to the latest levels at ground level 0. South are maps are 1-4, 6-7, 9-10, 13-14. North Area maps are 5, 8, 11, and 12. Camilla Mazzucato made the GIS maps at the ÇRP. Annotations, made by the author, are of findspots of each rare artists' material and pigment mentioned in the text as well as all wall paintings (from ID 1-77, See Appendix I).*

## Early Levels: XII-VII

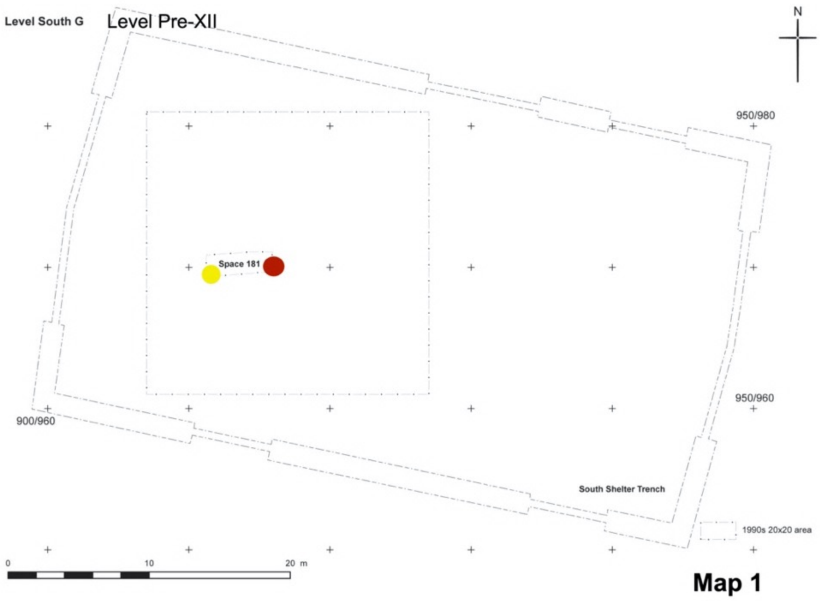



*Figure 4.15 Map 1, Level Pre-XII, South G*

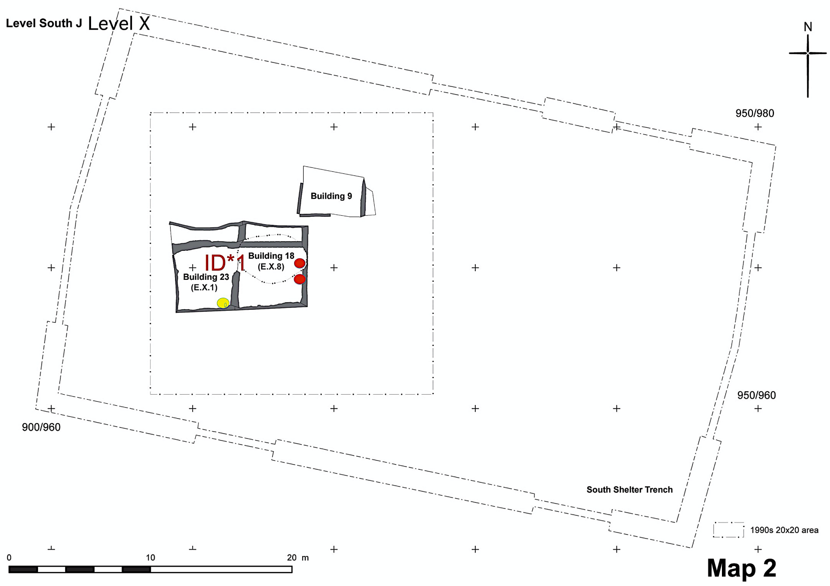



*Figure 4.16 Map 2, Level X, South J*

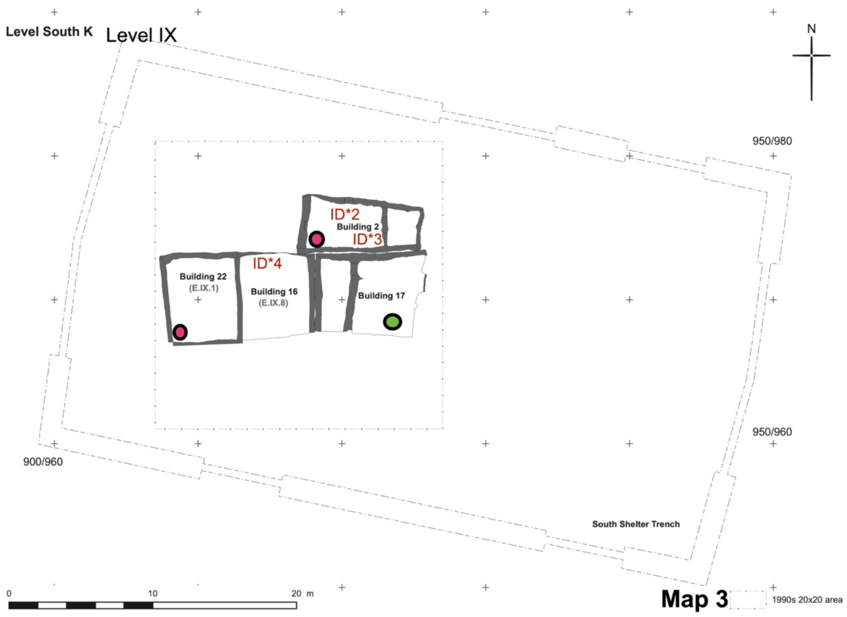



*Figure 4.17 Map 3, Level IX, South K*

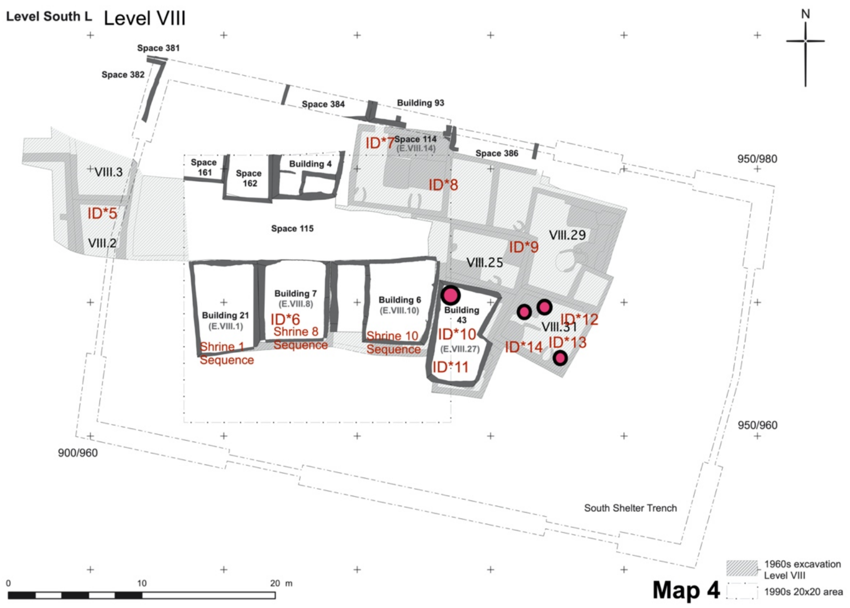



*Figure 4.18 Map 4, Level VIII, South L*

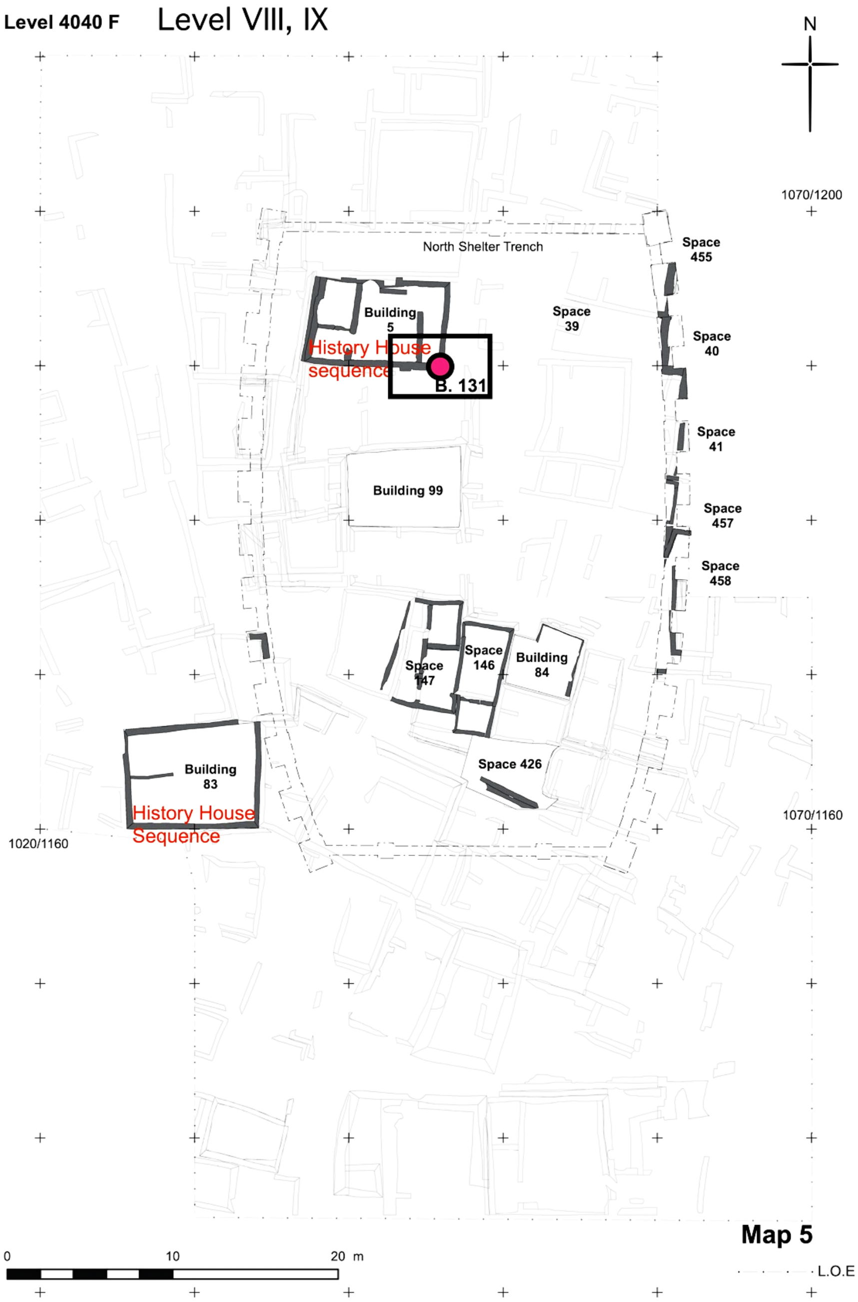



*Figure 4.19 Map 5, Level VIII, IX North F*

## Middle Levels: VII-V

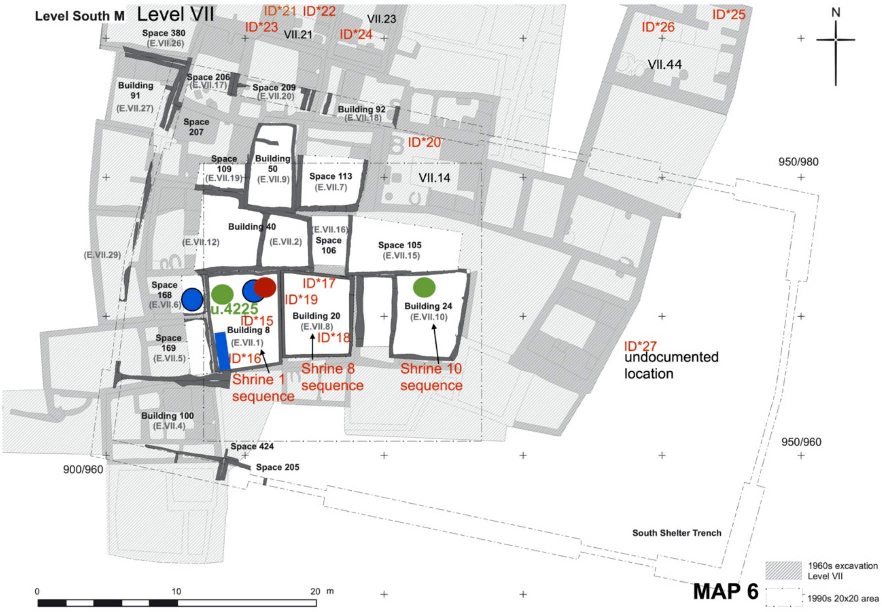



*Figure 4.20 Map 6, Level VII, South M*

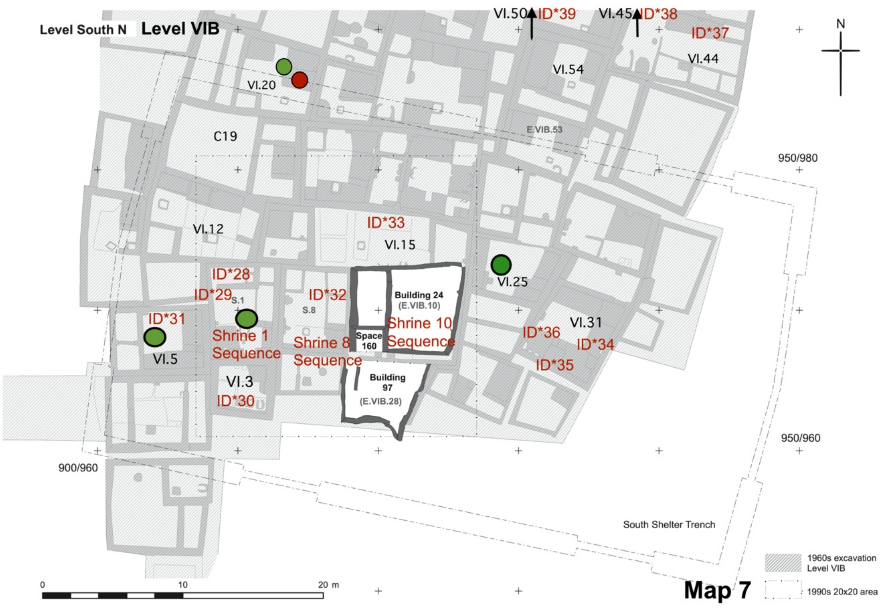



*Figure 4.21 Map 7, Level VIB, South N*

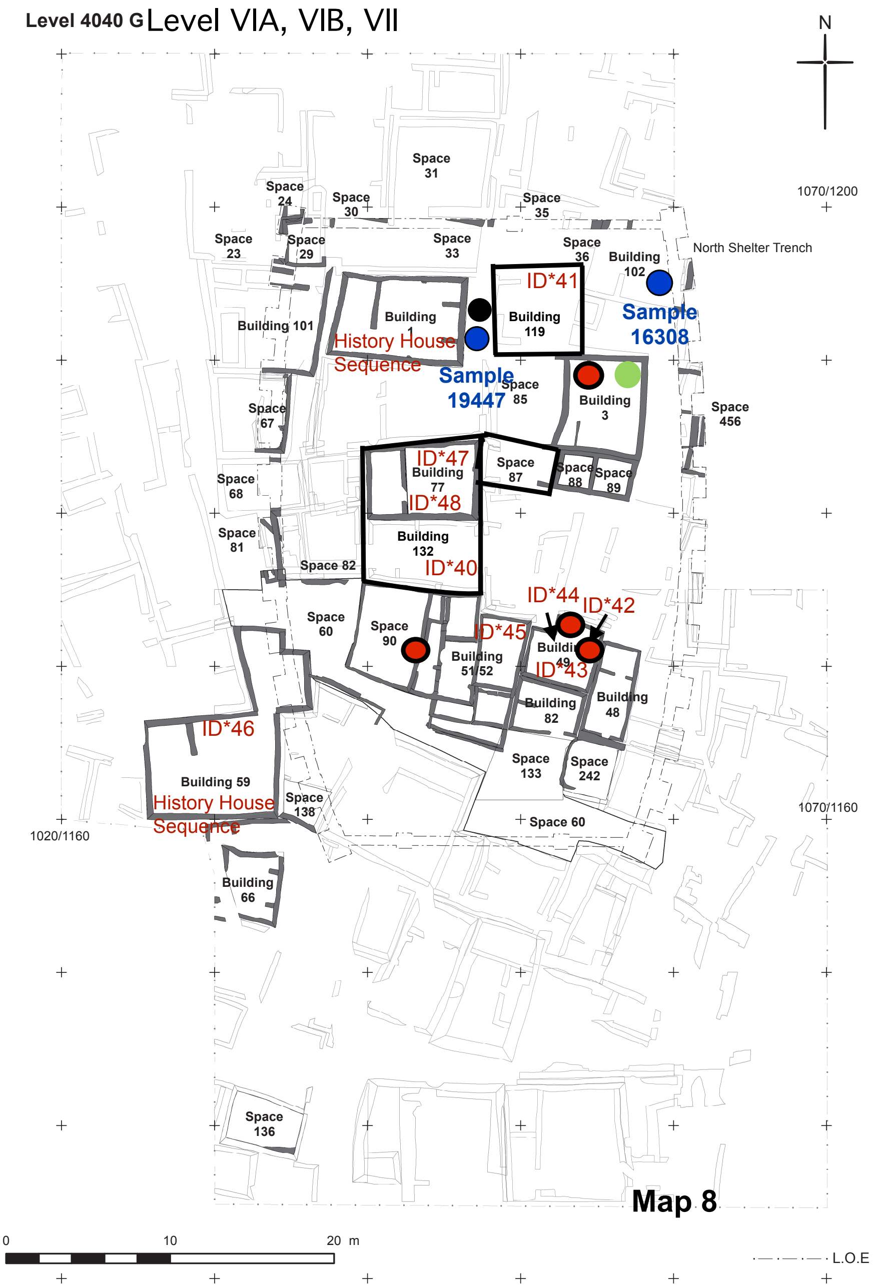



*Figure 4.22 Map 8, Level VIA, VIB, VII, North G*

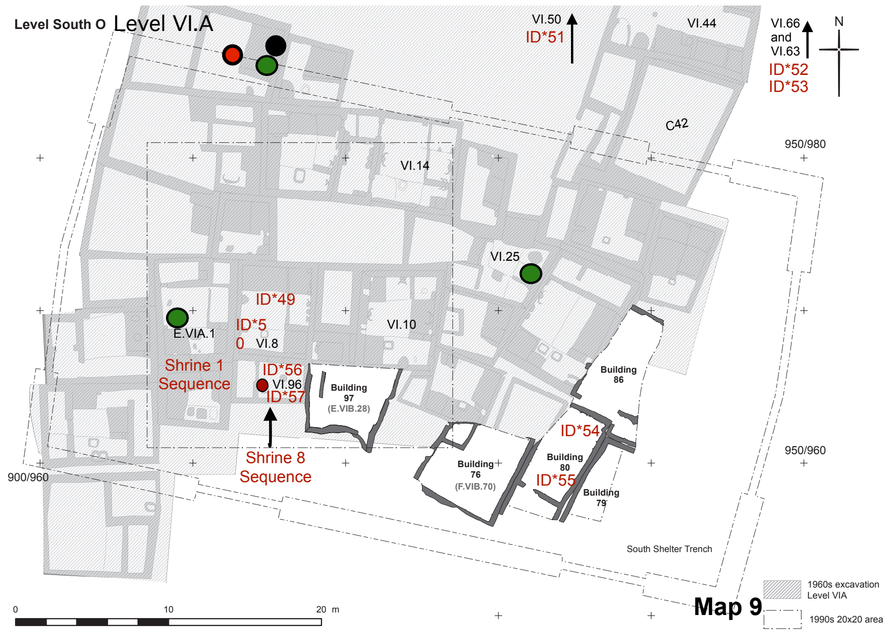



*Figure 4.23 Map 9, Level VIA, South O*

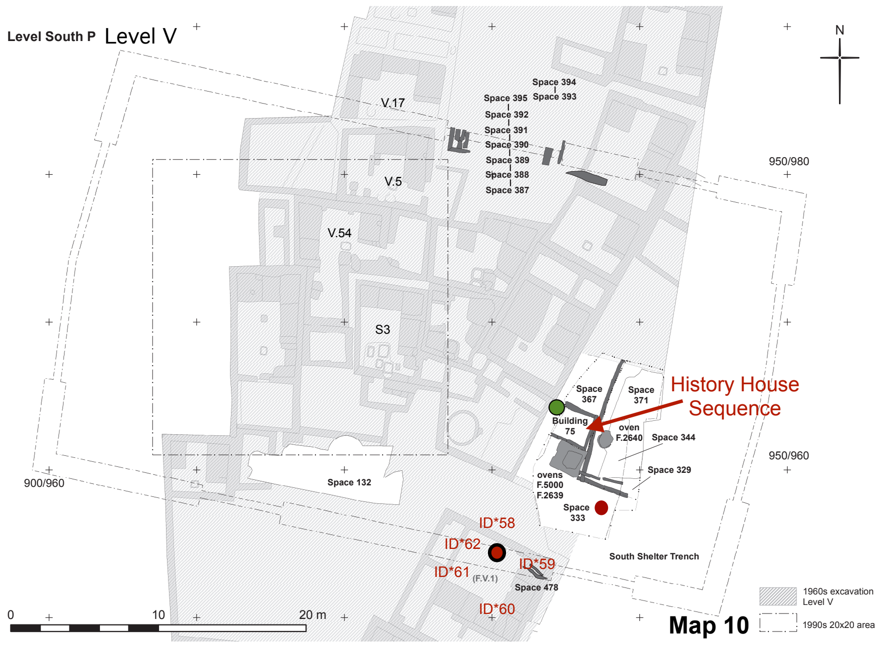



*Figure 4.24 Map 10, Level V, South P*

## Late Levels IV-0

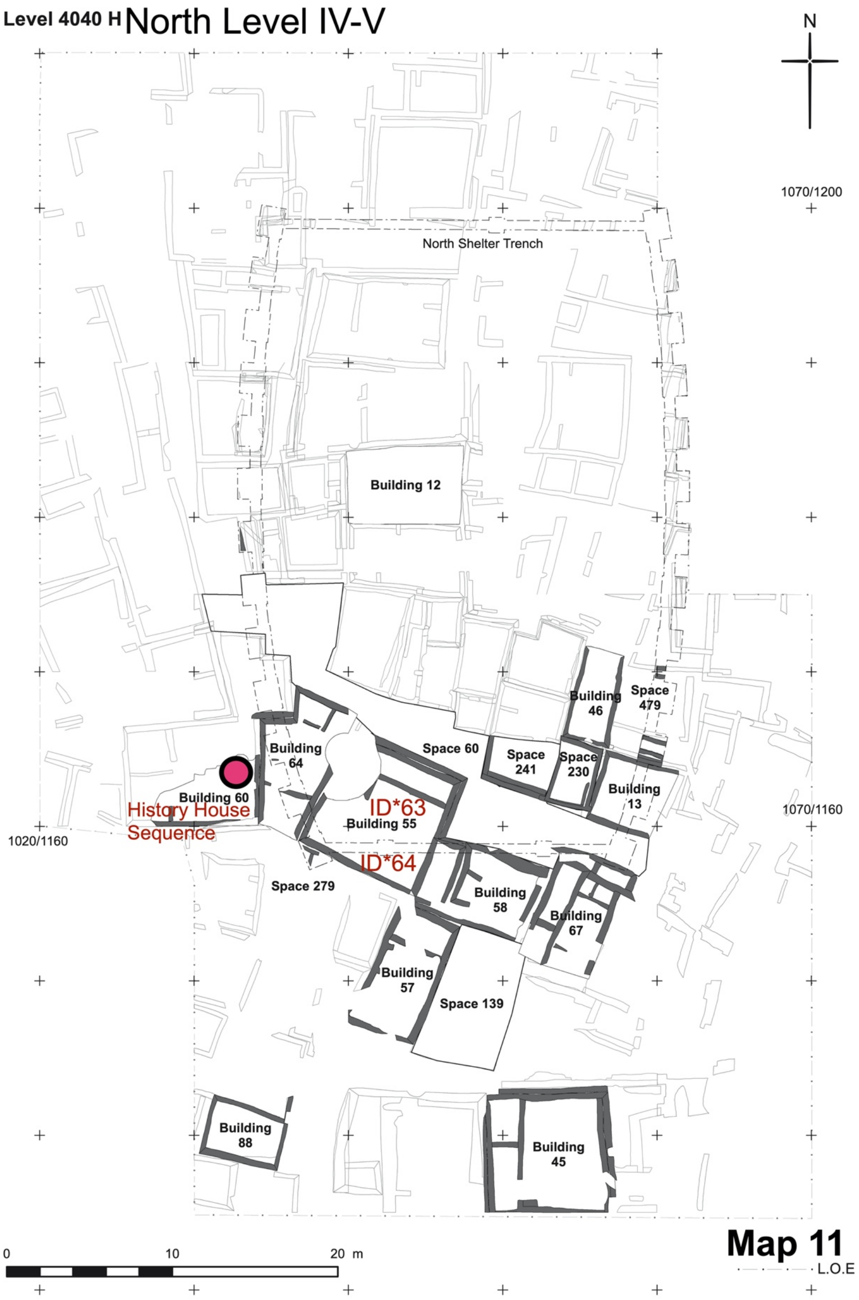



*Figure 4.25 Map 11, Level IV-V, North H*

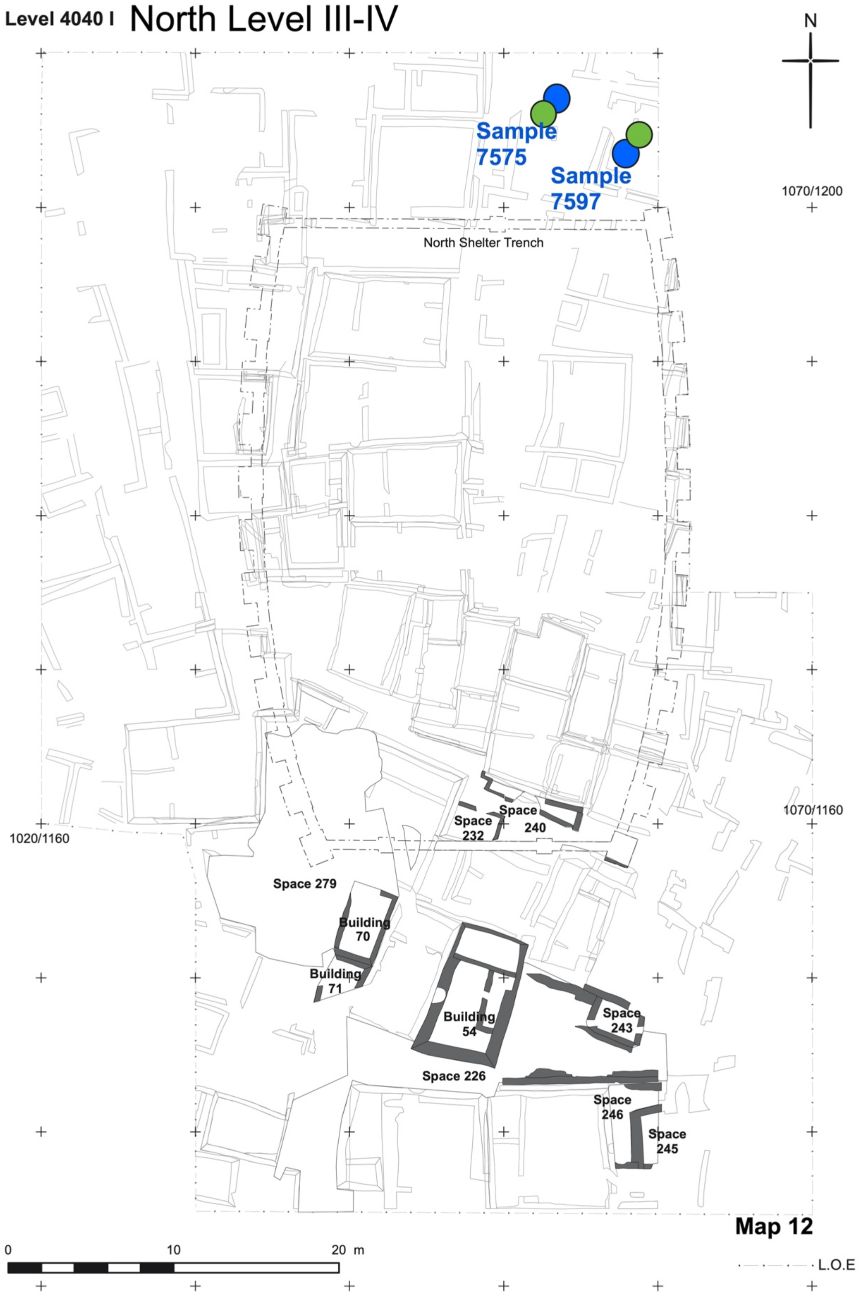



*Figure 4.26 Map 12, Level II-IV, North I*

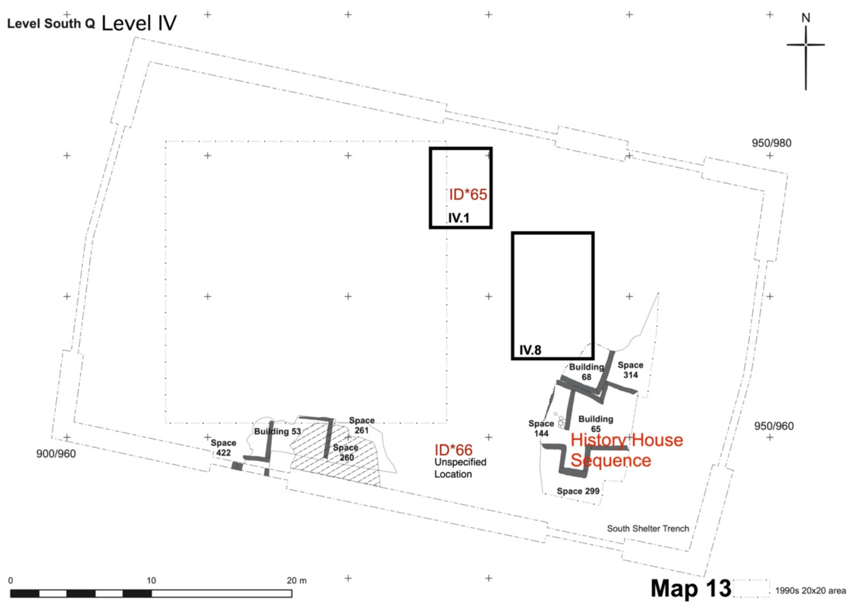



Figure 4.27 Map 13, Level IV, South Q

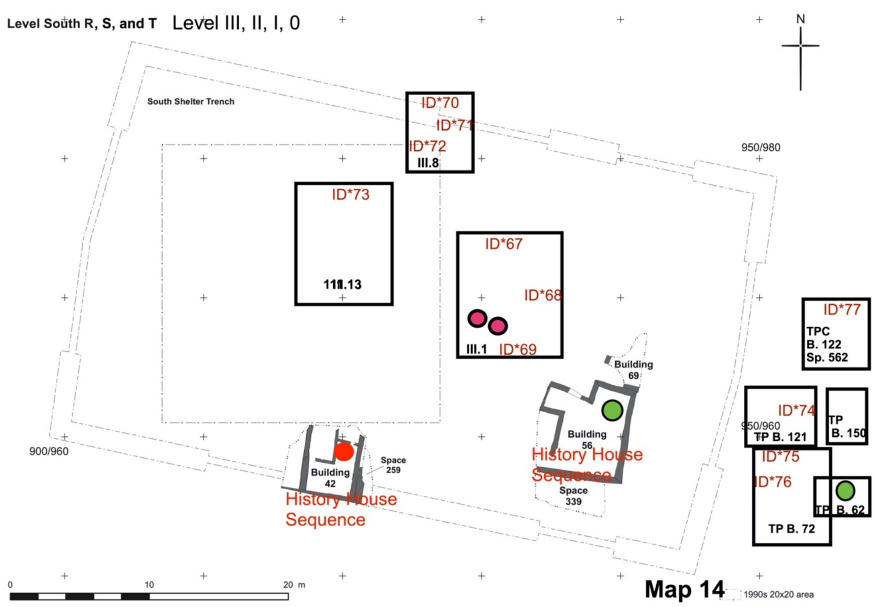



Figure 4.28 Map 14, Level III, II, I, 0, South R, S, and T

The phenomenon of history houses presented in Chapter 1 is observed in Figures 4.3 through 4.16. Within these history houses is a concentrated cluster of three sequences of adjacent buildings in the South area, in Figure 4.6, Figure 4.8, Figure 4.9 and Figure 4.11, in buildings 1, 8, and 10, in levels VIII through VI. They are labelled as history houses on the maps- e.g., 'History House Sequence 1', 'History House Sequence 8', etc. (Six sequences of history houses are shown in the maps and listed in Table 4.5.)

Hodder and Pels (2010) observed history sequences starting in level VIII (Figure 4.6). Figures 4.3 through 4.5 show the history sequence begins earlier than level VIII. The earliest excavated architecture of the site in space 181, in Figure 4.3, is directly below the building with the first painting, X.1 in Figure 4.4, and with the sequences for history houses 1 and 8 directly above.  These show two relevant points, that pigments were applied to the earliest known architecture, making them the first artefacts on-site, and 2) the history in this particular space is notable, enduring through subsequent generations; each of the houses in this location, from levels XII on to level VII, had painted surfaces and, as results in the last chapter showed, some of the most extraordinary art and artists' materials of the site.

### 4.2.1 Buildings

Spatial analysis of the earliest architectural levels shows the primary importance of colour and wall art at Çatalhöyük. Figures 4.3 and 4.4, levels Pre-XII and X, show that coloured plaster and painted designs are the earliest artefacts of Çatalhöyük. In the deep sounding excavated by Mellaart, red and yellow ochre paint was burnished into the earliest plaster floor remains in Space 181 (Matthews 2005, 129); these are annotated on Figure 4.3, with red and yellow circles. The first artefact under the earliest building in level X, building 1 was a curated fragment with a painted motif

(Mellaart 1964, 70; See Chapter 5 for additional information and Appendix I, ID 1 for image). Before beads, obsidian, or any other faunal or human remains, the first artefacts deposited by the Çatalhöyük peoples are mineral colours burnished into floors and curated painting fragments.

As shown in Figures 4.4 through 4.6 and the Master Pigment Table 4.1, red and black pigments are used in the Early level paintings X-VIII. A few of the earliest paintings excavated by Mellaart are documented only in his reports; the evidence was fragmentary and deteriorated upon excavation and therefore not photographed. Mellaart describes in reports red designs painted on a bucrania in level X building 1 (no photograph). In level IX in Figure 4.5, the earliest black pigments are seen in the cut-out of a quadruped in building 8 (ID 4). In the first known textile design Mellaart reports red pigment in shrine 8 (Mellaart 1964, 56; no photograph).

Research shows two red ochre pigment processing sites on Figures 4.4 and 4.5. Pigment was found in a fire installation in building 2, level IX, reported in the ÇRP team conservation report by C. S. Myers (1998). And E.X.8 (Hodder building 18) had a bin filled with red ochre in space 172, bin 516; red ochre pigment was examined from this feature, unit 4673, and reported by Matthews (1999, ÇRP database). These show the practice of ochre burning (to darken the colour of ochres) and specific sites for storage, respectively, in the Early levels.

The holistic method used to compile these results substantiates archival reports. Prior to this study, Mellaart's excavation reports from the 1960s published in *Anatolian Studies* were not integrated together with data gathered since the excavation re-opened in 1993. Mellaart claimed cases of cinnabar use, but without technical analysis to confirm the reports. By mapping available data from recent and archival sources, this study finds that the more recent substantiated cinnabar cases are found in the same locations in which Mellaart reported.

The earliest such case is seen in Figure 4.6, level VIII, building 31. In 2008, cinnabar was detected by XRF analysis of a small painting detached from the platform edge. It was stored at the Ankara Museum since the 1960s excavations and examined in a small-scale study of four painting fragments by a Turkish team led by Zararsiz et al (2008, 449, Figures 4a-c). (Image in Appendix I, ID 13.) Zararsiz et al (2008) did not attribute the analysed paintings to specific buildings. However, a careful match of the images in their article to the ÇPID indicates one of the painting fragments analysed by Zararsiz et al is from the building Mellaart called the 'Red Shrine' (ID 12); Mellaart (1966, 181-182) described the house as having a remarkable spectacle of cinnabar painted over the platform and dado. In a holistic integration of spatial data listed in Table 4.3 and plotted in Figure 4.6, this study finds the reporting of cinnabar in building VIII.31 overlaps with modern technical analysis substantiating Mellaart's accounts.

Red cinnabar is the first rare pigment at Çatalhöyük and, as mentioned in the chronology results in Section 4.1, pioneers the practice of bringing exotic pigments to Çatalhöyük from a distance. The use of it in such an extravagant way in the 'Red Shrine' signals a significant quantity was brought to that household in level VIII. At the same time, in building 27, Figure 4.6, it was also in wall art, used to highlight the heads of the first pair of leopard reliefs excavated by Mellaart (Image in Appendix 1, ID 10).

Blue is the most significant addition to the colour palette in the Middle levels; and, as was demonstrated in Section 4.1.5, azurite at Çatalhöyük is the earliest use of azurite as an artists' pigment. Understanding its use and resolving open questions is a high priority in this research. Maps for levels VII and VI in the South and North areas show all documented occurrences of blue pigments excavated in the Mellaart and Hodder phases of excavation.

The Late levels have two similar elaborately decorated buildings which demonstrate long-lived influence of artistic traditions in wall art. Both the style of the images and, as this study shows, the artists' materials, indicate Neolithic artisans were influenced by previous paintings over significant lengths of time. The elaborate scenes were painted in what Mellaart referred to as 'hunting shrines' in level V and level III, plotted in Figures 4.12 and 4.16. These paintings are a significant departure from Early and Middle level paintings and unique in the canon of images from the site. For the first time, Neolithic artisans are painting compositions with sophisticated arrangements of people relating to animals with a marked, sudden increase in depictions of humans; uniquely, both animals and people are rendered in a more naturalistic style (for more on this see typological analysis in Chapter 5).

Like the form, the artists' materials in the 'hunting shrines' also reflect a strong similarity in that the palette used to paint them was varied and includes the full range of pigments available at the time. Collated reports of archival sources and technical analysis indicate cinnabar was used in specific figures in both buildings. In level V, Mellaart indicated both organic and inorganic colourants in the scene of bull baiting in building V.1. Upon excavation and sun exposure, the red human figures faded entirely, suggesting they were painted with more fugitive organic pigments (Mellaart 1966, 186). In the large bull scene, a few male figures painted in an unusual pinkish-red colour on the north wall were most likely to be cinnabar (ibid). Todd (1976, 40) also notes the phenomenon of colour change in V.1, 'a few male figures are entirely painted black; others are a lighter pink pale colour (which turned dark when exposed to the air)'; Mellaart (1965, 180-1) also observed several cases of colours in paintings turning from red to black upon excavation. This red to black feature is a known deterioration phenomenon of some kinds of red cinnabar (mercury sulphide) turning to black (Nöller 2015). As presented in Chapter 3, the colour change from red to black on an excavated painted fragment was found in level VII in this technical study. The shrine in level III also has a palette of colours similar to the level V shrine; these were recently confirmed by Zararsiz et al (2008) in a technical study that also identified a mix of cinnabar and red ochre present in a human figure on a painting fragment held in the Anatolian Museum (see Table 4.3 for details.) Level V compositions inspired and influenced the similar wall art in the level III shrine painted two chronological levels later. This shows the considerable skill, knowledge and traditions in art practice were communicated over significant lengths of time towards the end of the life of the site.

*Figure 4.29 A red band painted on a skull from Mellaart's excavations, E.VI.20, findspot on Figure 4.15. XRF analysis by Carter confirmed cinnabar use. Photograph: ÇRP Archive report 2009, Figure 114.*

## 4.2.2 Bodies and Burials

### *4.2.2.1. Red*

Çatalhöyük carries forward Neolithic burial traditions from further afield such as plastering skulls and decorating secondary burials with colour (see example in Figure 4.17). Neolithic burials in the Near East and Anatolia often curated and coloured human remains, especially skulls, in secondary burial. There was a rare, but widespread practice of filling out the cranium or a full skull (with mandible) with plaster or mudplaster and setting cowrie or bivalve shells into the eye sockets and red pigment coating the surface.

The well-known examples of skulls such as this painted with red iron oxide are from Jericho (reg. no. 1995-565, Ashmolean Museum Oxford, and reg. no. JPE 121.32 Rockefeller Museum, Jerusalem) and Kfar HaHoresh (skull KHH Homo 1; Israel Museum, Jerusalem), and with red cinnabar at Kfar HaHoresh, (Homo 8; Cinnabar detection with SEM) and Tell Abu Hureyra (Molleson et al 1992; Goren et al 2001). Interestingly, Goren et al (2001, 681) also report a unique specimen from Beisamoun (Prehistoric Museum at Ma'ayan Barukh), a male cranium, which had its features modelled in a red paste made of a mixture of red iron oxide minerals and powdered calcite creating an effect reported as 'lustrous'; this pigmented plaster paste used at Beisamoun is similar to the pigmented wall plaster from Çatalhöyük pictured in Figure 4.26 and discussed in the technical examination findings in the last chapter.

At Çatalhöyük, one of the two plastered skulls found on-site was in level VII building 10; it was covered in red colour and had cowrie shells set into the eyes (Mellaart 1964, 93; 1966, 183, Pl. Lb; see Figure 4.18). Another plastered skull (sk. 11330) covered in red ochre was found in 2004 in building 42, South Area (ÇRP 2004 Archive Report). The remains were excavated intact and are now on display in the Konya Museum.

The Neolithic tradition of decorating buried bodies was a rarity at Çatalhöyük. Of the 480 (at least) burials excavated by Mellaart, only 21 had red colour. These are often termed 'ochre burials', but at Çatalhöyük, 'red burials' is a more accurate term, as the two types of red (ochre and cinnabar) were both used. Pigments were applied on the skeleton -– either the bones, the skull, or both.

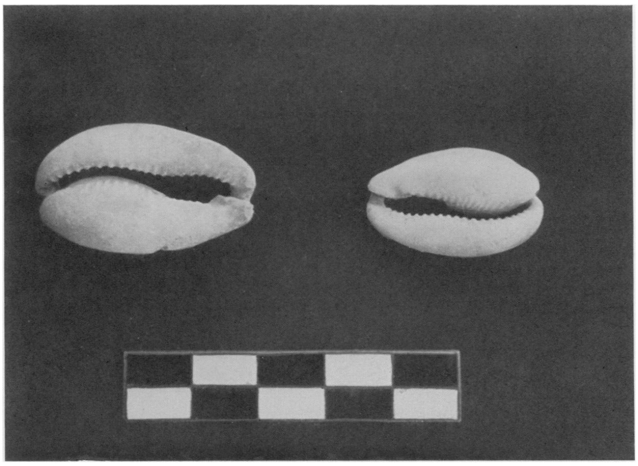


*Figure 4.30 From Mellaart 1966, Pl. Lb. Original caption, "Sliced Red Sea Cowrie shells set in eye sockets of red ochre burial below Shrine VII.10."*

Red burials were a long-lived practice. They were found on female remains from level IX to level III (Mellaart 1966, 183). The earliest ones are documented in level IX; in building 14 we see two 'red ochre burials' under the east platform (Mellaart 1965, 167; annotated with a red circle on Figure 4.5).

The specific use of rare cinnabar gives clues to the Neolithic peoples' relationship to their bodies. Cinnabar has a close association with skulls in secondary burials. Nearly all cases of cinnabar applied to skeletons have it exclusively on the head. This is the case in the earliest decorated burial in the South Area, in building 1, level IX, with a female skull covered in cinnabar and her body covered in red ochre (Mellaart 1963, 93; see Figure 4.5); noteworthy for this woman, estimated to be in her late teens, was that she was also buried with the first beads made of copper and galena (Mellaart 1963, 93). In level VIII a female infant burial was also found with cinnabar covering the skull in the 'Red Shrine'. (Mellaart 1966, 181-182, PL. XLVIII(b); Appendix I, ID12).

The use of cinnabar on skulls continues into the Middle levels, with an example in VI.20 (Mellaart 1964, 93; 1967, 207 Fig. 96) on a female skull with a band of cinnabar painted across the forehead, pictured in Figure 4.17. More recently, on-site XRF analysis of this skull confirmed the presence of mercury and sulphur, the constituents of cinnabar (HgS) in the paint layer, as reported by Tristan Carter (ÇRP Archive Report 2009, 127, Figures 113-114).

Highlighting of the head was the case with animals and humans, as seen in the use of cinnabar around the heads of the leopards in level VIII building 27, mentioned earlier. This evidence further demonstrates the point introduced in Section 4.1.1 that, contrary to the position taken in the work of Çamurcuoğlu (2015), Neolithic peoples did distinguish between red ochre and cinnabar. Furthermore, by using the prestigious cinnabar again and again on only the head region it indicates Neolithic peoples singled out the head as a distinct region of the body, potentially with additional value or priority.

Findings by the ÇRP team in the recently excavated North Area show skull painting with cinnabar was also practiced over extended time periods. On Figure 4.7 for North level F, corresponding roughly to levels IX - VIII, cinnabar was painted onto a skull and on a shell near the skull's posterior in building 131 adjacent to building 5 (See Figure 4.30 for a similar example). On Figure 4.10, for North level G, corresponding to levels VII – VIA and VIB, cinnabar was also painted on an unsexed adult skull in a multiple burial in building 108.

If red burials indicate a special focus or emphasis by Çatalhöyük peoples on the few individuals with decorated burials, then the practice also indicates they were honouring women and children. Of all the red burials found by Mellaart (1966, 183) all adult remains were of women; specific cases of female red burials previously mentioned were in IX.1 and VI.20 (Figure 4.17). Decorated infant and child burials began in Level X, with the first yellow ochre in an infant burial (~18 months old) with obsidian, shell, stone and charcoal. Additional infant red burials were found in VIII.31, as mentioned above, and a premature infant in E.VI.14 (Mellaart 1965, 167). Given the higher frequency of infant burials and a burial in level VIII.1 of a mother with an infant covered with red ochre (Mellaart 1967, 207), the red burial practice may also have a connection to motherhood or childbirth.

Colourants were found more frequently in the burials of the Transition levels than the Early levels, with the former providing over half – eleven of the twenty-one examples – excavated by Mellaart. Red and yellow ochre beads were also in use as funerary gifts in level VII (Mellaart 1965b, 183).

In the Late levels V-II, the practice of red burials becomes less frequent. Only five of the twenty-one red burials occur in levels V-III (Mellaart 1966, 183). Again, the emphasis in decorated burials is on children, with two of the five red ochre burials being of children, including the red ochre burial in E.IV.8 (Mellaart 1967, 208).

The pigment archive of current excavations contains the best-preserved specimen of a pigment crayon – ground powdered mineral pigments compressed to a shape to hold in the hand (Chapter 3, Section 3.3). Crayons were used to apply red ochre colours to building walls. This practice of crayon application of colour may occur at other times, but in a courtyard in level V is where the finds provide evidence of this method at that time. Prior study found red ochre remains on ground stone artefacts, specifically andesite slabs, at Çatalhöyük, suggesting these were the tools used to grind the earth pigments (Çamurcuoğlu 2013, 322). The context of the crayon – in a courtyard with other grind stones for grain – and the phytoliths and organic residue on the surface of this find, also indicate red ochre and grain grinding were done in the same locations.

In the Late levels, the investigations by Zararsiz et al (2008) also prove an additional point about the use of rare pigments, as well as verifying Mellaart's archival reports of cinnabar in specific buildings, as discussed earlier. By listing Mellaart's reports of cinnabar with the recent findings of the Turkish team led by Zararsiz in Table 4.3, the synergy of data shows certain households used rare pigments both on wall art and in burials. More specifically, in the first phase of excavation, cinnabar was reportedly applied to a skull in a secondary burial in the 'hunting shrine' building 1, level III; the cloth was saturated with paint and applied to a skull, leaving a faint impression of the textile and a distinct line of the cloths edge (Mellaart 1963b, 5, Pl. XXV*a*). Although this report is archival, as discussed earlier, analysis by Zararsiz et al (2008, 448)[17] confirmed mercury sulphide on wall paintings in the same building on a human figure in the 'hunting shrine' design held in the Ankara museum.

Spatial analysis strongly indicates that households in possession of exotic and exigent-to-obtain rare pigments used them for painting as well as honouring the dead. Collating the evidence in this study shows it to be the case in several houses discussed in these sections. For example, Figure 7.1, building VII.1 has blue in the wall painting as well as blue and green pigments in burials.

Over time, the spatial analysis also shows the practice of multiple context use of rare pigments is long-lived, with a history spanning from the Late to the Early levels.

[17] The platform design was not given a location by Zararsiz et al (2008), but the figure published with the results (Figures 2a-b) closely matches archival photographs from III.1 (See Appendix I, ID 68).

Cinnabar in paintings as well as skulls interred in the same building is seen in buildings VIII.31 and III.1; these are plotted on Figure 4.6 with levels dated to 6,710 - 6,550 cal BC and again in Figure 4.16 with levels dated to 6,380 – 6,180 cal BC, respectively. The use of artists' materials in architecture and burials demonstrates a considerable memory and continuity of practices and traditions over generations of peoples of Çatalhöyük.

### *4.2.2.2 Blue and Green Pigments and Copper-based Artefacts*

Evidence to date indicates that, despite Mellaart's reports, copper artefacts precede the use of blue and green pigments by two chronological levels. After the end of the first excavation phase in 1966, Mellaart's summary report claimed that copper-based pigments and artefacts started at the same time in level VIII (Mellaart 1966, 183). Archival evidence in Table 4.3 shows that while he is correct in recalling that copper beads in the earliest levels as some of the first burial goods, he is incorrect in the specifics. His excavation reports at the end of each season with mentions of specific findspots show copper artefacts are found earlier in level IX, and copper-based pigments slightly later in level VII. Specifically, beads for personal adornment were excavated from building 17 level IX, with the findspot annotated in Figure 4.5. The use of the blue colour is confined to levels VII and VI in documentation written immediately after the excavation season (Mellaart 1964, 114). The earliest confirmed findspots for green and blue pigments are in level VII buildings 1 and 6, (see Figure 4.8), making level VII the pigment 'start date' or defined time in which those pigments first appear on-site.

The timeline of the use of copper artefacts compiled in Table 4.3 also shows that technology grows more sophisticated over time. From the evidence of simple copper


*Figure 4.31 Macrophotography of the same blue bulk powder with the bone point (unit 16308) in 2008. From its shape and organic residue on the outer surface, in vivo it was most likely held in a leather or textile pouch prior to burial. Similar examples of the blue colour in pouch shape with spatulas were also reported in the South Area during the 1960's excavation, but not preserved. Photo credit: www.catalhoyuk.com, database search, photograph file DSC_0759.jpg.*

beads in level IX, starting in level VII, the metal was used to make different kinds of artefacts including small tubes in level VII, tituli attached to textiles in VI, and finger rings on men and women in VI.1 (Mellaart 1964b, 94, 111; Mellaart 1963, 99).

Spatial analysis also shows native copper use is longer lived through most occupational levels relative to copper-based pigments. Copper artefacts are found as early as level X, Figure 4., with pins and awls found as late as level II, in Figure 4.16 (1964b, 111). Blue or green pigments have firm start and end dates in levels VII and VI, as seen in Figures 4.8, 4.9, and 4.11. (See Table 4.4 for summary).

Azurite blue was used more frequently in burials than malachite green. Green pigments were reported in three burials by Mellaart (1964b, 94) in levels VII and VI, but he does not note specific buildings. It covered the bones in one burial of a male, who was also interred with his dagger (1967, 209). Malachite occurred in the burial of women in all other cases. Blue was more prevalent at this time, with an additional ten

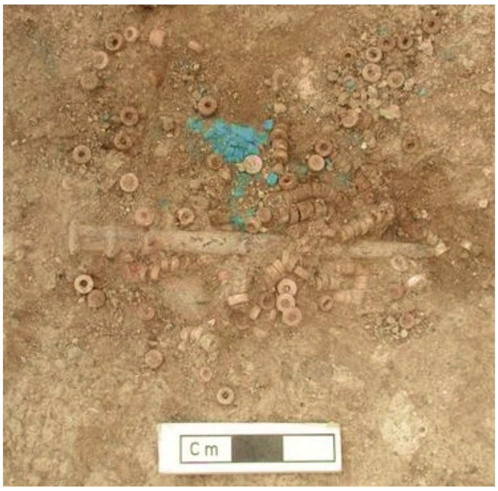


*Figure 4.32 Blue pigment with beads and a spatula unit 7575. Photo: www.catalhoyuk.com, file 20030803_4040_jpq_015.jpg*

*Figure 4.33 Blue pigment* in situ *below the neck of the skeleton with other grave goods of shell beads, green stone, and black beads. The multiple burial had two adults (sk. 16308 and 16132) and an infant (sk. 16131). Photo: www.catalhoyuk.com, file: 20070814_jpq_212.jpg*

skeletons in these levels with blue paint (1964, 93-94); findspot specifics of these were not reported. Burial evidence of green and blue pigments indicates that they were used not just for prestige burial goods, but also for body adornment *in vivo*. Mellaart notes that blue and green pigments were buried as part of cosmetic kits, complete with a reflective surface and applicator, "…delicate bone sticks still covered with green paint were used for applying make-up, baskets with rouge fully prepared and brilliantly polished obsidian mirrors to study the effect, are characteristic features… the finest of these mirrors from E.VI.20 was set in lime-plaster and beautifully smoothed to fit the owner's hand." Mellaart 1964, 95

The grouping of powdered pigments with bone applicators (Figures 4.19, 4.20) and obsidian mirrors (Figures 4.22 to 4.24) in burials strongly indicates the colours were applied to the body, especially to the face and head –- otherwise why would one require a mirror? Further evidence of in vivo use on the face is a notable burial with green paint specifically covered the eyebrows of a female skull (Mellaart 1967, 209). In recent excavations in the North Area, copper artefacts and pigments are also found in adjacent houses and even the same burial contexts. The northeast part of the North excavation area, level G (equivalent to Mellaart VII-VI), has a cluster of evidence of scattered azurite in burials with obsidian globes on the east edge of building 1 (unit 19947; Figure 4.22), and powdered azurite in a pouch shape in nearby building 102 (unit 16308; Figure 4.19), and malachite in building 3 (unit 8184) (findspots on Figure 4.10). In the earlier level Hodder North I, (roughly corresponding to Mellaart IV-III), Figure 4.14, the two azurite samples are found in adjacent burial

*Figure 4.34 Author pictured here investigating the pigment samples under the obsidian mirror globe in the double burial.*


*Figure 4.35 Double burial in the North area in which blue powder (units 19947 and 20450) was scattered below obsidian mirror.*


*Figure 4.36 Obsidian mirrors from Çatalhöyük excavated in the 1960s and preserved in the Konya Museum, Turkey. Photo: Author's own.*

contexts with copper artefacts – specifically bead fragments in one burial (7575) (Figure 4.2) and a complete arm band (7597) in another. (See Chapter 3 for technical analysis of pigments in this area from units 19947, 16308, 7575, and 7597).

Clusters and centres of activity of copper-based artefacts and pigments are also visible in both time and space. The spatial data gathered from first and second excavation phase sources show certain buildings in the South excavation area to have the majority of evidence. Figure 4.8 shows a cluster of copper pigment activity in the South Area in two neighbouring houses. In history house sequence 1, E.VII.1, (Hodder Building (B.) 8) Mellaart (1963, 95) reported lumps of blue pigment in a burial from the same building in which he described the cut-out of a cow painted blue (Mellaart 1964, 93-95; Mellaart 1967, 132, 151) discussed in Section 4.2.2.2. In the adjacent house, VII.6 (space 168), an infant burial was found with burial goods of blue pigment in a shell container (ÇRP Farid 1999) and powdered malachite in a pouch form (sample 4225).

Archival evidence from Table 4.3, seen in Figure 4.9, shows the copper interest in this cluster continued through time; in the next generation of buildings in history house sequence 1, the house built over VII.1, in VIB, building 1, Mellaart found evidence of copper heating, possibly an early attempt at smelting (1964, 111, 114; Neuninger et al 1964), and in the next immediate level in the same house in VIA.1, Figure 4.1, copper rings were found on skeletons of both sexes (Mellaart 1964, 93, 95, 114). While the technological interpretation of whether or not the finds indicate early copper smelting are in dispute by Radivojević et al (2017), the fact remains that copper artefacts are occurring in a single stack of buildings occupied over several hundred years.

These clusters indicate native copper and copper pigments were sourced, or at least handled and worked, by specialised craftspeople in these households. Additional support for this is that blue or green pigment is most often the main and only offering in the burials in which it occurs; these exotic colours are typically not found in what Mellaart (1964b, 94) refers to as 'rich' burials with several other goods. This, therefore, supports the idea that the copper crafts people were strongly associated with the material. And, the continuation of the tradition of copper artists' materials over three generations of history houses in sequence 1 shows the tenacity of peoples passing on the tradition – carrying the knowledge on over time over several generations of houses in the same spot.

Hodder and Pels (2010, 183) highlighted the phenomenon of strong similarities in households located directly over another in subsequent building stacks (see Table 4.5). They hypothesise that houses consisted of family which may or may not have been blood related. Family members divided labour between 'agriculture, herding and hunting' with elders passing on specialised knowledge in a specific skill set to younger generations.

This research extends the skill set from those technologies to copper and identifies the strongest copper history sequence in Shrine Sequence 1 (Table 4.5) which has households with artefacts, powdered minerals, and painted relief all of copper. Much like a modern-day house (in the sense of a high fashion house, like the house of Prada or Gucci) houses were known with a set of experiences leading to their specialised technical expertise handed down through generations. But, in the Neolithic, the peoples in this history house sequence were the house of rare colours like the sky or water, in materials solid and powdered, workable into several kinds of personal adornment.

This leads us to the next section, an analysis of sequences of history houses. Each sequence is examined for how often wall paintings and rare artists' materials occur in houses with longer histories relative to other buildings.

## 4.3 Colour and Paintings in History Houses

To build on and synthesise the previous two sections on Time and Space, this section presents the results of the unique research designed by this author to determine if history and art are strongly connected at Çatalhöyük. The original methodology examines the correlation of history house locations with wall art and rare minerals used for colourants.

*Table 4.5 History house sequences with occurrences of wall painting designs and rare artists' materials.*

**History Houses* with Paintings and Rare Pigments**

| | MELLAART LEVELS | HODDER SOUTH | HISTORY HOUSE SEQUENCES SOUTH AREA | | | | HODDER NORTH | HISTORY HOUSE SEQUENCES NORTH AREA | |
|---|---|---|---|---|---|---|---|---|---|
| | | | SHRINE 1 | SHRINE 8 | SHRINE 10 | B.75-10 SEQUENCE | | B.131- 1.2 SEQUENCE | B.83-60 SEQUENCE |
| LATE | 0 | TP | | | | | | | |
| | I | TP | | | | B.10 | | | |
| | II | TP | | | | B.44 | | | |
| | III | T | | | | B.56 | J | | |
| | | S | | | | | J | | |
| | | R | | | | | I | | |
| | IV | Q | | | | B.65 | H, I | | B.60 |
| | V | P | | | | B.75/SP.333 | H | | |
| MIDDLE | VIA | O | VIA.1 | VIA.8 | | | G | B.1.2B and C | B.59 |
| | VIB | N | VIB.1 | VIB.8 | | | G | | |
| | VII | M | VII.1/B.8 | VII.8/B.20 | VII.10/B.24 | | G | | |
| EARLY | VIII | L | VIII.1/B.21 | VIII.8/B.7 | VIII.10/B.6 | | F | B.5 | B.83 |
| | IX | K | IX.1/B.22 | IX.8/B.16 | B.17 | | F | B. 131 | |
| | X | J | X.1/B.23 | X.8/B.18 | | | | | |
| | XI | I | | | | | | | |
| | XII | H | | | | | | | |
| | PRE-XII | G | SPACE 181 | | | | | | |

WALL PAINTING IN BUILDING
MALACHITE or COPPER ARTEFACT
AZURITE
CINNABAR
OCHRE FLOOR AT FOUNDATION
Buildings from Hodder (2014, Table 1.1) shown in grey text.
Buildings excavated by Mellaart in the same sequence but not included in Hodder (2014, Table 1.1) shown in orange text.
*History House Sequences are defined by Hodder (2013b, Table 1.1 Çatalhöyük Building Categories identified between 2000 and 2008.

Sequences of houses in the same location built upon the same footprint of preceding house foundations are found throughout the Neolithic occupation at Çatalhöyük. Hodder and Pels (2010) term these sequences history houses and identify locations of these stacks of multi-generational buildings.

Table 4.5 examines the correlation between history houses and artistic practice. Each column is a sequence of history houses identified by Hodder (2014, Table 1.1) and overlays the frequency of paintings (represented as a yellow highlighted block) and rare pigments (red-cinnabar, green-malachite, blue-azurite). As in the last section, the rare pigment and copper data is sourced from the comprehensive data presented in Table 4.4; in that table, rare artists' materials found in history house buildings are labelled with a *HH symbol in red. Spatial maps in Figures 4.3 through 4.16 label history house sequences in red text; these correspond to the same sequences listed in red in each of the six columns of Table 4.5 on the previous page.

All the history house sequences have either paintings or rare artists' materials, seen in Table 4.5. All of the sequences have occurrences of paintings or rare artists' materials; and, three of the six sequences have painted designs and exotic artists' materials or copper artefacts.

In Table 4.6, the relationship of art and artists' materials to history at Çatalhöyük is analysed in further detail by comparing the proportion of excavated houses with evidence of art practice (in the form of paintings and rare artists' materials) to the frequency of art practice in history houses. This yields a quantitative comparison in Table 4.6 to examine art and artists' materials frequency in houses with a longer occupation sequence/history compared to all houses.

The figure of a total of 224 excavated buildings will be used in this analysis; this includes 160 houses excavated in the first phase of excavation by Mellaart and 64 in the second phase by Hodder. It is the most precise number within the available data for the total number of excavated houses.

This total was calculated in the following way. Prof Hodder (2014, 7), the ÇRP director, reported that Mellaart excavated over 160 houses in the south area of the Neolithic East mound (as opposed to the Chalcolithic West mound) between 1961-1965. Hodder does not report a definitive total of newly excavated buildings during the campaign since 1993. An exact figure may be difficult to give since much work was done on partially excavated buildings from the previous campaign. The figure given by Hodder (2014) is a total of 64, which consists of a total of at least 37 North Area buildings (34 buildings were revealed in a shallow, surface excavation of the north area with 23 of these excavated between 2000-2008, and buildings 1, 3, and 5 before 1999) and an additional 11 buildings in the south area, with some reopened houses from Mellaart's excavation. Using the Figures 4.3 through 4.16 GIS maps (see Section 4.2) and in Hodder's (2004, Table 1.5) summary of the latest published volume which lists the 23 buildings from the North and 11 buildings from the South. Of the 11 buildings of the South, (Hodder building numbers 10, 42, 43, 44, 50, 53, 56, 65, 68, 69, 75 (not to be confused with the different building numbers assigned by Mellaart), two houses, Hodder building 43 (corresponds to Mellaart VIII.27), and Hodder 50 (Mellaart VII.9), were previously excavated by Mellaart, reducing the figure from the 2000-2008 excavations from 11 to 9. Since 2008, I count an additional 21 excavated buildings with Hodder building numbers (and no Mellaart labels) present on GIS maps from ÇRP (Figures 4.3 through 4.16). These are: Level X Hodder building 9, Level IX Hodder 17 and 2, Level VIII Hodder 93 and 4, Level VII Hodder 40, Level VIA Hodder 86, 79, 80, Level V Hodder 75, Level IV Hodder 65, 68, 53, Levels III-0 Hodder 42, 56, 69, and an additional 5 buildings in the Team Poznan area. With 160 buildings in the South area under Mellaart, 30 under Hodder, and 34 in the North area directed by Hodder, the final total is 224 houses.

As Table 4.6 shows, the total history houses on-site are 27. To calculate total history houses, 20 buildings classified as history houses by Hodder (2014, Table 1.1) [18] are included. Since 2008, two additional buildings were excavated, buildings 75 and 83. These are differentiated in the table with grey instead of black text. Upon examination of the GIS maps, an additional five buildings excavated by Mellaart were in the sequences identified by Hodder; these are noted on Table 4.5 in orange text. Table 4.6 shows the count of 224 total houses with 27 of these houses in history sequences; the latter comprise 12% of all houses.

Figures regarding the wall art come from Master Table 4.1. These show that the total number of walls with documented, painted design is 77. Those paintings occur in a total of 48 buildings, with 23 of these, as mentioned previously, being history houses. Buildings in these sequences are shown in Table 4.5, with each case of painting represented by a yellow cell, and each case of rare pigments with the coloured cell matching the pigment, blue for azurite and green for azurite.

Table 4.6 compares counts in all 224 houses. Rare artists' materials total 40 contexts in 32 total houses. This is made up of 6 documented contexts of azurite, and 7 documented contexts of malachite in 9 buildings total, with copper artefacts in 13 documented contexts in 11 buildings, and 12 contexts of cinnabar in a total of 12

[18] Twenty-two buildings were listed in the table. However, upon investigation, Hodder listed a sequence two times, first the Building 59 and 60 sequence, then again the Building 83, 59, and 60 sequence. Therefore, two buildings were subtracted from his count in this table.

*Table 4.6 Relevant Counts to Calculate Ratios of Art or Rare Artists' Materials In All Houses Versus History Houses*

| | |
|---|---|
| Total Excavated Houses | 224 |
| Total houses in history house sequences | 27 |
| Buildings with walls with painted designs | 47 |
| Total contexts with copper pigments | 13 contexts 9 houses |
| Total contexts with copper artefacts | 13 contexts in 11 houses |
| Total contexts with cinnabar | 14 contexts in 12 houses |
| Contexts with rare artists' materials (cinnabar or Cu-based) in all excavated houses | 40 contexts in 32 houses |
| Contexts with rare artists' materials (cinnabar or Cu-based) in history houses | 15 contexts in 12 houses |
| Number of walls and houses with painted design in all excavated houses | 77 walls in 47 houses |
| Houses with painted design and/or rare artists' materials in all excavated houses | 67 houses |
| Number of walls and houses with painted design in history houses | 14 walls in 9 houses |
| Contexts with copper pigments and artefacts in history houses | 13 contexts in 9 houses |
| Contexts with cinnabar in history houses | 3 contexts 3 houses |
| Houses with painted design and/or rare artists' materials in all history houses | 18 houses |
| **All Excavated Houses** | |
| Houses with Copper pigments (9) / Total houses (224) | 4% |
| Houses with Copper artefacts (11) / Total houses (224) | 5% |
| Houses with Cinnabar (12) / Total houses (224) | 5% |
| Houses with Rare Artists' Materials (12) / Total houses (224) | 14% |
| Buildings with painted walls (47) / Total Houses (224) | 20% |
| Buildings with wall designs and Rare Artists' Materials (67) / Total houses (224) | 30% |
| History houses (27) / Total Excavated houses (224) | 12% |
| **History Houses** | |
| History houses with Rare Artists' Materials (12) / All history houses (27) | 44% |
| History houses with painted design (9) / All history houses (27) | 33% |
| History houses with Art or Rare Artists' Materials (18) / All history houses (27) | 67% |

buildings. These counts are compared with paintings and rare artists' materials in all houses versus history houses in Table 4.6.

Results from Tables 4.6 shows a strong correlation between wall art and rare artists' materials in history houses. These occur in significantly higher rates in houses with long sequences, relative to all houses. The chance of any house having painted designs is 20%, compared to 33% in history houses.

The location of rare artists' materials shows that these precious materials occur in houses with history more than twice as much as in houses in general. Rare artists' materials occur in 14% of all houses, but 44% of history houses. The likelihood of any given house having painted designs or rare artists' materials is double in history houses versus all houses, with approximately a two thirds chance in a history house (67%) and a one third possibility in any given house (30%). Recommended future work involves the investigation of the link between art and history with statistical analysis.

From these results, art practice in the form of painted design and exotic materials is highly concentrated in history houses. Such practice is almost twice as likely to be present in houses with longer history sequences than in other houses, indicating a strong link between art and history amongst the artisans and craftspeople of Çatalhöyük.

## 4.4 Curating Colour: Rare Pigment Sources in the Landscape

In order to connect the pigment minerals to the surrounding landscape, the methodology located potential mineral sources and overlaid this information with known areas of trade for Çatalhöyük peoples. Three forms of evidence are brought together in this examination of evidence: mineralogy, archaeology, and chronology.

The map in Figure 4.27 is compiled to examine the spatial relationships of archaeological sites with mineralogical sources of minerals of the rare pigments azurite and malachite in copper deposits and cinnabar in modern mercury deposits. The information concerning mineralogical sources is overlaid with known trade sites of the four volcanoes used by Neolithic peoples at Çatalhöyük to obtain obsidian identified by Carter (2011) (in Figure 4.25) and known Neolithic copper mines (from Wagner and Öztunalı (2000, Figure 2) reproduced in Figure 2.3).

The following section will cover the more extensive investigation of obsidian trade routes and its relevance to copper sources and the archaeological links to Cappadocia.

### 4.4.1 Copper and Obsidian Sourcing

Sources of obsidian at Çatalhöyük demonstrate a pattern of trade in close proximity with known copper sources and other Neolithic sites known to have had copper. The earliest obsidian at Çatalhöyük at level pre-XII is in the form of processed and ‘ready-made’ blades, which were imported from East Göllü Dağ obsidian (Carter 2011, 11), location in Figure 4.25. In level XII, obsidian comes from Cappadocia – with 95%

from East Göllü Dağ and the remainder from Nenezi Dağ (Carter 2011, 11). From level XII to level VII, obsidian sources and technology remain the same, with the East Göllü Dağ as the main source and some from Nenezi Dağ. At this time in copper, the first artefacts, beads rolled from copper sheets, were first deposited on-site (see Rare Pigment Table 4.3). See Appendix V for longitude and latitude data for archaeological sites.

In the Middle levels, both the copper and obsidian artefacts have significant changes. As seen in Figure 4.8 and in Table 4.3, Level VII sees the first copper pigments and a


*Figure 4.37 Map of Anatolia showing Çatalhöyük in relation to the sites of obsidian sourcing marked with red triangles. Figure by author using Google Earth. See Appendix V for longitude and latitude data for archaeological sites.*

significant rise in the frequency and complexity of copper artefacts. At level VII, obsidian sources are 50% from Nenezi Dağ and 50% from Göllü Dağ, with a dramatic shift in VI. In obsidian deposited after level VII, Nenezi Dağ becomes the dominant source, with 95% of the assemblage from there and the remainder from Gollü Dağ; and a concomitant change in processing and technology with the “adoption/arrival of new skilled and exclusive modes of obsidian working” beginning in level VI (Carter 2011, 13). Both events in these two artefact groups signal an influx of peoples with new materials, knowledge, and skills from new areas in the landscape in the middle periods. They also demonstrate strong trade links and travel to and from Cappadocia.

In the Late levels, from V onwards, copper pigments are not in evidence and a significant reduction in other copper artefacts is noted. See Table 4.3 and Figures 4.12 through 4.16. At this time, the Nenezi Dağ obsidian is still the most prevalent, with 87% of the assemblage. Most interestingly, a handful of blades come from ~650-825 km away at Nemrut and Bingol Dağ in eastern Turkey (Carter et. al 2008, 903; Carter 2011, 4) shown in Figure 4.25. As seen on Figure 4.38, these two eastern obsidian sources are on either side of the earliest known Neolithic settlements with evidence of copper and malachite use. The first of these settlements is Ergani Madan. This is named in a review of early metallurgical sources by Henderson (2000) that cites a report by Coughlan (1962) as a likely source for identifying the first copper in early metallurgy in south-east Turkey. The second is Çayönü Tepesi (discussed in Section 4.1.3). Therefore, this small cache of ready-made blades from east Anatolia, found at level V, signals Neolithic peoples had travelled far afield near sites with significant evidence of copper technology and, as we see in the Mineralogy Sources section, multiple nearby mineralogical sources.

#### 4.4.1.1 Çatalhöyük Blue and Obsidian, too: Cappadocia Connections

As discussed, the trade route between Konya and Cappadocia is confirmed in obsidian technology. More specifically at Tepeçik-Çiftlik, the bifacial points which occur in the early levels of Çatalhöyük, from XII to VIII which ends ~6,550 cal BC, matches the same techniques found in later contexts dated to ~6,300 at Tepeçik-

Çiftlik (Biçakçi et al (2012). Blue azurite appears at Çatalhöyük at this juncture between levels VII and VI- and prior to the bipolar lithic technology appearing in Cappadocia. These establish a strong connection between the two specific sites with the obsidian sources and technology. Archaeological evidence also supports a strong influence from Çatalhöyük artistic practice in a Neolithic building in Cappadocia.

*Figure 4.38 Wall plaster with red stripes and remnants of blue paint from the Neolithic Upper Phase at Tepeçik-Çiftlik. Photo: Biçakçi et al 2012, Figure 55.*

In this research, a survey of Neolithic Anatolian sites yielded the discovery of one other occurrence of blue pigment in Cappadocia in a published excavation report. A fragment of wall plaster with blue paint was found at Tepeçik-Çiftlik, a höyük in a region of active tectonic dynamics leading to volcanic domes, craters, and calderas. This site is in the southwest of Cappadocia, along obsidian trade routes used by Çatalhöyük peoples. Due to its placement near obsidian sources, Tepeçik-Çiftlik is thought by Biçakçi et al (2012, 89) to be a key site involved in the distribution of obsidian to the Konya plain, with likely contact with Neolithic Çatalhöyük traders.

Figure 4.26 shows the wall plaster with blue remnants found at Tepeçik-Çiftlik in phase IV, Pottery Neolithic Upper Phase (Levels 4), structure AK. The level, phase

IV, was carbon dated to ca. 6,300 cal BC with two dates (ibid,103). This is contemporary with the late occupation levels of Çatalhöyük. Plaster artistry similar to wall installations at Çatalhöyük were found in the same building with the blue painted plaster – namely, two sets of bullhorns set into the walls (ibid, 90) – linking the structure to the artistic practices of Çatalhöyük in time and specificity of house decoration. The blue colour has not been characterised but is included here as the only other account of blue pigment in Neolithic Anatolia. Also, given the strong connection with the obsidian trade, not only in Cappadocia, but specifically at this time between Tepeçik-Çiftlik and Çatalhöyük, details of trade between the two sites show a strong connection. The connection is evidenced by the similarities in house decoration with bucrania and sophisticated decoration with a varied palette of colours, and potentially of blue colours. These all demonstrate an exchange of artistic knowledge and skill from Çatalhöyük and Cappadocia, specifically between these two sites.

### *4.4.1.2 Mineralogy* Sources: *Copper Pigments and Metal* in Anatolia

The view of copper sources in relation to Çatalhöyük comes from the preliminary work on metallic finds at the site by Birch et al (2013). The review draws upon the comprehensive survey by Wagner and Öztunalı (2000, figure reproduced for reference in Figure 2.3) of prehistoric copper deposits and mining locations in Anatolia. Based on that survey, Birch et al (2013) assert that native copper was widely and easily accessible, listing the following twelve sites in the region from the Wagner and Öztunalı study (listed in Section 2.4.2). These twelve Neolithic copper source sites are annotated in Figure 4.27 with green arrows. As Figure 4.27 shows, while copper sites are indeed accessible, only a few occur near sites known to connect with trade at Çatalhöyük.

What is established in this holistic investigation of copper sources by examining chronological and spatial data is that the blue mineral at Çatalhöyük is the earliest known occurrence (see Section 4.1.3). Also, from the map in Figure 4.27, we see early Neolithic mines, modern copper mines, and early Neolithic sites with copper evidence all converge in eastern Anatolia. The few specimens of ready-made obsidian from eastern Anatolia attest to direct contact with the region prior to level V at Çatalhöyük. This convergence of evidence with mineralogical sources for copper, archaeological evidence at Çayönü Tepesi and Ergani Madan, and known trade routes indicates that this region is the most likely source for copper pigments.

The lack of mineralogical sources in Cappadocia seen in Figure 4.27 indicates this area was not a source, but a hub for trade. This comes from the strong trade links with Cappadocia, especially the significant change in obsidian sources and technology from Nenezi Dağ when copper pigments came into use in level VII.

Also, the similar blue pigment at nearby Tepeçik Çiftlik, and accompanying Çatalhöyük-like art assemblage in the same building as the blue painted plasters, indicate a direct link. Therefore, evidence supports Cappadocia as being a trading hub, but not a geological source, for copper-based materials.

### *4.4.1.3 Cinnabar Sourcing*

The map in Figure 4.27 shows a mineralogical map of Turkey from the Geological Survey Turkey (MTA) http://www.foramproject.net/index.php/consortium/third-parties/geological-survey-of-turkey-mta/ with circle annotations by author. Modern mercury deposits are ringed in red. The closest in proximity to Çatalhöyük is ~20km north of nearby Konya.


*Figure 4.39 Composite map of Turkey with Neolithic archaeological sites, modern and Neolithic copper sources, modern mercury sources, and volcanoes known to be sourced for obsidian at Çatalhöyük. Map: (http://www.mta.gov.tr/v2.0/eng/maps/images/myatak.jpg with annotations by the author.*

As far as is known regarding modern deposits, the nearby Konya location is the only mercury deposit near the site or near other sites with confirmed archaeological connections to Çatalhöyük, such as the obsidian trade routes in Cappadocia. The mercury deposits on the coasts in the west and north do not have confirmed archaeological connections to Çatalhöyük through obsidian trade or archaeological artefact or assemblage similarities. This source north of Konya was also thought to be the most likely source according to Mellaart (1967), again, based on its close proximity to the site.

Looking at the chronological evidence for cinnabar, it was used from the earliest levels at Çatalhöyük, first in a burial in level IX, dated to 6,950-6,550 cal BC, and up to level III, 6,380-6,270 cal BC. Given the longevity of the use of the mineral and the variety of trade routes that must have been in use over the ~700 years, it is possible other smaller mercury deposits were found. Also, considering the mineralogical co-occurrence of cinnabar with iron oxide in volcanic environments, it is also possible that smaller lumps of cinnabar were found in conjunction with other coloured materials brought to site.

In summary, other, smaller deposits from volcanic environments in which Neolithic peoples were trading for obsidian, such as Cappadocia or eastern Turkey, are possible but less likely sources. Overall, the single source north of Konya remains the most likely source of the cinnabar pigment found at Çatalhöyük.

## 4.5 Summary

In this chapter, comprehensive archaeological data pertaining to artists' materials from both excavation phases of Çatalhöyük were brought together for the first time. Several vital datasets were established which facilitated a robust, holistic investigation of the use and role of colours at Neolithic Çatalhöyük and how they related to other artefact groups. These unique data sets include a chronology of pigment use (Section 4.1); also shown are the spatial relationships of mineral colourants to each other, the paintings on-site (4.2), history house sequences (4.3), and other artefact groups (4.4). Also, with more detailed pigment findings, especially in the Master Table 4.1 and

How Neolithic peoples related to their colours was clarified during this investigation. Sections 4.2.1 *Buildings* and 4.2.2 *Bodies and Burials* presented evidence which re-examined how and where cinnabar was used at Çatalhöyük, and Section 4.4., which identified its distant sources in the landscape. Contrary to the position taken by Çamurcuoğlu (2012, 254), this evidence demonstrates that it is highly likely that Neolithic artisans fully understood the two red pigments, iron oxide and cinnabar, to be different materials with different working and handling properties and sources, and with distinct attributions of value and meaning.

This chapter also investigated the relationship of art and artists' materials to history at Çatalhöyük, through a quantitative analysis which used frequencies of appearance of paintings and of rare artists' materials as indices of art and art practice on-site. The concept of history used here derives from the phenomenon at Çatalhöyük of artefact and house connections spanning several generations and hundreds of years; history houses with long occupational sequences were identified by Hodder and Pels (2010) and Hodder (2014). In Section 4.3, wall art frequency amongst all houses was compared with its frequency in history houses to see if the ratio of paintings was higher in houses with long occupational sequences. Ratios of frequency of the rare artists' materials were compared between history houses and all houses. The future work on this issue will benefit from statistical analysis; however, in a general overview history house sequences had considerably higher percentages of art practice in all forms relative to other buildings, showing a strong link between art and history.

Connections of colours to other relevant artefact groups are demonstrated. Copper artefacts are found to be closely associated with the procurement of rare pigments. The chronological and spatial investigations in Sections 4.1-4.3 show that the copper-based materials had a strong archaeological connection in both time and space and were most likely sourced together; Section 4.4 establishes a strong link of pigment procurement to early prospection for copper metals. Copper-based pigments and copper artefacts are to be used often in the same households. This is shown in the Rare Artists' Materials Table 4.3 as well as being mapped in Section 4.2 with spatial analysis; these findings are then connected to history house sequences in Table 4.5.

Section 4.4 also demonstrates the relevance of obsidian procurement and technology to artists' pigments. We see obsidian sources and processing styles change at exactly the same time as the radical changes in the pigment palette occurred, namely the appearance of copper pigments and rise in sophistication and frequency of copper artefacts in the Middle levels VII and VI. This indicates that Neolithic peoples were exploring the landscape procuring obsidian, copper metal, and powdered blue and green copper-based pigments. These artefacts signal an arrival of peoples at Çatalhöyük who had technology and specific technical skills from further into Cappadocia and eastern Anatolia.

Additionally, this work establishes evidence that points to obsidian trade as a highly likely mechanism for bringing the exotic blue and green pigments on-site. This demonstrated with synthesised data from Neolithic copper mines and prior use of malachite in southeast Anatolia at Çayönü Tepesi, combined with the copper-based pigments appeared at Çatalhöyük for the first time contemporary with new developments in obsidian trade. The results here also establish copper mines along trade routes for obsidian in Cappadocia and south-eastern Turkey are the most likely sources for azurite and malachite pigments.

The holistic method employed in this thesis, incorporating original chronological and spatial data sets, gives new insight into the relationship Neolithic peoples had to their artists' materials, the relationship this shows to their Anatolian landscape, and the strong connection art practice had to living memory and history at Çatalhöyük. Having comprehensively examined the pigments from micro to macro, the next chapter turns to the wall paintings with an in-depth analysis of form and content over time.

# CHAPTER 5 WALL PAINTING ICONOGRAPHY

## 5 Introduction

This chapter presents findings concerning the paintings. First, Sections 5.1 and 5.2 present the foundation datasets for the typological study and the two original databases created for this thesis. Then, the analysis of the painting frequency is presented.

Typology analysis follows in Section 5.4. This first gives results for analysing paintings with Broad typology, expanding the number of types from three (used in prior study) to five, to explore what understanding can be gained from this form of analysis. Next, the complexity of compositions over time is evaluated using Element typology which tracks each single motif type over time. Simple images, those with one motif, and Compound images, with two types, are tracked over time. The methods for analysing typology with Broad categories or the more detailed methods of Element typology are applied and then compared for efficacy and accuracy in Section 5.5. This is followed by the Spatial Analysis in Section 5.6 and notable findings in Section 5.7.

Later in the thesis, discussions draw on the findings in relation to the paintings presented in this chapter and are integrated with findings regarding pigments from the preceding chapter.

## 5.1 Master Summary Table of Çatalhöyük Paintings

Painting typology is summarised in the Master Summary of the Painting types Table 5.1; it shows the development of painting types over time. The typological data from Table 5.1 is queried to analyse frequency, complexity, and style to examine changes and innovations through time.

To navigate the table, see the left columns for the painting and right columns for typology

*Table 5.7 Master Summary Table of Çatalhöyük Painting Typology in Chronological order from the Early to Late Levels. Sources for Radiocarbon dates: *Chronology from, Cessford 2005, Hodder, Chapter 1, Fig. 1.5 CH vol. 9. **Chronology from Bayliss et al 2015. *** Chronology from Marciniak and Czerniak (2015), TP Areas correspond to Levels 0-III.*

**TYPOLOGY**

**Early Levels XII-VIII**

| | ID | BLDG number | Wall Orientation | BROAD: Geometric Motif | BROAD: Zoomorphic Motif | BROAD: Anthropomorphic Motif | COMPOUND: Compound Compositions | EARLY LEVELS: i Crosses and Rosettes | ii Unclassified Geometric | iii Lozenges | iv …Quadruped Cut-outs | v Circles | vi Vultures with Humans | vii Triangles | viii Vine Pattern | ix Textile Patterns | x …Feline Relief | xi Dado/Painted Platform |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South I. X 7,035-6,920 cal BC** | 1 | below 1 | none | ■ | | | | ■ | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| South K. IX 6,950-6,550 cal BC | 2 | 2 | N | ■ | | | | | ■ | | | | | | | | | |
| | 3 | 2 | E | ■ | | | | | | ■ | | | | | | | | |
| | 4 | 8 | N | | ■ | | | | | | ■ | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| South L. VIII 6,710-6,550 cal BC | 5 | 2 | NW | ■ | | | | | | | | ■ | | ■ | | | | |
| | 6 | 8 | E | | ■ | ■ | ■ | | | | | | ■ | | | | | |
| | 7 | 14 | N | ■ | | | | | | | | ■ | | ■ | ■ | | | |
| | 8 | 14 | E | ■ | | | | | | | | | | | | ■ | | |
| | 9 | 25 | NE | ■ | | | | | | ■ | | ■ | | | | | | |
| | 10 | 27 | W | | ■ | | | | | | | | | | | | ■ | |
| | 11 | 27 | W | ■ | | | | | | ■ | | | | | | ■ | | |
| | 12 | 31 | NE | N | | | | | | | | | | | | | | ■ |
| | 13 | 31 | E | ■ | | | | | ■ | | | | | | | | | ■ |
| | 14 | 31 | W | ■ | | | | | | | | ■ | | | | | | |

| ID | MIDDLE LEVELS: xii …Cow Relief | xiii …Splayed Figure Relief | xiv String Patterns | xv Handprints | xvi Architectural Landscape | xvii Other Landscape | xviii Honeycomb | xix Brick Patterns | xx Relief Mask | xxi Red Rings Around Niches | xxii Individual Human Figure | xxiii Red Cut-Outs | LATE LEVELS: xxiv Total Hunting Scenes | xxv …with Bulls | xxvi …with Stags | xxvii …with Boars | xxviii …Naturalised birds | xxix Incised Scroll |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | |

216

## Middle Levels South VII-VIB

## TYPOLOGY

BROAD | COMPOUND | ELEMENT: EARLY LEVELS (i–xi), MIDDLE LEVELS (xii–xxiii), LATE LEVELS (xxiv–xxix)

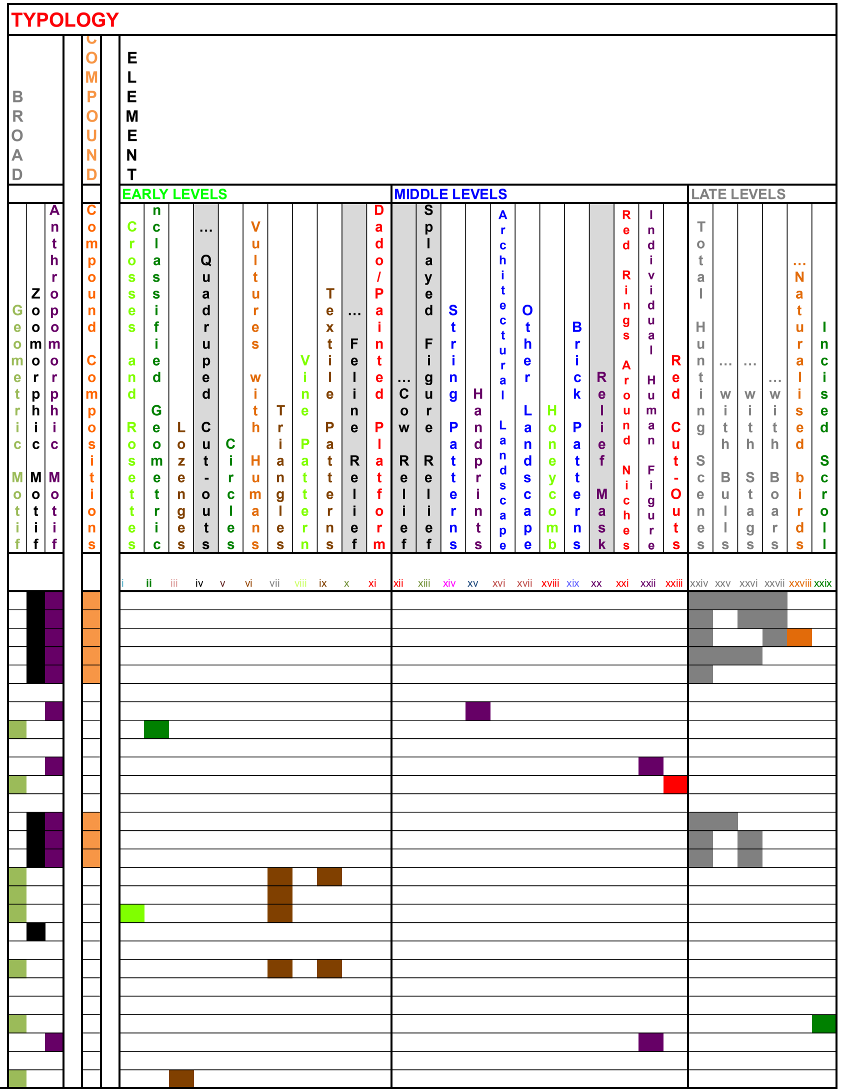
| | ID | BLDG number | Wall orientation | Geometric Motif | Zoomorphic Motif | Anthropomorphic Motif | Compound Compositions | i Crosses and Rosettes | ii Unclassified Geometric | iii Lozenges | iv … Quadruped Cut-outs | v Circles | vi Vultures with Humans | vii Triangles | viii Vine Pattern | ix Textile Patterns | x … Feline Relief | xi Dado/Painted Platform | xii … Cow Relief | xiii … Splayed Figure Relief | xiv String Patterns | xv Handprints | xvi Architectural Landscape | xvii Other Landscape | xviii Honeycomb | xix Brick Patterns | xx Relief Mask | xxi Red Rings Around Niches | xxii Individual Human Figure | xxiii Red Cut-Outs | xxiv Total Hunting Scenes | xxv … with Bulls | xxvi … with Stags | xxvii … with Boars | xxviii … Naturalised birds | xxix Incised Scroll |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South M.VII 6,610-6,500 cal BC* | 15 | 1 | E | ■ | | | | | | ■ | | | | | | ■ | | | | | | | | | | | | | | | | | | | | |
| | 16 | 1 | SW | | ■ | | | | | | ■ | | | | | | | ■ | ■ | ■ | | | | | | | | | | | | | | | | |
| | 17 | 8 | N | | ■ | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 18 | 8 | E | | ■ | ■ | ■ | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | |
| | 19 | 8 | NW | ■ | | ■ | ■ | | | | | | | | | | | | | | ■ | ■ | | | | | | | | | | | | | | |
| | 20 | 14 | N | ■ | | | | | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | |
| | 21 | 21 | N | | ■ | ■ | ■ | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | |
| | 22 | 21 | N | ■ | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | |
| | 23 | 21 | W | ■ | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | |
| | 24 | 23 | E | | ■ | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | |
| | 25 | 44 | N | ■ | ■ | | ■ | ■ | | | | | | | | | | ■ | | | | | | ■ | | | | | | | | | | | | |
| | 26 | 44 | E | ■ | ■ | | ■ | ■ | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | |
| | 27 | none | N | | ■ | | | | | | | | | | | | | | ■ | ■ | | | | | | | | | | | | | | | | |
| SOUTH N. VIB 6,490-6,380 cal BC* | 28 | 1 | N | ■ | | | | ■ | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | |
| | 29 | 1 | E | ■ | | | | ■ | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | |
| | 30 | 3 | none | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | |
| | 31 | 5 | none | ■ | | | | | | | | | | ■ | | ■ | | | | | | | | | | | | | | | | | | | | |
| | 32 | 8 | E | ■ | | ■ | ■ | ■ | | | | | | | | | | | | | | ■ | | | ■ | | | | | | | | | | | |
| | 33 | 15 | N | | | ■ | | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | |
| | 34 | 31 | E | | ■ | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | |
| | 35 | 31 | S | | ■ | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | |
| | 36 | 31 | W | | ■ | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | |
| | 37 | 44 | N | | ■ | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | |
| | 38 | 45 | none | | ■ | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | |
| | 39 | 50 | E | ■ | | | | | | | | | | | | ■ | | | | | ■ | | | | | ■ | | | | | | | | | | |

# Middle Levels North G and South VIA

| | | | | TYPOLOGY: BROAD | | | COMPOUND | ELEMENT: EARLY LEVELS | | | | | | | | | | | MIDDLE LEVELS | | | | | | | | | | | | LATE LEVELS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ID | BLDG number | Wall orientation | Geometric Motif | Zoomorphic Motif | Anthropomorphic Motif | Compound Compositions | i Crosses and Rosettes | ii Unclassified Geometric | iii Lozenges | iv … Quadruped Cut-outs | v Circles | vi Vultures with Humans | vii Triangles | viii Vine Pattern | ix Textile Pattern | x … Feline Relief | xi Dado/Painted Platform | xii … Cow Relief | xiii … Splayed Figure Relief | xiv String Patterns | xv Handprints | xvi Architectural Landscape | xvii Other Landscape | xviii Honeycomb | xix Brick Patterns | xx Relief Mask | xxi Red Rings Around Niches | xxii Individual Human Figure | xxiii Red Cut-Outs | xxiv Total Hunting Scenes | xxv … with Bulls | xxvi … with Stags | xxvii … with Boars | xxviii … Naturalised birds | xxix Incised Scroll |
| NORTH G. VIB 6,490-6,380 cal BC* | 40 | 132 | E floor | | | ■ | | | | | | | | | | | | | | | | | | | | | ■ | | | | | | | | | |
| | 41 | 119 | NE | ■ | | | | ■ | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 42 | 49 | N | | | ■ | | | | | | | | | | | | ■ | | | | ■ | | | | | | | | | | | | | | |
| | 43 | 49 | W | ■ | | | | | | | | | | ■ | | | | ■ | | | | | | | | | | | | | | | | | | |
| | 44 | 49 | NW | ■ | | | | ■ | | | | | | | | | | | | | ■ | | | | | ■ | | | | | | | | | | |
| | 45 | 52 | NE | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | |
| | 46 | 59 | N | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | | | |
| | 47 | 77 | N | ■ | | ■ | ■ | | | | | | | ■ | | | | | | | | ■ | | | | | | ■ | | | | | | | | |
| | 48 | 77 | E | ■ | | | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | |
| SOUTH O. VIA 6,490-6,380 cal BC* | 49 | VIA-B.8 | N | | ■ | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 50 | VIA-B.8 | W | | ■ | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | | |
| | 51 | 50 | E | ■ | | ■ | ■ | | | | | | | | | ■ | | | | | | ■ | | | | ■ | | | | | | | | | | |
| | 52 | 63 | E | ■ | | ■ | ■ | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | |
| | 53 | 66 | E | ■ | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | | | ■ | | | | | | | |
| | 54 | 80 | NE | ■ | | ■ | ■ | | ■ | | | | | | | | | ■ | | | | ■ | | | | | | | | | | | | | | |
| | 55 | 80 | E | ■ | | | | | ■ | | | | | | | | | | | | | | | | | ■ | | ■ | | | | | | | | |
| | 56 | 96 | N | ■ | | | | | | | | | | | | | | | | | | | | | | | | | | ■ | | | | | | |
| | 57 | 96 | E | ■ | | | | | | | | | | | | | | | | | ■ | | | | | | | | | | | | | | | |

## Late Levels South V-III-TP, North H

| | ID | BLDG number | Wall Orientation |
|---|---|---|---|
| SOUTH P. V 6,330-6,220 cal BC* | 58 | 1 | N |
| | 59 | 1 | E |
| | 60 | 1 | S |
| | 61 | 1 | W |
| | 62 | 1 | NW |
| NORTH H. V-IV 6,450-6,090 cal BC* | 63 | 55 | N |
| | 64 | 55 | S |
| SOUTH IV 6,450-6,250 cal BC* | 65 | 1 | E |
| | 66 | none | none |
| SOUTH III 6,380-6,269 cal BC | 67 | 1 | N |
| | 68 | 1 | E |
| | 69 | 1 | S |
| | 70 | 8 | NE |
| | 71 | 8 | E |
| | 72 | 8 | W |
| | 73 | 13 | N |
| SOUTH III-II - TP 6,335-6180 cal BC*** | 74 | B. 121 | E |
| 6,350-6,180 cal BC*** | 75 | 72 | NWS |
| | 76 | 72 | burial |
| Level III-II TPC | 77 | 122 | E |



information. Like the Master Table of Colourants in Table 4.1, paintings are listed for each chronological level with the earliest first and grouped according to period: Early, Middle, and Late. For the Master Table of both the colourants and paintings data together, see Appendix 0.

The first set of columns lists each wall with a painted design at Çatalhöyük and its ID number[19,20], building number, and wall orientation. Each row represents a painted wall. The second set of columns code the paintings according to Broad painting types; the next column labels Compound images, those with motifs with more than one of the Broad categories. Broad painting types are colour coded: geometric (green), zoomorphic (black), anthropomorphic (violet); and Compound images are coded orange. The third set of columns code the paintings with the Element painting types. Element painting types are divided into a code for each kind of motif, such as circle, triangle, human figure, etc.

Colour coding for the Elemental Types is as follows: geometric-type motifs are green including the subgroups (crosses and rosettes, circles, honeycomb, incised scrolls, vine pattern, and unclassified geometric). Other geometric-like categories are in brown, including textile patterns, lozenges, and triangles. Animal quadruped figures are in black or grey text; these include the categories of splayed figure, quadruped, feline, cow, bull, stag, or boar. The subgroups of raised or sunken reliefs have a grey background to distinguish them. Categories in orange are zoomorphic images with birds; these include paintings with naturalised birds or compound imagery with

[19] As discussed in the methodology chapter, recall that the database for this study adheres to the Mellaart level classification system, with later evidence and equivalent level and building numbers being related to it. This choice in using the older system of level classification is due to the high ratio of paintings from Mellaart's excavations relative to recent findings. The Roman numerals and building numbers of Mellaart's scheme for levels are used throughout the thesis.

[20] The ID number for each painted wall was assigned in this research according to the chronological order– with the earliest painting as ID 1, then ID 2-4 in the subsequent level, and so on for levels XI through II.

animals and humans, specifically, vultures with humans. Purple categories are anthropomorphic elements such as individual human figures and handprints. Blue categories are architectural landscape, other landscape, brick patterns, and string patterns. Red categories are flat applications of red colour including red cut-outs, red rings around niches, and dado/painted platforms.

## 5.2 The Çatalhöyük Paintings Image Database

The results in this section are drawn from the database of painting images gathered during research with methods discussed in Chapter 2. The ÇPID database (ÇPID), created for research in this thesis, includes photographs and detailed pictures and contextual data for each excavated and documented wall painting to date. Each entry also contains references to archive reports and monographs by Mellaart (1961-6, 1967), Todd (1976), and the ÇRP team. For the full collection of photographs in the ÇPID, see Appendix I.

As discussed in Chapter 2 regarding the methods of research with the paintings, a partial record of black and white photographs of paintings was scattered through preliminary and published excavation reports in Anatolian Studies – *AS* – from 1962-6, for the seasons Mellaart was site director. Additional photographs from the excavation, with notable paintings in colour plates, were published in his 1967 monograph *Çatal Höyük: A Neolithic Town in Anatolia*. In 1989, Mellaart co-authored *Goddess of Anatolia,* a rare three-volume set, unavailable in the Bodleian libraries. This was accessed during research by the author in the British Institute of Archaeology in Ankara (BIAA).

As discussed in Chapter 1, this publication likely had a biased hypothesis by Mellaart was based on the strong association of the volume publisher with the antiquities and

**Catalogue ID 7**
**Description: Room view of Catalogue ID 7, 8, and 9.**
**Context: VIII.14**
**Wall orientation: N**
**Excavation phase: Mellaart**
**References: *AS* XVI black and white photograph Pl. XLII *(a)***
**Photograph Source: Hirsh 1989 Plate I colour *(9)* detail; (a) Hirsh 1989 colour Pl. 1 *(9)***

**a**
**Catalogue ID 7**
**Description: (a) Detail of a raised relief with a vine-type design framed in horizontal registers painted red in recessed areas.**
**Context: VIII.14**
**Wall orientation: N**
**Excavation phase: Mellaart**
**References: *AS* XVI black and white photograph Pl. XLII *(a)***
**Photograph Source: Hirsh 1989 Plate I colour *(9)* detail; (a) Hirsh 1989 colour Pl. 1 *(9)***

*Figure 5.40 An example of a ÇPID catalogue entry for ID number 7, a climbing vine relief, with full view and detail images.*

textile trade.  Despite the bias in the text, the *Goddess of Anatolia* volumes are a valuable image resource of previously unpublished colour plates of wall paintings.

Fifteen colour plates from the volumes are referenced in the ÇPID. Eleven of these fifteen plates are the only published colour images available (ID numbers 5, 6, 7, 8, 15, 19, 21, 22, 33, 51, 58), with others either unavailable or shown only in black and white. Three of the plates show views of wall art that were not available in other sources (ID numbers 10, 24, 32), and one shows the only full image of the original painting with only cropped or reproductions available elsewhere (ID 53).

Figure 6.3 shows a previously unpublished, yet remarkable full-wall design of vertical registers of climbing vine-like motifs in low relief from Early level VIII. As discussed fully in the next chapter, the Early period is characterised, in part, by botanical themes.

The period that benefits the most from these new images is the Early levels. With only fourteen total paintings from these levels, the four colour plates from the *Goddess* volumes in levels XII-VIII significantly inform what we know of art in the earliest years of occupation. For now, these figures exemplify two things, (1) how the archival data was utilised to make the image database, and (2) how a re-examination of archival sources for this thesis advances the interpretation of imagery at Çatalhöyük.

## 5.3 Painting Frequency in Early, Middle, and Late Levels

For the analysis of frequency, results start with an overall quantification of wall art in each level and compare findings with recent studies. Table 5.2 shows this research identified a total of 77 walls with documented paintings throughout the occupation of the Neolithic levels in the South and North areas of the East mound.

*Table 5.8 Painting count over the Early, Middle, and Late Levels in the South and North Areas.*

| LEVELS | Mellaart | Hodder | | | |
|---|---|---|---|---|---|
| LATE | | SOUTH AREA | Number of Paintings | NORTH AREA | Number of Paintings |
| | 0, I, II | TP | 4 | | |
| | III | | 7 | | |
| | | T | | J | |
| | | S | | J | |
| | | R | | I | |
| | IV | Q | 2 | H,I | |
| | V | P | 5 | H | 2 |
| MIDDLE | | | | | |
| | VIA | O | 9 | G | |
| | VIB | N | 12 | G | 9 |
| | VII | M | 13 | G | |
| EARLY | | | | | |
| | VIII | L | 10 | F | |
| | IX | K | 3 | F | |
| | X | J | 0 | | |
| | XI | I | 1 | | |
| | XII | H | | | |
| | PRE-XII | G | | | |
| TOTALS | | | 66 | | 11 |
| | | | TOTAL NUMBER OF PAINTINGS 77 | | |

Evidence of painted motifs begins in level XI in a fragment deposited below building X.1. The earliest architecture from Mellaart levels XII to VIII[21] has 14 of the 77 total paintings, making up 20% of the total. Paintings are most frequently found in the Middle, or Transition, levels of occupation from Mellaart levels VII-VIA and VIB with a total of 43, or 56%, more than half of the documented paintings. Of these, 34 paintings, or 18%, are from the South area, Mellaart levels VII-VI, and nine paintings are from the North Area, Hodder level G. Late levels, Mellaart V-0, have a total of 20 paintings in the South.

[21] As mentioned in Chapter 1, the stratigraphic levels have been defined by the two excavation campaigns in different ways. Mellaart defined the chronology with level 0 at the surface and levels I, II, and III down through subsequent layers to levels XII and Pre-XII. Table 5.2 shows the correlation of equivalent chronological levels -- as defined by Hodder (2014, Table 1.3) -- between Mellaart's Roman numerals and the recent alphabetical system labelling of ÇRP with letters G-T for South Area levels and F-J for the North Area. South area excavations in Late levels conducted by other teams are currently being integrated by the ÇRP into the Hodder levels as defined by the project. At present, these areas are labelled according to the team who excavated them, namely 'TP' for Team Poznan led by Prof Arkadiusz Marciniak and 'IST' for the team from Istanbul University led by Mihriban Ozbasan.

Evidence of paintings is more prolific in the South area, with 66 of the 77 catalogue entries, totalling 86%, from this excavation area. The North area, excavated exclusively during the more recent phase of excavation, has 14% of the total with 11 painted walls with design.

A high proportion of paintings evidence was discovered in the 1960s excavations, 56 of the 77 total; this is 73% of the evidence for wall paintings versus the 21 paintings from the more recent phase of excavation, comprising 27% of the total. This agrees approximately with the percentages put forward by Czeszewska (2014, Fig. 12.1) with 71% from Mellaart data and 29% by the ÇRP.

More wall paintings and buildings with paintings are counted in this study than prior findings. In her recent research, Czeszewska (2014, 187) identified fewer overall paintings; she totals 65 paintings from the two phases of excavation: 46 counted during Mellaart's excavations and 19 during Hodder's phase. The number of buildings with paintings is reported by her to be 36. Czeszewska (2014, 188-189) counts 24 paintings in 12 buildings in Early Levels (XII-VII, North F), 27 paintings in 13 buildings for the Middle levels (VI, North G) with, and 11 wall paintings from 5 buildings in Late levels (V-I, North H-J). However, in this project, an additional 12 buildings and 11 walls with painted design are counted. The total number in this study is 48 buildings and 77 painted walls with confirmed paintings. Czeszewska does not include an itemized list of paintings or a database in her published findings; therefore, it is not possible to be definitive about the reason for these discrepancies.

In summary, examination of the frequency of paintings determined that the most prolific period of wall art was during the Middle period, with painting evidence tapering off in the Early and Late periods. An additional finding is that research for this thesis has the highest and most comprehensive painting count to date. One of the reasons for the discrepancies between this project and Czeszewska may be due to her article being published prior to finding an additional two paintings in the 2014 season and one wall painting, one painted relief, and one painted platform in the 2015 season (ÇRP Archive Report 2015, 2016). The lower numbers may also be due to the fact that she did not include any material that is not substantiated with photographic documentation. This criterion was also followed by this study, with the exception of four walls with sufficient evidence to justify the inclusion of paintings without photographic records. In these four exceptions – paintings seen in ID 16, ID 28, 29 & 31 – evidence consists of reconstruction drawings, reports of paintings in both Mellaart (1967) and Todd (1976) sources, and/or other similar examples of wall art with photographic documentation to validate the image. Additionally, there are two paintings from the Mellaart phase of excavation without a building designation (ID 27 and ID 66); these may have been excluded from prior findings. With the five additional paintings and reliefs found since her publication, four additional painting entries based on reconstructions, and two paintings with unspecified buildings, this accounts for eleven of the twelve paintings and two of ten buildings with paintings in this project not accounted for in Czeszewska's publication. However, without a detailed account of evidence in prior work, it is difficult to compare directly the results.

## 5.4 Typological Analysis

Typologies from previous work by Mellaart were expanded here. The six main categories used by Mellaart in his reporting of the wall paintings are split into categories for each motif and figure into narrowly defined groups. The detailed categories are termed Element types, as each element in the image is coded. This is shown in Table 5.3; the column on the left lists the main classifications for painting designs used by Mellaart (1967, 132, Table 13). The column on the right has terms for the expanded categories – 29 in total – used to code the distinct forms and motifs that this author has identified in wall paintings in the ÇPID.

In the Element types, the broad geometric category is divided into groups of individual motifs such as crosses, lozenges, circles, triangles, etc., except for one group of 'unclassified geometric' for motifs which are not identifiable as human or animal and are too fragmentary to classify.

Two groups are included as a general category followed by more specific subcategories. One is 'Relief Figures', with subcategories of feline, cow, and splayed figure reliefs. Another is the 'Architecture/Landscape' category that includes the architectural motifs in the 'Volcano/City Plan' and landscape scenes with trees and grazing animals. The group is expanded to include the recently discovered 'brick' type paintings. See the discussion of the 'Architecture/Landscape' group in Chapter 7.

In the Master Results Table 5.1, each category is colour coded. This is to visually distinguish the categories and make the table more readable. See Table 5.4 for a list of paintings that are in each of these groups, shown in chronological order with their level and building number and the order in which each Element category occurs in the Early, Middle, and Late levels. The Master Summary Table of paintings shows the results for both the Broad and Element Types for each painting.

Table 5.3 shows three different kinds of quantitative data that will be used for analysis in the following section. First are the counts of all paintings in each level which have one of the three kinds of Broad motifs – geometric, human, or animal; in addition, the two more ambiguous types discussed in the methodology in Chapter 2 are counted separately and compared to the total.

*Table 5.9 Terms for the types of wall painting and painted plaster relief content. Column on the right shows Mellaart's classifications (1967 132, Table 13). Column on the left shows terms used for classifying images in this study.*

| **Mellaart Types for Wall Paintings** | | **Terms of Types for Wall Paintings in this Study** |
|---|---|---|
| **Plain Panels** | | |
| | Dado | Dado |
| | Painted Platforms | Painted platforms |
| | | Red rings around niches |
| | | Red cut-outs |
| | | |
| **Panels of Geometric Patterns** | | |
| | Kilim | Textile Patterns |
| | | Incised Scroll* |
| | | |
| **Panels of Symbols** | | |
| | Quatrefoils, crenellations, stylized flowers or stars | Crosses and Rosettes, Lozenges, Circles, Triangles |
| | | Honeycomb |
| | | Unclassified Geometric* |
| | | |
| **Human Hands** | | |
| | Human hands | Handprints |
| | | |
| **Naturalistic Paintings** | | |
| | Human figures | Human figures; Individual Human Figure |
| | Hunting Scenes | Hunting scenes… with bulls… with Stags… with Boars |
| | Birds | Naturalised Birds |
| | Vultures | Vultures with Humans |
| | Animals in Sunk Relief- Stag, Cow. | Quadruped Cut-Outs; Cow Relief |
| | Goddess Reliefs | Splayed Figure Relief |
| | Leopard Reliefs | Feline Reliefs |
| | | Relief Mask* |
| | | |
| **Representations of Architecture and Landscape** | | |
| | Architecture/Landscape | Architectural Landscape; Other Landscape |
| | | Brick patterns* |
| | | String patterns |
| ***Types of art that were found in recent Hodder levels, not known to Mellaart.** | | |

In coding the painting types, ambiguities arose with two motifs. The first are handprint designs. These may be classed as geometric because they are not strictly human forms and therefore not anthropomorphic; or they can be anthropomorphic in the sense that the form is of a part of the human body. The second type of ambiguous image is unique to Çatalhöyük, the sophisticated motifs in the 'Volcano/City Plan' and other landscape images with trees and animals. Classifying them as zoomorphic because of the animal forms seems to miss the sophistication of depicting depth and perspective in painting practice. Given their relative sophistication, Mellaart (1967) and Todd (1976) both categorised these images in their own groups called 'Architecture' or 'Landscape'. In the following section, analysis examines what the percentages of types are when these two groups are classed as distinct from the 3-Broad types of geometric, human, and animal. This adds the handprints and architecture/landscape types to make the 5-Broad category system; this addition resolves the ambiguities in the 3-Broad category method used in prior research and gives a more accurate accounting of typology changes in each level.

## 5.5 Stylistic Analysis

As discussed in Chapter 2, *stylistic analysis* – looking at forms and motifs in a collection of artworks from a culture – is aimed at revealing how the components relate to each other and the whole (Gell 1998, 165). In the following sections, we put Gell's idea into practice using the corpus of wall painting motifs at Çatalhöyük, breaking down each motif and figure, codifying them into discrete components or elements. This differs from the Broad typology method above in that the motifs are more narrowly defined; this method, designed for this research, is termed Element typology. But first, before viewing the whole, let us examine the components, the building blocks of the stylistic analysis.

### 5.5.1 Element Groups

Table 5.6 lists the Element type groups for each of the 77 paintings; the colour coding for each group is used as an aid to visually distinguish categories. As discussed in Chapter 2, Element types are those in which each motif or element in a composition is labelled individually. The number of elements is determined by the content of each image in a method which codes each discrete figure. This results in more detailed categories, classifying paintings into one of 29 groups of elements. These are then grouped like with like and analysed for trends over time.

As is expected with this level of detail, paintings in each group have significantly stronger similarities in form compared to the Broad categories. Table 5.6 groups each motif and form and places the findings in chronological order. Each painting is listed at least once with its ID and building number. Some paintings that are in more than one group, such as those with both human and animal figures, are listed at least twice so that they are included in each relevant grouping.

Table 5.7 presents results for the Element types over time, starting with Roman numeral (I-XI) for the earliest types, (XII-XXIII) in the middle levels, and (XXIV-XXIX) in the latest levels.

The subsequent discussion in Chapters 6 through 8 continues the analysis of the emergent patterns over time. These results examine how the individual motifs relate to the whole and how the art changes over the life of the site.

### 5.5.2 Element Types Through Time

Considerable artistry and skill are observed from the earliest levels of occupation with impressive full wall vine-like designs in low relief (ID 7) in level VIII. This period is dominated by other botanically themed motifs such as a stamen-like cross (ID 1) and lozenge designs resembling fibre woven textiles (ID 11). Sophisticated planning of compositions by Neolithic peoples is also in evidence with full wall paintings of geometric motifs with repeating concentric circles and a dado of red and black triangles (ID 5), and circles and lozenges in a nearby building (ID 9).

The first zoomorphic content is not in paintings, but in reliefs of animal figures, first in a sunken relief of a quadruped (ID 4) in level IX and next as a raised relief of felines (ID 10) in level VIII. The first time a distinctive narrative content occurs in a painting

*Table 5.10 Element typology groups in chronological order, from Early to Late levels, top to bottom. (Detail of Table 5.1)*

| | | |
|---|---|---|
| EARLY LEVELS | i. | Crosses and Rosettes |
| | ii. | Unclassified Geometric |
| | iii. | Lozenges |
| | iv. | … Quadruped Cut-outs |
| | v. | Circles |
| | vi. | Vultures with Humans |
| | vii. | Triangles |
| | viii. | Vine Pattern |
| | ix. | Textile Patterns |
| | x. | … Feline Relief |
| | xi. | Dado/Painted Platform |
| MIDDLE LEVELS | xii. | …Cow Relief |
| | xiii. | …Splayed Figure Relief |
| | xiv. | String Patterns |
| | xv. | Handprints |
| | xvi. | Architectural Landscape |
| | xvii. | Other Landscape |
| | xviii. | Honeycomb |
| | xix. | Brick Patterns |
| | xx. | Relief Mask |
| | xxi. | Red Rings Around Niches |
| | xxii. | Individual Human Figure |
| | xxiii. | Red Cut-Outs |
| LATE LEVELS | xxiv. | Total Hunting Scenes |
| | xxv. | … with Bulls |
| | xxvi. | … with Stags |
| | xxvii. | …with Boars |
| | xxviii. | …Naturalised birds |
| | xxix. | Incised Scroll |

is also in level VIII; the image is the first of several examples of birds and humans interacting with the stylised and angular birds depicted with skeletal wings (ID 6). Recall from Chapter 4 how level VIII households showed innovation within artists' materials and motifs. The remarkable painting materials development, the 'Red Shrine',[22] was one of the first and most spectacular uses of the brilliant and rare cinnabar mineral covering a platform and painted designs along the edge.

The Middle period ushers in the greatest period of innovation in wall art content. It shows a considerable diversification in content with twelve new Element groups; the first are two more types of reliefs: sunken relief cow (ID 16) and splayed figures in raised relief (ID 16, 24, 27, 34, 35, 36, 38, 50). The innovative Architectural/Landscape groups occur only at this level with the 'Volcano/City Plan' (ID 20) mural being the most iconic of the Çatalhöyük paintings. New findings concerning that design are discussed in Chapter 6. This period is marked by other unique compositions, such as the honeycomb design (ID 32) and the recently excavated face mask (ID 40). The only purely phallic content seen in the wall art, the sunken red cut-outs (ID 17, 66), also occurs in these levels.

Late level paintings are marked by a more naturalised style of rendering animals, having content that is mostly comprised of the well-known hunting scenes with bulls. The majority of wall paintings at these levels are from the two large buildings, or 'shrines', with scenes of bulls, stags, and boars surrounded by humans in level V (ID 58-62) and level III (ID 67-69). Mellaart (1967) describes a third Hunting Shrine in level IV, but it was undocumented due to poor condition; therefore, it was not documented and omitted from results of this study. While these hunting scenes are discussed as 'classic Çatalhöyük' painting (Marciniak 2012), it is worthy of

[22] See Chapter 4 for evidence of archival information from Mellaart's excavation and the current technical study which substantiates the presence of cinnabar use in the 'Red Shrine'.

*Table 5.11 Groups of Element Categories*

**Each Group is in Chronological order from Early to Late Levels**

## Geometric

### Crosses and Rosettes

**X.1 Detail of four-point cross / star in red** ID 1
**VII.44 Details of black circles with rosettes formed in negative space** ID 25b and c
**VII.44 Details of black circles with rosettes formed in negative space painted on leopard relief** ID 26
**VIB.1 Design in Horizontal registers separated by diagonal sections including rosette and cross motifs with skull-like elements in lower registers** ID 28
**VIB.1 Design in Horizontal registers with diagonal lines and five-point stars** ID 29
**VIB.8 Drawing of crosses and stylised flowers and insects** ID 32c and d
**North Area B. 49 Black four-point shapes with "brick" pattern inside linked with rosette** ID 44
**VIA.66 Detail of a human figure with crosses** ID 53
**III.8 Triangles and Eight point rosettes, full wall view.** ID 72

### Vine Pattern

**VIII.14 Raised relief with a vine-type design** ID 7a

### Honeycomb

**VIB.8 Painting of a Honeycomb design in red with circle and cross motifs in white** ID 32a-d

### Circles

**VIII.14 Rows of two concentric circles repeating over two full walls with rows of triangles below** ID 5
**VIII.14 Incised ovoid shapes in first phase of decoration on North wall** ID 7b
**VIII.25 Circles and lozenge shapes covering North and East walls in repeating design, duplicate** ID 9
**VIII.31 Three circles in row each with a red centre with white circles** ID 14

### Unclassified Geometric

**IX.2 Rectangular design in red** ID 2
**VIII.31** Platform edge in the 'Red Shrine' with curved and diagonal lines ID 13
**VI.80** Checkerboard on platform edge ID 45
**VI.80** Curved lines ID 46
**North Area B. 55 Red horizontal design** ID 64

### Scroll

**TP.N B.72 Incised scroll pattern in plaster around burial tomb** ID 75

### Lozenges

**IX.2 Concentric lozenges in red** ID 3
**VIII.25 Circles and lozenge shapes covering North and East walls in repeating design, duplicate** ID 9
**VIII.27 Framed design with concentric lozenges in red** ID 11
**VII.1 Concentric lozenges within framed, red squares a border of red stripes** ID 15
**Mellaart level unassigned. North Area G or F, Concentric Lozenges incised in red** ID 41
**III-II.122** Black and white painted lozenges ID 77

### Textile Patterns

**VIII.14 Diagonal lines with chain-like pattern in red ID 8**
**VIII.27 Framed design with concentric lozenges in red, duplicate** ID 11
**VII.1 Concentric lozenges within framed, red squares a border of red stripes, full wall** ID 15
**VIB.1 Design in Horizontal registers separated by diagonal sections including rosette and cross motifs with skull-like elements in lower registers** ID 28
**VIB.1 Design in Horizontal registers with diagonal lines and five-point stars** ID 29
**VIB.5** Triangles and diagonal lines ID 31
**VIB.50 Black textile pattern** ID 39
**VIA.50 Red and black framed textile pattern** ID 42
**III.8 Red triangles and white diagonal lines** ID 70
**TP. B.121 Diagonal and vertical textile-like pattern, in white on buff plaster** ID 74

### Triangles

**VIII.14 Rectangles in checkerboard-like design in black** ID 7c
**VII.21 Incised red and black triangles with white lines and dots in triangle centres** ID 22
**VII.21 Incised red and black triangles with white dashed line to frame design and white dots in triangle centres** ID 23
**VIB.5 Triangles and diagonal lines** ID 31
**North Area B. 49 Horizontal, diagonal lines, with red triangles** ID 52

**North Area B. 77 Detail of incised platform design in horizontal registers of crosses, scrolls, and triangles in red** ID 56b
**III.8 Red triangles and white diagonal lines** ID 70
**III.8 Red Triangles** ID 71
**III.8 Triangles and Eight point rosettes, full wall view.** ID 72
**III.121 TPC Diagonal and vertical textile-like pattern in white** ID 74

## Brick Patterns

**VIB.50 Remains of diagonal lines with rectangles in brick-like design** ID 39b
**VIA.50 Red framed design in two horizontal registers with centre motif of four-point stars with diagonal brick-like pattern in black and red, full wall** ID 42
**South O. VIA.80 Horizontal registers with diagonal lines in brick-like patterns** ID 46
**North Area G B. 49 Black four point shapes with "brick" pattern inside linked with rosette, duplicate** ID 53b

## String Patterns

**VII.8 Two Rows of alternating red and black handprints with strings between, duplicate** ID 19
**VIB.50 Red string diagonal lines, detail, duplicate** ID 39a
**North Area B. 77 Detail of red string design** ID 48
**South Area VIA.O B. 96, sp. 370 Red string diagonal lines** ID 57

## Dado/Painted Platform

**VIII.31 Room view of the "Red Shrine" seen here from the east with painted floors, platforms, walls** ID 12
**VIII.31 Platform edge in the "Red Shrine" with curved and diagonal lines separated in vertical registers** ID 13
**VII.1 Red dado below blue cow cut out** ID 16
**VII.44 Raised reliefs of Quadrupeds in profile with sculptural heads and red dado below, duplicate** ID 25
**VI.3 Red dado over platform** ID 30
**North Area B. 49 Handprints along platform** ID 42
**North Area B. 49 Horizontal and diagonal lines on platform edge** ID 43
**North Area B. 52 Red Platform** ID 45
**North Area B. 59 Red dado** ID 46
**VIA.80 Checkerboard pattern on painted platform edge** ID 54

## Red rings around niches

**North Area G B. 77 Red painted niche under bucrania** ID 47
**South O B. 80 Red ring around niche over brick pattern painting** ID 55

## Red Cut-Outs

**South O B. 96 Diagonal sunk relief (cut-out) line in red** ID 56
**~VI. South Area, Horizontal sunk relief (cut-out) line in red** ID 66

# Zoomorphic

## Leopard Reliefs

**VIII.27 Raised relief of two facing quadrupeds** ID 10
**VII.44 Pair of raised reliefs of quadrupeds in profile** ID 25
**VII.44 Raised relief of single quadruped in profile** ID 26
**VI.44 Leopards in raised relief on North wall** ID 37

## Splayed Bear Figure Reliefs

**VII.1 Reconstruction with two splayed figure reliefs in the centre of the south wall next to the cut out of a cow** ID 16
**VII.23 Relief of splayed figure with two concentric circles in the centre in red, white and black** ID 24
**VII undocumented building Relief of a pair of truncated 'splayed figures'** ID 27
**VIB.31 Splayed figure with head with a trail** ID 34
**VIB.31 Splayed figure with red posts over a red dado** ID 35
**VIB.31 Splayed figure with short limbs** ID 36
**VIB.45 Truncated, Splayed figure with red outline on paws** ID 38
**VIA.8** Splayed figure relief ID 50

## Quadruped Cut-outs

**IX.8 Black animal torso cut-out with three full legs and partial fourth leg in sunken relief** ID 4
**VII.1 Engraving of bull with horn on western wall, and the cut out of a cow painted in blue over a flat red dado base** ID 16
**VII.8 Black animal torso cut-out** ID 17
**VIA-B.8 Cut-out of a quadruped** ID 40

## Relief of Face

**VI.B.132** Sculpted, Painted Relief of a Mask ID 49

### Quadrupeds Only

**III.13 Detail of Two horned quadrupeds, adult and young in red** ID 73

## Anthropomorphic

### Individual Human Figures

**VIA.66 Human figure with crosses** ID 44
**IV.1 Human figure in white** ID 65
**TP.O Red figure on fragment in burial chamber** ID 76

## Handprints

### Handprints

**VII.8 Two Rows of alternating red and black handprints with strings between** ID 19
**VIB.8 Two rows of negative handprint below plastered boar jaw installations** ID 32
**VIB.15 Six rows of schematic handprints in faded black, full wall** ID 33
**North Area B. 49 Schematic handprints in red along platform** ID 42
**VIA.50 Handprint in lower left corner of textile pattern** ID 51
**VIA.63 Schematic Handprint detail** ID 52
**VIA.80 Handprint on the surface of painted platform** ID 54a
**North Area B. 77 Two positive handprints in red** ID 56a
**North Area B. 55 Positive red handprints** ID 63

## Compound Zoo-Anthropomorphic

### Vultures/Humans interacting

**VIII.8 Human figure in red with outstretched arms and weapons with two, black birds (vultures) on either side** ID 6
**VII.8 Four birds (vultures) with two, headless human figures** ID 18
**VII.21 Headless human with two birds (vultures) in red** ID 21

**Birds/Humans**

**V.I Humans under animals black birds and red quadrupeds, reproduction** ID 60

### Hunting scenes/bulls/human interacting scenes

**V.1 "Hunting Shrine" bull with human figures in red and black on all sides.** ID 58a-f
**V.1 Quadrupeds with humans, North and centre section of the wall** ID 59
**V.I Humans with animals, detail of red quadrupeds and black birds** ID 60
**V.1 Large quadruped with antlers as a centre figure surrounded by human figures and one, smaller animal figure** ID 61
**V.1 Corner view quadrupeds with humans** ID 62
**III.1 Bull with human figures** ID 67
**III.1 Two horned stags with human figures** ID 68
**III.1 Horned Animals with Human Figures** ID 69

## Landscapes

### Landscape with Zoomorphic Figures

**VII.44 Tree with Quadrupeds below Leopard relief** ID 25d
**VII.44 Tree design with five horned animals in North Alcove** ID 25e

### Architectural Landscape with Anthropomorphic Figure

**VII.14"Volcano/City Plan" in red** ID 20

*Table 5.12 Detailed comparison of Simple and Compound Compositions with 5-Broad Types in Early, Middle, and Late Periods.*

| SIMPLE COMPOSITIONS | COMPOUND COMPOSITIONS | SIMPLE COUNTS | COMPOUND COUNTS |
|---|---|---|---|
| **EARLY PERIOD** 13 of 14 images with design | | | |
| GEOMETRIC | | 10 | |
| HUMAN | | 1 | |
| HANDPRINT | | 0 | |
| ANIMAL | | 3 | |
| ARCHITECTURE/LANDSCAPE | | 0 | |
| PLATFORM/DADO ONLY | | 1 | |
| SINGLE COMPOSITION ONLY TOTAL | | 13 | |
| PERCENTAGE OF SIMPLE COMPOSITIONS | | 92% | |
| | GEO-HUMAN | | 0 |
| | GEO-ANIMAL | | 0 |
| | HUMAN-ANIMAL | | 1 |
| | EARLY COMPOUND COMPOSITIONS | | 1 |
| | COMPOUND COMPOSITIONS | | 8% |
| **MIDDLE PERIOD** 40 of 43 images with design | | | |
| GEOMETRIC | | 24 | |
| HUMAN | | 12 | |
| HANDPRINT | | 8 | |
| ANIMAL | | 15 | |
| ARCHITECTURE/LANDSCAPE | | 11 | |
| PLATFORM/DADO ONLY | | 3 | |
| SINGLE COMPOSITION ONLY TOTAL | | 29 | |
| PERCENTAGE OF SIMPLE COMPOSITIONS | | 73% | |
| | GEO-HUMAN | | 7 |
| | GEO-ANIMAL | | 2 |
| | HUMAN-ANIMAL | | 2 |
| | MIDDLE COMPOUND COMPOSITIONS | | 11 |
| | PERCENTAGE OF COMPOUND COMPOSITIONS | | 27% |
| **LATE PERIOD** 20 of 20 images with design | | | |
| GEOMETRIC | | 8 | |
| HUMAN | | 10 | |
| HANDPRINT | | 1 | |
| ANIMAL | | 9 | |
| ARCHITECTURE/LANDSCAPE | | 0 | |
| PLATFORM/DADO ONLY | | 0 | |
| SINGLE COMPOSITION ONLY TOTAL | | 12 | |
| PERCENTAGE OF SIMPLE COMPOSITIONS | | 60% | |
| | GEO-HUMAN | | 0 |
| | GEO-ANIMAL | | 0 |
| | HUMAN-ANIMAL | | 8 |
| | LATE COMPOUND COMPOSITIONS | | 8 |
| | PERCENTAGE OF COMPOUND COMPOSITIONS | | 40% |
| ALL LEVELS | | | |
| SIMPLE COMPOSITIONS TOTAL | | 54 OF 74 = 73% | |
| | COMPOUND COMPOSITIONS TOTAL | | 20 OF 74 = 27% |

observation here that these scenes only occur in a relatively narrow time frame – towards the end of the life of the site at the buildings during the late occupation. The second dataset shows Compound compositions in the three combinations of 3-Broad Types: geometric, anthro- or zoomorphic. This information examines how each 3-Broad type motif is combined with the other two types over time. It is presented with a view to further analysis and discussion of the changes in how the Neolithic peoples related to animals, to themselves, and to their community. Images are classified to follow the trends of animals either in isolation or in compositions relating to humans to see if this becomes more or less frequent over time. With this data, one can also view if humans are depicted singly in some periods and in groups in others.

The third data set in the table is the number of Simple compositions, those with one kind of Broad type motif, versus Compound, with two types, in each level. This information allows the examination of the complexity of designs over time. Also, it will be used to assess the methodology; if Simple Compositions do not make up the majority of images consistently over time, then analysis with a Broad typology may not be effective.

### 5.5.3 Compound Compositions

In Table 5.3, 20 paintings are Compound Compositions; the most frequent combination is of anthropomorphic and zoomorphic figures, with a total of 11 paintings. Nearly half (13) of the 27 paintings with animal figures are in Compound Compositions. The Human-Animal Compound type is the most prevalent in the Late period, making up 8 of the 9 of this combination.

In the Early and the Late periods, geometric motifs occur only as Simple Compositions, with more of a mixture of them with other motifs in the Middle levels. Almost a quarter of the paintings with geometric content are in a Compound

Composition; this applies to 9 of the 41 geometric paintings, which are combined with human figures in 7 paintings and with animal figures in 2 paintings.

In terms of anthropomorphic content, two-thirds (6) of handprint forms are in Compound Compositions. Humans are mostly in scenes with animals, rarely as individual figures. Of the 23 paintings with human figures, 18 of them are Compound with other types with nearly half (11) animals, and nearly a third with geometric motifs (7). The few cases in which human figures are shown in isolation do not occur until the end of the Middle Period and into the Late period.

### 5.5.4 Overall Trends in the Early, Middle, and Late Level Typology

Looking at the categories of the three Broad types (geometric, anthro- and zoo-morphic) plus the two more sophisticated image types from the end of the previous section in Table 5.4, geometric paintings make up the majority of the Early level

*Table 5.13 Summary of percentages of 5-Broad types over time.*

**COMPARISON OF FIVE TYPES OF EARLY, MIDDLE, AND LATE MOTIFS**

| | TOTAL NUMBER OF IMAGES WITH DESIGN | Percentage of GEOMETRIC motifs of the total in the Period | Percentage of HUMAN motifs of the total in the Period | Percentage of HANDPRINT motifs of the total in the Period | Percentage of ANIMAL motifs of the total in the Period | Percentage of ARCHITECTURE/ LANDSCAPE motifs of the total in the Period |
|---|---|---|---|---|---|---|
| EARLY | 13 OF 74 | 77% | 78% | 0% | 23% | 0% |
| MIDDLE | 40 OF 74 | 56% | 30% | 20% | 38% | 28% |
| LATE | 20 OF 74 | 40% | 50% | 5% | 45% | 0% |

motifs, over two-thirds of the total, with frequency decreasing through time to less than half of the total content in the Late levels. Anthropomorphic content, both of human figures and handprints designs, is increasingly and significantly more prevalent in the Middle and Late levels with an over 40% increase between the Early to Late levels. Zoomorphic types steadily increase in the levels with just over 20% more animal figures from Early to Late periods. Paintings of the

Architecture/Landscape group occur only in the Middle levels and make up just under a quarter of the content.

These results indicate a more detailed method to distinguish content such as handprints and landscape scenes from more straightforward, but limited, categories such as geometric, is required to classify more accurately and analyse the complex painting content at Çatalhöyük. The next section more directly examines the complexity of images throughout the levels by quantifying Simple and Compound Compositions.

### 5.5.5 Complexity Analysis: Simple or Compound Compositions

This analysis investigates trends of composition complexity over time. Two different methods of analysis are compared here: grouping paintings as a Simple or a Compound Composition. In addition to a more comprehensive understanding of the development of painting types through the levels, the results are used to evaluate the efficacy of the two different typology systems for the analysis of painting types at Çatalhöyük.

In Table 5.3, 53 paintings are Simple Compositions with only one type of form or motif which fit easily within the Broad Typology method. Of the 3-Broad types, geometric motifs are the most prevalent with a count of 41, followed by anthropomorphic forms with 32, then zoomorphic forms with 32.

Table 5.5 shows the percentages of Simple vs. Compound Compositions through the levels. Of the 13 paintings in the Early levels, 12 have Simple Compositions of only one type of motif and 1 has a Compound Composition. In the Middle levels, 29 of the 40 paintings have Simple Compositions, and 11 of the paintings have Compound Compositions. Late levels have 12 Simple and 8 Compound Compositions of the 20

*Table 5.14 Summary of Simple and Compound Compositions over time.*

**COMPARISON OF SIMPLE AND COMPOUND COMPOSITIONS**

| | SIMPLE | COMPOUND |
|---|---|---|
| EARLY | (13) 92% | (1) 8% |
| MIDDLE | (29) 72% | (11) 27% |
| LATE | (12) 60% | (8) 40% |
| TOTAL FOR ALL LEVELS | (54) 73% | (20) 27% |

paintings.

The significant discovery of these results is that that the complexity of painting content increases over time. Table 5.8 demonstrates that over a quarter of all paintings are Compound types. This means that for that 27% of all murals, coding with 'geometric' and 'zoo- or anthropo- morphic' does not accurately reflect the differences in designs. Compromises in typological classifications are made if using a three-category typology because only one of the two types of design elements is represented in coding content.

Furthermore, the proportion of Compound types in each period increases over time Therefore, what may be an effective tool in the Early period with 8% Compound Compositions, becomes less accurate in the Middle period with 27%, and even less so with 40% of Compound paintings in the Late period. In short, the method used in prior research using 3-Broad types to classify paintings becomes less effective and applicable to the painting content through time.

The implication of these results is that it is necessary to forge a new and more effective direction for stylistic analysis. The results from this and the previous sections demonstrate the value of a method using detailed painting groups; it yields more accurate and informative results regarding typology. Applying a method using

Element typology sheds new light on changes in painting content over time at Çatalhöyük.

## 5.6 Spatial Analysis

For this project, it was vital to understand and analyse not only the frequency of the paintings or their content, but also their spatial distribution for each period, Early, Middle, and Late.

Analysis is based upon results presented in the GIS maps in the last chapter; Figures 4.3–4.16 show thumbnail versions of Maps 1-14 for the reader's reference. Full-page versions of each map are available in Appendix IV. Each of the maps show the locations of painted designs and artists' materials of interest to the study. For spatial analysis, the author has annotated maps, plotting each of the 77 examples of paintings for each Neolithic level from Pre-XII. Each painting is represented by a red asterisk followed by the identification number of its entry in the Çatalhöyük Paintings Image Database. For example, the first painting is indicated by (*ID 1) on Figure 4.4.

In the previous chapter, the vertical space in stacks of history houses was examined, showing a strong correlation to them with rare artists' materials. Quantitative analysis also demonstrated a strong correlation of history houses with art, with the frequency of wall painting in these buildings being considerably higher than in other houses. Instead of viewing households vertically as with history houses, this section addresses open questions regarding the blue pigments by examining data along horizontal space in level VII.

Early level results on Figure 4.3 and Figure 4.4 show the first architectural floors at Çatalhöyük were painted with pigments. The first plaster floors were coloured with yellow and red ochre; these are indicated on Figure 4.3 with red and yellow circles.

Despite the scarce evidence for architecture a plaster fragment with the first painting of Çatalhöyük was excavated in the foundational buildings in Level XI, annotated as ID*1. The first painting was a cross motif that was cut away as a fragment of wall plaster and mudbrick (ID 1; Figure 6.1). This fragment of a painting was a kind of 'heirloom' taken from a pre-existing building and placed as an offering, deposited by the Neolithic peoples under the floor of a small grain storage room. See Chapter 6 'Early Levels' for the discussion of the first painting and discovery related to it made during this study.

In Chapter 7 'Middle Levels', a group of paintings with strong similarities in technique and content is examined and concluded to be by the same artist. Spatial analysis of painting placement in the South area lends strong evidence to this theory of an individual artist whose artworks likely influenced other designs.

Figures 4.3 through 4.16 also illustrate a point relevant to the interpretation of spatial results for any artefact type at Çatalhöyük. The GIS map results here confirm the point observed by Cutting (2005) in Chapter 1 regarding the architecture on-site; archaeological evidence is not evenly distributed through the levels. Especially in the earliest levels, excavated evidence is sparse, with few buildings excavated until level VIII. Levels VII and VI have the most excavated buildings per level. This creates a disparity in results that is considered when interpreting the frequency or percentage of colours, and in the following chapter, in painting types, over time. The marked increase in painting frequency at this time, seen in Chapter 5 Section 1, may indicate an active period in painting, but given the disparity in the available houses, it can indicate an increase of evidence availability rather than indicate that Neolithic painters were particularly prolific at these levels.

We cannot say with confidence that the high rate of frequency correlates unequivocally to a particularly active paintings practice in the Middle levels due to the relatively little excavated area in preceding levels. However, when the spatial evidence is examined together with the typology, it can be seen that the Middle levels contain a significant increase in new painting types and images, demonstrating an avant-garde wall art practice. Results show the innovative character of this period.

## 5.7 Summary

These results built upon the previous chapter which showed the unique methodology and new quantitative results from spatial analysis. Chronological and spatial data have a demonstrable pattern, revealing a marked increase of wall art and rare artists' materials in houses with history. Spatial results in this chapter show that painting practice is present in the foundational levels at Çatalhöyük, beginning at the earliest levels of the site's occupation.

The examination of frequency shows that wall painting increases from the Early levels with a peak in the Middle level, VIA & B, and decline into the Late levels. Comparisons to prior research show the empirical results of wall art counts in this study are the highest and most comprehensive.

Results of wall art iconography showed how the painting content increases in complexity over time. Simple Compositions occur in approximately three quarters of all painted designs and Compound Compositions appear in the remaining quarter. Also, by quantifying Simple vs. Compound compositions, results show that images with only one motif were prevalent only in the Early period; over time, paintings became more complex, with multiple motifs in a single image for up to 40% of images per period. The implication of the findings is that for a quarter of all paintings, especially those in the Middle and Late periods, utilising only three categories in a Broad Typology is less accurate and less effective as an analytical method than a more nuanced, detailed approach as in the Element typology.

The increasing complexity identified in these results demonstrated the need for a new methodology to analyse art at Çatalhöyük. Results in Section 5.5 presented the analytical approach, Element Typology, its design, and its application to images. The more detailed method identified new patterns in iconography, especially the development in innovative motifs and their departure from any previous painting types; this was identified in the Middle level Element group as Landscape / Architecture. These show unprecedented and unique perspective in painting content. The interpretive implications of these findings will be discussed in the next chapter.

# CHAPTER 6 EARLY LEVELS SYNTHESIS

## 6 Introduction

This chapter brings a fresh perspective to the wall art of Çatalhöyük, integrating more fully the data on artists' materials, paintings, and the artefact record. By employing the methodology discussed in Chapter 2 and the pigment and painting findings in the last three chapters, we systematically integrate the matrix of evidence through the levels. Each of the paintings and the pigments are an individual thread of information; this chapter weaves them together.

This chapter is a discussion of the Early period with a detailed examination, level by level, of the pigments and the paintings in the foundational, Early occupation levels of Neolithic Çatalhöyük. The connection between the developments in paintings and other artefact groups is examined in chronological order.[23]

## 6.1 Early Period Pigments

As we saw in Chapter 4, the palette of colours at Çatalhöyük is the same range of colourants in common use in the preceding periods in the Palaeolithic and Early Neolithic. The common palette in prehistory is of iron-based earth pigments, known as ochres, and carbon blacks and calcium-based whites. These were all available locally within close walking distance.

The exceptional colour in the Early period, sourced off site, is the rare pigment cinnabar. As seen in Section 4.4, the closest source for cinnabar was a mercury

[23] For additional supporting data for this chapter, see Appendix 0 for the Master Summary List of Paintings and Colourants, Appendix I for the Çatalhöyük Paintings Image Database, and Appendix IV for maps of each chronological level with the findspot for each painting.

deposit 20km away; this was thought by Mellaart to be the most likely source for the cinnabar found at Çatalhöyük. As presented in Section 4.2, house 31 in level VIII, referred to by Mellaart as the 'Red Shrine', was a significant display, indicating that large quantities of the pigment became available for house decoration at this time. The floors, walls, and platforms are all painted in a solid application of red. The decoration of the platform in this room is elaborate, with horizontal registers dividing designs of chevrons and figures.

The surviving documentation is, unfortunately, in black and white and does not convey what must have been a spectacular sight, especially to the Neolithic eye. The 'Red Shrine' is evidence of a strong investment of rare materials in house building and offers a clue to the start date for a red other than an iron oxide at Çatalhöyük. Here the paintings evidence shows innovation of the artists' materials and discovery with the use of a large quantity of this fugitive red. Mellaart (1965, 70) observes that the pigment in the 'Red Shrine' designs and panel darkens from an orange-red to black on exposure to the elements. He also reports this unusual phenomenon in the painted elements of the VIII.27 felines in relief and as a common occurrence in level VIII pigments.

Other innovations which occur in the Early levels are in the technical practice of the wall art and in the materials. In the techniques of wall renderings, the first low relief, created by cutting into thick plaster layers,[24] was used to display quadrupeds, as seen initially in building IX.8. The first raised relief occurs in building 27, level VIII. The choice of content is a pair of quadrupeds, facing each other, with heads and paws touching.

[24] This may be evidence there are not regular plastering cycles in all buildings. In order to create a cut-out, building up multiple layers at once may be in practice. This would also explain the observations of Matthews (2005) of cleanliness of the Neolithic people as a lack of residue or soil between plaster layers.

## 6.2 Early Period Paintings

Most Early period content falls under the general category of 'geometric'; motifs appear in the record in the following order: crosses and rosettes, lozenges, circles, triangles, and textile patterns. Two types of reliefs occur at this time: a sunken, or cut-out relief of a quadruped and the raised relief of feline figures.

A total of 14 paintings have been identified in the Early levels. Images for each painting are in Appendix I with ID numbers 1-14. To see the locations of each painting plotted in the GIS maps for Levels XI-VIII, see Figures 4.3-7. (For full page Early Level maps, see Appendix IV Maps 1-5). The documentation of a geometric motif, specifically of a cross, is the first evidence of painting. Locating the image of this painting in the archival photography is an original discovery of the painting research in this thesis. The next section discusses this finding in detail.

### 6.2.1 Level XI: The First Painting

The re-discovery of the earliest known painting at Çatalhöyük before level X came about from archival research. By examining Mellaart's reports and Todd's colour photographs from the 1961-5 excavations, the author connected Mellaart's written account of the earliest painted wall plaster with its image from Todd's archival photographs (Figure 6.1, ID 1). This account and the picture of the first painting it relates to had not yet been previously put together or discussed, either in grey literature or in later publications.

In his Preliminary report of the 1963 season, Mellaart describes the find during his excavations. He gives a description of a painting fragment buried under a long, narrow room with grain bins under building X.1[25] (Hodder B.23).

> 'From below the floor of this room came a slab of plaster, probably a remnant either of the plaster covering a post or perhaps a part of a door-jamb with a fine Maltese cross painted on it. It is therefore clear that painting at Çatal Hüyük may have been practiced even before level X' (1964, 70).

This description is repeated in his subsequent book, where he states that, 'wall painting was practiced even before level X, for a painted fragment of a doorway was found in debris on which a house of level X was erected' (1967, 84, 161). The same information is given by Todd[26] (1976, 36) in his monograph, but the fragment is not pictured in either publications or excavation reports. Consequently, this first painting has not been reported in recent studies by the ÇRP team (Last 1998; Düring 2006; Russell and Meece 2005; Czeszewska 2014).

During the 1960s excavations, Todd took colour photographs documenting the wall paintings and significant finds *in situ*. He later donated his colour slides from the 1960s excavations to the ÇRP; as presented in the Methodology chapter, these colour slides were utilised in the image database for this project. The images are labelled without giving a context, marked only with the season the image was taken and its number, in sequence. In this collection, I located a photograph of a thick plaster fragment from a platform or doorjamb that fitted the description of Mellaart's

[25] Mellaart and Todd provide conflicting accounts for which of the two, adjacent buildings in level X the fragment was under. See Appendix IV Map 4 for a map of this level. Ian Todd (1976) accounts for the fragment being under building 8, Level X, rather than building 1. Given Mellaart's excavation report was written closer to the event, this is the preferred account. The salient points, however, are not disputed; this is that the earliest evidence of wall paintings comes from below a grain storage in level X.
The confusion between the two buildings is understandable, given their similarity. X.1 and X.8 are used by Hodder to exemplify the joint construction of similar buildings. 'Buildings 23 (X.1) and building 18 (X.8) were built on a common foundation raft in Level X. in addition, these two buildings shared a party wall, and there was an opening between the buildings which was closed off at some point during their occupation… Buildings 18 and 23 replicate each other in terms of their internal fittings and functional arrangements' (Hodder 2006, 115).

*Figure 6.41 The First Painting of Çatalhöyük, ID 1*

and Todd's accounts (See Appendix I, ID 1). From the numbering, the image was taken during the 1963 season in which Mellaart reports excavating the first painting in the Early levels and during which he wrote his account quoted above. See Figure 6.1 above.

The first painting is the foundation of what became a tradition of households with investments in elaborate paintings and decoration. The first known painting was buried under a side room used for grain storage in a building, X.1, which, as can be seen in the spatial analysis in Section 4.2, was at the base of a succession of five elaborately decorated buildings termed 'shrines' by Mellaart.[27] Except for fragmentary plaster floors in space 181, there is no architecture in the section below the floors in level X (Farid 2013, Figure 5.6). The first painting was therefore excavated from

[27] The buildings are labelled as building, or 'shrine' 1, in area A, with a stack of subsequent buildings over X.1 being IX.1, VIII.1, VII.1 and VI.1. (See maps of these levels in Appendix IV, Maps 1-4, Maps 6-7, and Map 9, with 'Shrine 1 sequence' labelling the successive buildings that were built on top of X.1).

under the floor of a building that begins a long history of occupation in the first known history house sequence.

The absolute chronological dates for this context come from the recent radiocarbon dating programme. Bayliss *et al* (2015,16) dated the construction of building X.1 (Hodder B. 23; see Figure 4.4) and the adjacent building X.8 (Hodder B. 18) to 7,000-6920 (64% probability)[28]. The context below, excavated in recent years in space 199 and 198, was dated to 7,030-7,000 cal BC (68% probability)[29]. The broadest range of the painting is therefore reliably dated as after space 199 and prior to X.1/X.8, meaning that it was made between 7,030-6,920 cal BC.

This finding impacts what we know of the chronology of the earliest levels. Mellaart and Todd reported that the fragment with a cross painting under the floor of level X, indicating earlier occupation. Based on radiocarbon dates for spaces 199 and 198, Bayliss *et al* (2015) put forward the idea that the dating of earliest levels at 7,100 cal BC is later than the previously reported start dates for the site as 7,200 BC; however, as quoted in Chapter 1, Bayliss et al (2015) also added the caveat that prior occupation in yet-to-be-excavated areas lateral to or below this area is possible (Ibid, 18).

It is worth considering more carefully the implications of this artefact having come from extant architecture. For this painting to be used as a foundational deposit it would require the construction of a pre-existing building at least one generation earlier, then a second generation for the curation of a fragment. The presence of this fragment therefore indicates that there are occupational layers of at least one generation. It is worth considering in future excavations that earlier levels may be

[28] 7,015 - 6,860 cal BC (95% probability)
[29] 7,035 - 6,955 cal BC (95% probability)

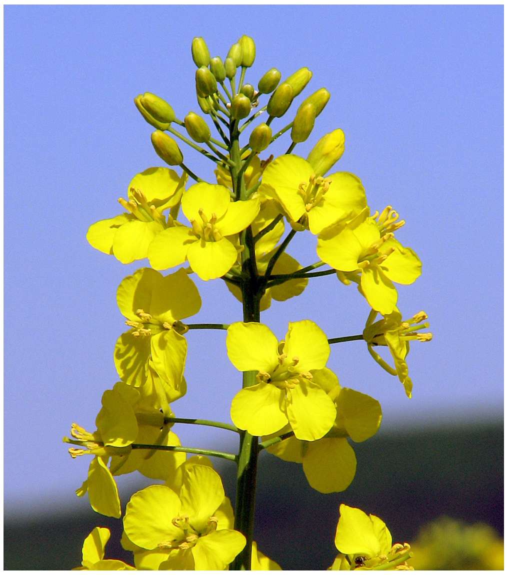



*Figure 6.42 Detail of cross motif (from ID 1, Appendix I), left, Bloom of a modern Cruciferae plant, Brassica napus, right. Photograph source: https://en.wikipedia.org/wiki/Rapeseed#/media/File:Brassica_napus_2.jpg, accessed 12 July 2018.*

present elsewhere on the site, below or laterally to what we currently identify as the earliest architecture.

As for the form of the painting, Mellaart (1967) and Todd (1974) maintain that many of the geometric motifs are inspired by agriculture. Mellaart, in particular, strongly emphasizes that several of the geometric motifs, especially the crosses and rosettes, are connected to plant life and overall themes of fecundity and fertility. The archaeobotanist at the excavation, Dr Amy Bogaard, (pers. comm. 2016), observed that the motif on this fragment bears a strong resemblance to the bloom of the Brassicaceae or crucifer plant with four petals on a flower (Figure 6.2). Fairbarin *et al* (2005) and Bogaard *et al* (2013) identify Cruciferae seeds at Çatalhöyük.

Evidence suggests the seed and plant is ritually relevant. Based on the contexts in which it was found, Mellaart (1967, 121) first suggested the crucifer plant had significance as an offering; he reports that under the notable leopard relief in level VII, building 44a (ID 25), a container on the floor with grain offerings of crucifer seeds was left in a house deposit with a collection of statuettes and stalactites.

Archaeobotanists at the site continue to put forward the idea that seeds, especially the Cruciferae, were drawn upon as symbolic devices and connected to motifs in wall paintings (Fairbarin *et al* 2005, 199).

Other paintings in the Early levels indicate a considerable interest in agriculture through the display of botanical themes. For example, painted rosettes such as the one in ID 1 are also found in VIII.8 in undocumented evidence reported by Mellaart (1967, 111). In addition to the isolated, simple motifs, we also see more elaborate, skilled designs with botanical themes; for instance, in the first full wall design in building 14, ID 7 (Figure 6.3). This wall has motifs of what Mellaart referred to as an ‘eye and hook’ or ‘curvilinear’ design, like climbing vines, in low relief. The designs are framed in four horizontal registers along the width of the wall. The composition has an overall botanical theme, with one corner showing what resembles the red interior of a plant with seeds as dots on the left corner of the North wall (ID 7a). Together with the evidence of the first painting, these examples collectively demonstrate that people were choosing content in art related to botany.

*Figure 6.43 The first full wall design in building 14 showing botanic themes with organic shapes and climbing vines, in low relief ID7.*

The art at Çatalhöyük was described by Hodder (2006, 206) as a practical science, as a '…material intervention [that] can be seen as a way of affecting the world – even an early form of science.  By intervening, people tried to understand, make sense of, control the world around them.' Given that the first painting was found under the floor where grain was kept, the botanical life, specifically the crucifer flower, could have served as inspiration for the cross motif we see in the first painting. Its context under grain bins in X.1 may have been as an offering inviting fecundity in this area of grain storage. The Cruciferae may hold a high significance or ritual role as a seed and plant, as is not in the domesticated crop groups identified by archaeobotanists (Bogaard et al 2017). The painted crucifer bloom, once 'planted' on the wall, may have then been re-planted under the grain storage as an intervention to encourage crop abundance.

Painting practice was connected to and influenced by agriculture in the very earliest buildings for which we have evidence. In considering the question of what the art was doing at these initial levels, it is not that the paintings are *of* plants; rather, what paintings are *doing* is displaying people's affiliation with and honouring of agriculture in these households.

### 6.2.2 Level X

In level X, as seen on the map for this level in Figure 4.4, Mellaart found traces of red and yellow pigments and a painting below the floor of building X.1 but no distinct paintings. Mellaart (1964a) describes his excavations of the earliest levels in 1963 in his third preliminary report in *AS*. In this, he tells of paintings in level X that were fragmentary and severely damaged from the weight of overlying structures and not documented in photographs. The undocumented evidence of painting traces in level

*Figure 6.44 Textile-like painting with reproduction drawing by Grace Huxtable in Goddess of Anatolia (Mellaart et al 1989, Pl. 6 & 7).*

X is not included in the count of 77, but it is worth mentioning in order to see the extent and type of paintings in these levels and show their continuity.

In *Goddess of Anatolia* (1989), Mellaart again asserts his hypothesis that Çatalhöyük textiles are the root of the continued tradition of modern-day kilims. Figure 6.4 shows a colour plate of that volume illustrating his point with paintings from Çatalhöyük side by side with similar motifs from modern, kilim textiles.

### *6.2.2.1 Connections – Textiles to Paintings*

As discussed in Chapter 1, even if the textiles are not precursors to the modern kilim, the connection remains between patterns in paintings and the evidence we have for fibre technologies in this period. Textile-like paintings are seen in the earliest levels. The net-like pattern in the twined fabric resembles the orange net pattern covering the east wall in building VIII.14, ID 8. Also, a balanced plain weave, as was described by Burnham (1965), with the warp and weft fibres of equal size and weight, produces a characteristic checkerboard-like pattern. This can be found in the north wall of the same building, ID 7c.

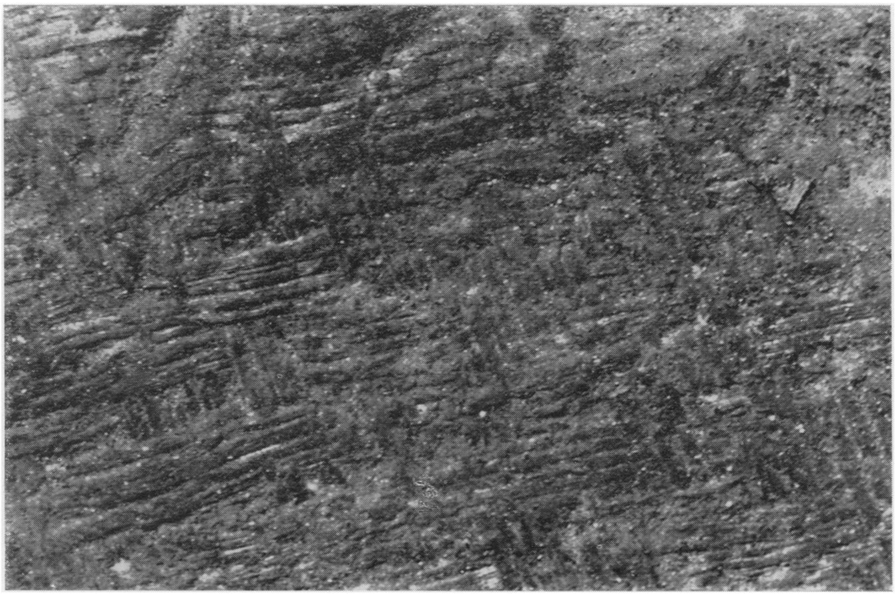


*Figure 6.45 Detail showing "marsh-grass" matting covering the floor in E.VI.14. The weave pattern echos several designs of the textile-like type. For an example, see Figure 6.5. Source: Mellaart 1963, pl. XVI.*

As for the concentric lozenge pattern seen in several textile-like geometric designs – the motif occurs in seven paintings from levels IX to VI (see Appendix 0 and Section

5.3 for detailed listings of the textile-like group of paintings) – the small fragments of preserved textiles from level VI do not exhibit a similar pattern; however, the rush or reed floor mats do. The *in situ* carbonised remains of floor mats were not observed by Burnham but were recorded by Mellaart (1964). Mats are woven with a basket weave pattern placed diagonally to the outer edge creating a pattern similar to the concentric lozenges. In excavations, the carbonised remains of matting covering the floor of VI.14 are pictured in Mellaart's excavation reports (Figure 6.5), where one can observe the quadruple warp and weft of rushes or marsh grass he discusses when considering the crafts of Çatalhöyük (Mellaart 1963, pl. XVI; 1967, 218, Plate 120). Mellaart does not draw parallels between the diagonal paintings in mats and painted designs, yet these do appear to be a close match that connects painting practice to woven mats.

The above evidence clearly demonstrates that the early geometric patterns were more than abstract geometric motifs; they have parallels in the fibre technologies in the artefact record. This is not to imply that there is a straightforward pragmatic transfer of a pattern from one technology to another. Rather, it is likely that the house inhabitants had a connection to the production of mats and textiles, and this had influence when they were choosing what to paint and display on their houses.

### *6.2.2.2 Symbolism of Fibre Arts*

An intangible symbolism or abstract connotation is associated with the fibre arts and may connect them to painted textile motifs. Ritual association of basketry is seen in the burial practices of humans of all ages at Çatalhöyük. Basketry materials were chosen for specific purposes, with a specific wild grass, *Agropyron sp*., used only in burial baskets containing neonates and infants (Rosen 2005). Neonate baskets had the additional distinction of phytoliths from the floral segment of the plant, in all other baskets, only the stem and leaves were used (Ibid). Rosen (2005, 210) interprets this evidence as indicating that the flowers were symbolically significant as well as an indicator of the season in which the deaths occurred, namely in spring, the bloom season for the grasses.

Matting is significant as it was used to make boundaries and differentiate uses of house space; mats 'mapped' out space with different weave types used in different activity areas on the floor and platforms. As Hodder has observed:

> 'As you walked around a house at Çatalhöyük, you would have walked through a social map laid out on the floor. This map was made up of baskets, pots, wooden containers, mats in all their places and some or all of them would have been associated with different categories of people, or different individuals. The social order here is sedimented in the material world.' (Hodder 2006, 187).

The specialised use of basketry, textiles, and mats thus supports the suggestion that a symbolic, abstract connotation was ascribed to the various weave technologies and materials of the fibre arts. This shows that multiple interpretations by Neolithic peoples were in force. The motifs displayed a pragmatic connection to textile technology as well as an intangible, abstract meaning. In light of this re-examination of textile-like paintings, one cannot fully agree with Hodder's (2006, 83) statement that domestic aspects of life are not depicted in the art, or its symbolism.

Given that textiles were woven from plant-based materials, and that the art depicts textiles, it is also incorrect to say that the art does not depict plants as claimed by Hodder (Ibid). Further to this point, in light of the evidence of the plant depicted in the first painting, the climbing vines in painting ID 7, and textile designs, Hodder's (2006) position that there is a lack of reference to domesticated plants underestimated the connection between botanical life and art.

## 6.2.3. Level IX

Level IX has three paintings in two buildings; for images see Appendix I, ID 2-4 and locations in Figure 4.5. Two developments occur at this level, and we see them both in building 8, ID 4. This is the first figurative art. It shows the figure of a black quadruped, in sunken relief, discussed below.

For the remaining paintings in this level, in IX.8, Mellaart also reported another undocumented textile painting (1964, 70). Other motifs for which there is evidence are geometric content such as fragments of geometric design in ID 2, classified as ‘unclassified geometric’, and concentric lozenges in ID 3.

### *6.2.3.1 Early Continuity*

The other development we begin to see at this level is that of continuity in paintings’ content in subsequent households. The black quadruped on the north wall of level IX, building 8 (ID 4), and the two houses built directly above in level VIII, building 8 (undocumented) and level VII, building 8 (ID 17) also have cut-outs of quadrupeds, coloured black, on north walls (See Figures 4.5-7 for the locations of these paintings at these levels). As was mentioned regarding the ‘Shrine 1 sequence’ over the first painting, buildings at Çatalhöyük are often constructed in stacks. They are labelled on the area maps for levels VIII-VI in Figures 4.4-6, 4.8-9, and 4.10). In several places, paintings and reliefs recur on the same wall in subsequent buildings. Two houses with extraordinary longevity were in buildings 10 and 31 in level IX; these were in use up to level VI, spanning a period of nearly 400 years (Hodder 2006, 127). (See Figures 4.5-9 for painting locations). Other buildings, IX.1, XI.7, and the household of the black quadruped cut-out, IX.8, continued up three to five levels (Ibid). Additional examples of continuity occur in the Middle levels, but the first evidence of this repetition of nearly identical wall art from one building to its successor are seen here in level IX with the black quadruped cut-outs.

### *6.2.3.2 Bull, Cow, or Other?*[30]

The paintings ID 4 and 17 are often used as key evidence for the prevalence and dominance of bulls in the symbolism of Early levels. The figures in these two paintings were thought to be bulls by Mellaart (1964, 70; 1967, Table 13). Hodder (2006, 163) agreed with this assessment and subsequently asserted that the bull is an important symbol at Çatalhöyük, building his case, in part, with the figures like those in ID 4 and ID 17. However, direct examination of the archival photographs of the figures reveals that the identification of a species is not possible with certainty.

Russell and Meece (2005) noted that the walls on which ID 4 and 17 are located are truncated, leaving the figures with just the torso and legs of a large quadruped. Unlike Late level 'hunting scenes', the figure in ID 17 has more full, bulky legs and stomach and no male genitals, lending to an interpretation that it may be either a cow or bull. ID 4 does not have a silhouette distinguishing it as male or female or from other animals known to be kept and eaten at Çatalhöyük, such as the sheep or the goat, which Hodder (2006, Table 1) insists are scarcely represented in the art. The only complete example of a quadruped cut-out survives in a reproduction in level VII, ID 16; this is documented with replica drawing and interpreted as a cow by both Mellaart (1967) and Todd (1976). Without complete, documented examples of this cut-out type, describing the figure as a bull is therefore over-interpretive. Using it as evidence of the prevalence of bull symbolism in painting assumes more than the evidence in wall painting in Early levels can support. In the absence of distinguishing features of an animal's gender or species, in this research the generic term of

[30] … Or, is it a Bull or Cow patty?

“quadruped” serves to categorise figures of this type. This greatly reduces the number of paintings considered to be ‘bulls’ in the Early levels. It should be noted, however, that in Late period paintings (see ID 58, 61, 67), the dominance of bull symbolism does appear unambiguously.

### 6.2.4 Level VIII

Many of the paintings in Level VIII have content and technology which increase in sophistication.[31] Level VIII geometric designs are skilfully executed and planned to cover the full wall, as in IDs 5, 7, 8, 9. See Figure 5.1 for an example from VIII.14.

The painting with stylised birds with skeletal wings and headless human figures (ID 6) in level VIII breaks new ground as the first painting considered to be narrative, or storytelling. This image in particular, and the others of its type, were thought to be symbolic of death and connected with the Neolithic mythology of the Anatolian region (Hodder 2006). In the image are the faint remnants of two human figures, one of them headless, between two birds with a raised weapon. The birds are of a similar style to those in later levels with skeletal wings, represented usually in profile. Russell and Meece (2005, 211) suggest that the long necks in figures of this type of match those of Griffon Vultures. In this early painting, the human figures between the vultures and to the left have raised arms and weapons, conveying a scene of fighting. Mellaart interprets the weapons as slings and asserts that the headless human is a corpse that is being defended by the first human (Mellaart 1965a, 70). This is supported by the fact that in the building immediately below, in IX.1, remnants of paintings of slings in black were made over the central platform (Ibid). As we will see, the compositions with vultures and headless humans recurs in later levels with variations in the colours used and the arrangement of the figures (see ID 18 and 21).

[31] For images see Appendix I, ID 5-14; for locations see Appendix IV, Map 4.

The second example with animal content is the first *bas relief* of a pair of felines in ID 10. This pair is the precursor to the well-known feline reliefs in VII.44 and VI.44. The animals are feline in appearance and can be panthers, lions, or leopards, with the first two animals preferred by Stordeur (2010) and third being the favoured interpretation of Hodder (2006). The example in building 27 is the predecessor to the more often discussed painted reliefs, often referred to as the 'leopard reliefs', in the Middle levels. The pose of the animals here differs from later examples. They are touching both front paws on either side of their touching muzzles, which could suggest that they are either attacking (Mellaart 1965, 180; Hodder 2006) or kissing. Thus, the action can be provoking or tender, or possibly the ambiguity between making love or war is intentional.

#### *6.2.3.1 Connections between Paintings Content and Other Artefacts*

The interconnection of technologies is observed in crafts such as baskets, woodworking, and ceramics at Çatalhöyük. Baskets and ceramics were both made with spiral-coiled techniques, building up successive rings to make a vessel. Mellaart (1967, 218) asserts that the two technologies are closely related and informed one another.

Ceramics also strongly resemble the woodworked vessels. Woodworking yielded sophisticated artefacts such as deep and shallow round bowls, small boxes with well-fitted lids, and large meat dishes with handles; some wood vessels had relief decoration or were painted red (Mellaart 1967, 215). Ceramics were strongly influenced by their wooden precedents and were thought by Mellaart to be a secondary craft:

> "It is clear from the pottery shapes that throughout the Neolithic period at Çatal Hüyük pottery occupied a secondary position and was unable to free itself completely from hitherto current

> shapes in wood and basketry. As late as level II a fair number of pottery shapes are angular and wooden, imitate wooden boxes, or have wooden feet." (Mellaart 1967, 216)

The cross-over influence between technologies, or skeuomorphism, is also apparent in wall paintings. We have already discussed in Section 6.2.3 on level XI botanical themes in paintings and textile-like designs, and the relation of other technologies in paintings continues into level VIII. For example, the three paintings in building 14 show correspondence to botanicals and textiles in their geometric motifs. The previously mentioned climbing vine composition in ID 7 is executed in a painterly manner with a grey-scale, grisaille method, and shows a clear botanical theme. Paintings on the other walls include geometric textile-like designs of a checkerboard pattern on the north wall (ID 7c) and the net pattern painted on the East wall (ID 8).

### *6.2.4.2 Circles and Beads*

Another case of the connection between paintings and other technologies can be seen with the concentric circle motif which was painstakingly discovered during the excavations in the 1960s. ID 5a-b consists of a full wall design of at least 17 rows and 7 columns (before the wall was truncated) of concentric circles. The design carries on to the adjacent wall. ID 9 in VIII.25 also has circles covering one wall. This proliferation of concentric circles is, most likely, not random. The repetition of circles as geometric motifs over full walls, or indeed of any circle motif, is seen for the first and only time at this level; and then, as the Master Summary of Painting Typology in Section 5.1 shows, the concentric circle motif is not seen at all after level VIII. A likely explanation of the proliferation of circle motifs at this time, and only at this time, can be found in the artefact record.

In the case of ID 5, the concentric rings are connected to bead-making. As discussed in Section 4.1, beads made from copper first occur in level IX.[32] (See Figure 4.5 for level IX map with a green circle noting the copper beads burial). The map of the subsequent level shows three paintings with motifs with concentric circles – ID 5, 9, 14 – are found in the neighbouring houses in the next level, just above the first occurrence of this innovative metal bead technology.

An understanding of the technology of copper beads provides clues as to why painted concentric circles would indicate beads. As the latest archaeometallurgy study shows (Birch *et al* 2013), the method of producing metal beads at Çatalhöyük was to hammer the copper into a flat sheet and, starting at the edge, roll the sheet. The rolled sheets were then sliced to produce round beads with a central hole that could be strung. To visualise this, think of how sushi is made. The concentric circles that cover the adjacent north and west walls VIII.2, ID 5a-b, appear much like the copper beads do in cross section. Given this evidence from the artefact record relative to the painting placements, the concentric circle motifs are likely to be a part of the paintings' corpus that is inspired by the hands-on, tactile experience of peoples engaged in copper bead production.

## 6.3. Stylistic Analysis Summary

Even in the first few paintings in the Early levels, the content has skill levels and complexity which makes the Broad category of Geometric too general for comparison of like types for analysis. Typological results show 12 of the 14 total paintings contain simple motifs of either a geometric, zoomorphic, or anthropomorphic type. The observation to emerge from this overview is that at the Early levels, painting content

[32] (Mellaart 1964, 111) and continue to be found in levels VIII and VII (Mellaart 1966, 183). Copper beads were first found in a burial in building 17, level IX (Mellaart 1964, 111).

fits within Simple typological classifications such as ‘zoomorphic’, ‘anthropomorphic’, and ‘geometric’, categories which are relied upon heavily in recent analysis by Czeszewska (2014). It is true that some paintings fall easily into these categories; examples are the leopard reliefs or the black quadruped, which are clearly ‘zoomorphic’. However, ‘zoomorphic’ is not a sufficient category for the complex designs, such as those depicting vultures and humans in ID 6. Similarly, the term ‘geometric’ is a Broad category encompassing vastly different levels of skill in execution from the simple motifs of a few concentric lozenges, like in ID 3, to the elaborate full wall design in ID 7. A continued discussion of typology is presented for the Middle and Late levels in their respective chapters with a summary in the discussion in Chapter 9.

## 6.4 Summary

At the earliest levels XI-VIII, dating from a range between 7,035-6,550 cal BC, paintings are characterised by motifs that are connected to single artefacts and animals. This can be seen clearly in the first painting, with house inhabitants choosing to isolate a single motif of a simple, red cross and deposit it below the house. Artefact-connected designs begin in the earliest evidence in level X and VIII with designs linked to botanicals and textiles. The growth in complexity of content is seen in the zoomorphic types, which develop from single animal content in level IX to more complex compositions of the first narrative ‘scene’ showing the interactions of people with skeletal winged birds in building 8. At the same time, the technology grows in sophistication with animal motifs developing from sunken reliefs to raised reliefs in level VIII, ID 10. The complexity of geometric paintings increases in level VIII, with large, full wall designs which require more skill and planning, as in IDs 5, 7, 8, and 9.

Another observation is that these findings counter Hodder's assertion that domestic life, especially plants, are not depicted in the art of Çatalhöyük (Hodder 2006, 204). From the first painting, we see the strong emphasis of botanical themes. The earliest painting of a cross is most likely inspired by the bloom of the ritually significant crucifer plant. One of the first full wall designs is of a climbing vine design, which, again exhibits a floral theme. Paintings with designs connected to the technology of the fibre arts, such as basketry, mats, and textiles are prevalent. This indicates that the plant-life and technologies have a strong influence on painting content from the earliest levels.

However, these findings concur with Hodder's position (2006, 206) that art at Çatalhöyük can be likened to a 'practical science'. At the roots of Çatalhöyük's occupation, art as an intervention in the natural world is practiced. The curation of the first fragment of a crucifer bloom and its inclusion as a house deposit below building X.1 demonstrates an intention to facilitate fecundity and fertility. This Early period is also characterised by a strong connection of wall painting content to other technologies. We know from the textile paintings that painters are influenced by a connection between artefact technologies and paintings in these levels. The evidence presented above suggests that this connection extends to other geometric content, with agricultural production connected to botanical motifs and copper bead production influencing concentric circle motifs. These may be related to the 'practical science' in that they facilitated abundance in the productive technologies at the foundation levels.

The new evidence from the Early period reshapes our understanding of the art at this time. Based on this level-by-level examination of artefacts and paintings, we can see that there is a significant influence of other technologies on painting content and motifs. First, with the painting of the cross, we have the link between the foundations of the site before level X and the botanical and agricultural focus of its inhabitants. Then the influence continues with textile-like paintings and the first frame around a concentric lozenge design. Concentric circle paintings only occur when copper beads first occur on-site; the concentric circle motif mimics what we now know of the bead technology and the method of rolling copper sheets into beads. Occurring at the inception of the technology for bead-making in this fashion, this is the first and only place in which we see circle motifs in paintings.

Having observed and established the connection between paintings and other technologies, we can consider what this tells about the role of wall paintings in Neolithic culture at Çatalhöyük. It is not that the paintings are *of* basketry or *representative of* beads as such, but that they display a household's affiliations with these technologies. The continued use of motifs in subsequent 'history' houses, discussed in Section 4.3, shows that people's connection to these technologies in these locations persisted over generations on the site. Thus, the art in architecture shows high cultural value being attributed to the perseverance of knowledge of craft technology and skill. In these levels there is a strong focus on the technology for making food for either sustenance or ritual offering, as well as crafts to decorate the body, like beads, or the home, like textiles.

The wall art displays an emphasis on other technologies and skills that are passed on through people and successive households; the social connection of these persists through generations over hundreds of years during the Early levels of Çatalhöyük and beyond.

# CHAPTER 7 MIDDLE LEVELS SYNTHESIS

## 7 Introduction

In the last chapter a synthesis of Mellaart's data with current findings from the Hodder excavation campaign achieved more robust interpretations of the Çatalhöyük wall art. Strong connections between the content of paintings and the artefact record were demonstrated. This chapter continues with this approach through what is known as the Middle, or Transition, levels of the site.

The Middle levels at Çatalhöyük are where the most significant changes and developments occur both in artists' materials and in the content of paintings. For example, Chapters 3 and 4 presented the new blue mineral, azurite. This blue pigment is of paramount importance in the study of artists' materials as its appearance in the archaeological record at Çatalhöyük is the first known occurrence in prehistory and predates the first known use in literature concerning artists' pigments by three thousand years.

The highest number of paintings and the newest developments in content occur in the Middle period. By examining the chronological order of the evidence, the picture emerges in levels VII and VI that the developments in artists' materials and painting content are simultaneous and intertwined.

A considerable increase in frequency and diversification of content occurs in paintings at this time. Levels VII and VI are the most prolific in wall art, with the highest number of recovered paintings having 43 of the 77 catalogue entries. The Middle level paintings are from ID 15 to 57 in Appendix II and listed in The Master Summary Table of Çatalhöyük Paintings, Appendix 0.

In the Master Summary Table of Çatalhöyük Paintings, Table 5.1, 12 new Element Type motifs occur. Three categories of new wall art content discussed in this chapter are reliefs, shown with the grey fill background in Table 5.1. The first is the sunken relief of a cow, the second splayed figure reliefs, and the third a mask. Of the nine new paintings categories, the handprints group, the honeycomb painting, and red cut-outs are discussed in Section 7.2. The group landscape/architecture/brick/string types are also discussed in 7.2. with a special focus on the noteworthy discovery of a human figure.

The recent discovery on-site of the first relief of a mask in the North Area is examined and contextualised using extant evidence of wall art and reliefs. Also discussed in the results for each level are the notable examples of painting groups from the Early levels which carry on into this period in Middle levels; these lend further weight to the strong evidence we see for continuity of content and techniques from previous generations.

## 7.1 Transition Level Pigments

In the Master Table of Colourants in Chapter 4, paintings in the transition levels continue to be primarily red ochres with the less frequent use of carbonaceous black, and calcium-based white.

Colourants were found more frequently in the burials of the transition levels. We continue to see the use of ‘ochre burials’ with red and yellow iron oxide scattered over burials or applied to bones. Red ochre burial became more frequent in the transition levels with over half – eleven of the twenty-one examples found by Mellaart – occurring at this time. Applying colours directly to skulls or bones is seen in level

VII, building 10. The skull in Mellaart's shrine 10 was coated in red ochre and had two cowrie shells placed in the eye sockets (Mellaart 1965b, 183, Pl. L(*b*)). As a part of the cosmetic kits with bone applicator tools and cosmetic kits, we see in level VI, what Mellaart calls a 'rouge' of red pigment and fat in basket (Mellaart 1964b, 94). Red and yellow ochre beads were also in use as funerary gifts in level VII (Mellaart 1965b, 183).

Cinnabar continues to be in use. In level VIB, cinnabar is found on a female skull in building 20 (Mellaart 1963, 93; 1967, 207 Fig.96). While pigment analysis was not routinely performed during the first phase of excavation in the 1960s, the presence of cinnabar can also be inferred in cases where researchers note a red pigment which turned black on exposure to the sun. Mellaart and Todd note these, with a specific mention on paintings from VIA building 96.

Reliefs in level VII demonstrate the practice Neolithic peoples had of plastering over paintings, then repainting again. For example, the pair of feline relieves in building 44 were repainted and re-plastered. Mellaart reports up to forty layers of painting and replastering, using red, black, and yellow coloured paint on the VI.44 reliefs (Mellaart 1967, 119). Photographs of these reliefs are in black and white, but Mellaart reports that the mouth, claws, and tail tips are outlined in red. This particular red of the outlines on ID 37 (VI.44) is unusual. The mural is painted in a pigment Mellaart (1964, *AS XIV*, Plate IIa) assumes to be organic, given that it changed in colour from an orange-red to a black after it was excavated and exposed.

The most remarkable development in the pigment data is the introduction of blue and green colours. As discussed in Chapter 4, copper-based pigments were rare in prehistory; a few cases of malachite were reported in the Natufian and early Neolithic periods. This makes the blue azurite at Çatalhöyük the first recorded occurrence in prehistory. Known occurrences in the literature of artists' pigments place the start date for azurite use in Europe, in the villa Giribaldi, Nice, dated to 4,750 – 4,000 cal BC (Binder 2004), then not again until Japan in the seventh to eighth century in the Hôryûji Temple (Yamasaki 1953, reported in Gettens and Fitzhugh 1993b). Confirmed use of azurite at Çatalhöyük excavations pushes back the first use of azurite to 6,710-6,550 cal BC in Turkey, two thousand years earlier. Understanding its use and resolving open questions is a high priority in this research.

For full page Middle Level maps, see Appendix IV Maps 6-10. Maps for levels VII and VI in the South and North areas show all documented findspots of blue pigments from the Mellaart and Hodder phases of excavation. _There are contradictions in the evidence as follows: reports by the ÇRP team deny the use of blue or green pigments in any context other than graves (Çamurcuoğlu 2012, 255; 2013, 316; 2015, 147, Table 4.3; Radivojevic et al 2017, 103). All cases of the blue pigment materials analysis reported by the ÇRP team and previously discussed in this thesis are found in burials. However, Mellaart (1964, 94; 1967, 151) and Todd (1976, 37) report one interesting use in wall art. They report blue in a cut-out design on the west wall of E.VII.1 (annotated as *ID 16 on Figure 4.8), where thick layers of plaster are built up and then carved out in sunken relief. The form was reportedly in the shape of a cow, with blue painted in the low relief area. The remains of this blue painting were in poor condition, and unfortunately only documented in black and white photographs (Image in Appendix I, ID 16)

As seen in Figure 7.1, a detail of the level VII GIS map, when the E.VII.1 building is examined along with other archival and contemporary reports of rare pigments, listed

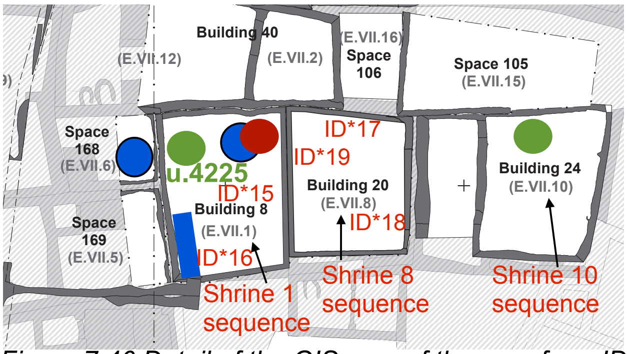



*Figure 7.46 Detail of the GIS map of the area from ID 16. ((top right)*

*Figure 7.47 Macrophotography of sample 7575, an example of small lumps of powdered blue pigment scattered in burial. (top left)*

*Figure 7.48 A similar, better-preserved, quadruped cut-out from the neighbouring building in level IX, building 8, ID4.*

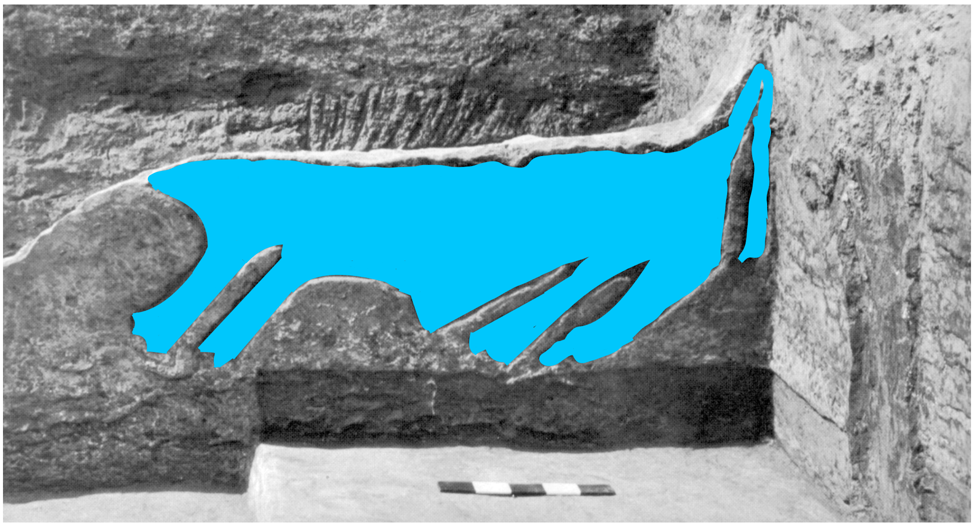


*Figure 7.49 An estimate of what the blue cow cut-out would have looked like (colour annotation by author).*

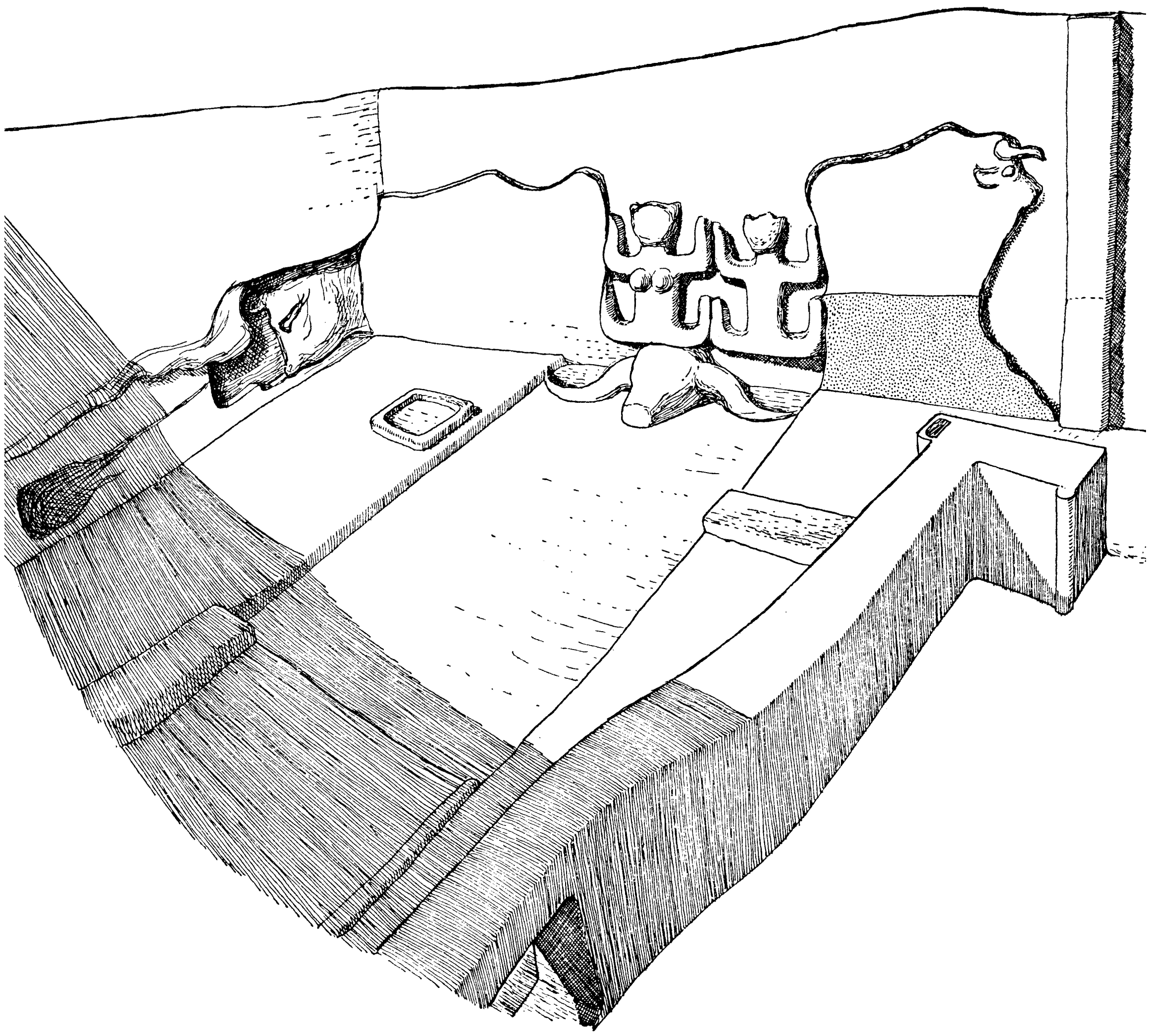


Fig. 14. Restored view of west wall of Shrine VII, 1.

*Figure 7.50 Replica drawing of cut-out of a cow from Shrine 1, Level VII*

in Table 4.4, several other cases of azurite and malachite are found in the same building and the neighbouring one. This cluster of copper-based pigments in contexts of the same building gives further evidence to substantiate the 1960's account of the blue cow painting. Therefore, the evidence brought together in this study proves that blue pigments were used in painting as well as burial goods.

Others have claimed that the specificity of the use of blue had to do with the prestige of the colour or a colour symbolism (Çamurcuoğlu 2012, 255). This author does not dispute that blue had a cultural connotation; in fact, evidence does suggest it (see Section 4.2.2.2). However, there is a pragmatic reason relating to the technology of wall paintings at Çatalhöyük that would limit its use. More than an ideology or even a cosmology of colour, the likely reason that blue was not used more often in wall paintings had to do with the handling properties of azurite as a powdered mineral.

The type of plasters used at Çatalhöyük were clay-rich white mudplasters, not fired lime plaster used in the more robust fresco technique (Matthews 2005; St George 2012). It is difficult to make azurite adhere to wall plaster of this type. Copper-based pigments have a crystalline structure, and as we saw in the technical findings in Chapter 3. A feature of azurite and malachite is that a coarse particle size is more saturated the hue. Larger copper carbonate particles retain the blue colour, while finer particles are translucent, with reduced colour saturation. In practice, the large particles affect the handling properties, the way the pigment adheres to a substrate; the coarse azurite particles do not adhere easily to the wall without the 'tooth' that easily binds red ochres and clays to most surfaces.

Given that there is only one case of azurite use in the wall art of Çatalhöyük, and it was significantly deteriorated upon excavation, the use of it in building VII.1 was likely to be an experiment when the colour first came to the site. Given that the experiment was unsuccessful in staying on the wall, it was not repeated. This evidence supports the position that the cultural connotation and limited uses of blue pigment were not only due to its rare, exotic colour, but also the pragmatic issue of its handling properties.

The symbolism of the colour is indicated by its contexts. Of course, its rarity and sparing use indicates a high value. All of the burials in which it was used were predominantly of women, with a few of infants. The overall bovine symbolism introduced in the last chapter prevails throughout the site; the cow relief in the blue painting is a female dimension of the imagery. Putting it all together, there is a considerable link of the precious blue to the feminine.

## 7.2 Transition Level Paintings

### 7.2.1 Level VII

As seen in Chapter 5, Table 5.1, the frequency of paintings at level VII is the second highest, with 13 painted walls in 7 buildings. There is a rise in complexity of the wall art content. The clearest indicator of a rise in complexity, though, is the increase in Compound motifs in the Middle levels to 27% of the paintings, up from 8% in level VIII and zero compound motifs prior to VIII, seen in the typological analysis in Section 5.4. Data show continuity in the choice of painting forms and motifs in Transition levels from Early levels, namely: crosses, rosettes, lozenges, triangles, and textile patterns.

The most significant diversification and expansion of paintings content from previous levels occurs in level VII. Table 5.4shows six new painting groups that appear at this level, including paintings connected to landscape and architecture, as well as cut-outs of splayed and bovine figures. Other new painting content includes the first paintings of handprints and strings. Both sunken and raised wall art reliefs also continue to be utilised at this level with the expansion of the range of animals being depicted, including splayed figures, and a sunken relief of a blue cow. These are all discussed in the following subsections.

#### *7.2.1.1 Continuity and Change*

Superimposition of painting and relief content on walls in successive buildings occurs in the middle levels most strongly between level VII and the preceding level VIII and subsequent level VI. For example, between VIII and VII, textile-like patterns recur on the stack of buildings referred to as a ‘shrine sequence’. In the shrine sequence number 1, textile paintings are on the east walls of successive buildings from VIII.1 (undocumented; Mellaart 1964, 70) to VII.1 (ID 15), and VIB.1 (ID 29). The pattern in this level VII.1 (ID 15) is identical to the monochrome red design of framed concentric lozenges seen in the preceding level VIII in building 27 (ID 11).

Examples of continuity from the raised reliefs are seen in the felines that begin in level VIII.27 (ID 10) and continue in the Middle levels. A single feline relief occurs in VII.44. A pair of felines occurs in two subsequent buildings, building 44 (ID 25) in level VII and the subsequent building constructed on top of it on the same wall in level VI (ID 37). The feline figures are built up in plaster and re-painted in multiple phases.

Continuity and change in paintings with a narrative content are seen in the variations of compositions within the ‘vultures with humans’ group. The second example of this group, VII.8, ID 18, is found in the house directly above the first example from the Early levels, VIII.8, ID 6, both on the east wall. The third and last painting of this type is found to the northeast of this shrine sequence, in building 21 (ID 21). The level VII compositions have strong similarities, indicating that the artist of each must have been aware of the other. Unlike the polychrome prototype in VIII.8, the level VII paintings are monochrome. In later compositions, the human figures are significantly smaller, relative to the skeletal winged birds, and have no weapons or hints of heads. The story or myth being told in the level VII compositions of this type impresses upon the viewer an increased sense of dominance of the birds over the human figures. The differences in colour, composition, and relative scale indicate that, even though the content continues into the next generation, variations on the narrative are made each time the story of the painting is being told.

### *7.2.1.2 Paintings Connected to the Landscape: The Mountaineer*

Mellaart claimed that, 'a single wall painting… more than any other illustrates the artistic genius of the people of Çatal Hüyük' (Mellaart 1967, 176). The composition painted on the north and east walls in building 14 is that painting. Labelled by Mellaart (1967) the 'Volcano/City Plan', it is the most iconic painting known from Çatalhöyük. As presented in Chapter 1, it is of interest outside of archaeology to those in a number of disciplines, including to art historians as the first landscape and cityscape (Boardman 2006, 21), to vulcanologists (Schmitt *et al* 2014) for its connection to a Neolithic period volcanic eruption in Anatolia, and to cartographers (Clarke 2013) as it is arguably the first map yet discovered in prehistoric painting.

#### *7.2.1.2.1 Competing Interpretations: Volcano/City Plan or Leopard Skin?*

As discussed in Chapter 1, the current debate surrounding the image casts doubt on Mellaart's long-standing interpretation of the figures as a volcano in the upper register and a plan of the city in the lower register. Mellaart asserts his interpretation clearly:

> A clearer picture of a volcano in eruption could hardly have been painted; the fire coming out of the top, lava streams from vents at its base, clouds of smoke and glowing ash hanging over its peak and raining down on and beyond the slopes of the volcano are all combined in this painting (Mellaart 1967, 176).

He takes the position that the double peaked volcano Hasan Dağı (see Figure 7.6), at the eastern edge of the Konya plain 130km northeast of Çatalhöyük, is the one shown in the painting (Ibid, 177).

Meece's (2006) attempt to overturn the interpretation of this mural as a volcano in favour of its interpretation as a leopard skin is eloquently argued but contains several errors. We will look briefly at her argument. The points that support her reading of the figures are as follows:

1) that a painting depicting the volcano at Hasan Dağı is unlikely.

2) that depictions of maps did not exist prior to this painting or for 4,000 years after it, therefore it is unlikely people had the cognitive capacity to represent three-dimensional space in this two-dimensional form (Ibid, 5).

3) the view of the city plan shows houses in plan, rather than the view that would have been observable and familiar to a Neolithic inhabitant (Ibid, 5).

4) that Mellaart's first, and most likely correct, interpretation of the painting was that it was of a leopard skin (Ibid, 6).

5) that taken as a whole, geometric motifs are the most common kinds of content in the corpus of wall art at Çatalhöyük (Ibid, Fig 7a, 13); therefore, the figures in the lower register are more likely to be abstract geometric figures and not houses.

Findings from recent work by vulcanologists refute Meece's argument that an eruption of Hasan Dağı cannot be depicted in the volcano painting, as presented in Chapter 1. The authors observe the eruption date from their analysis of tephra corresponds with the dates of occupation of Çatalhöyük and precedes level VII in which the painting was made (Schmitt *et al* 2014, 11). This evidence matches the eruption peak, date, and type to that shown in the painting in VII.14.

As also cited in Chapter 1, Clarke (2013), a specialist in Analytical Cartography, refutes Meece and argues that humans made maps as early as the Magdalenian as aids with navigating, hunting, and finding seasonal food sources. As memory aids, maps helped people to navigate the landscape successfully, ensuring a competitive advantage to those who used them (Clarke 2013, 142).

*Figure 7.51 View of Hasan Dağı from Aşıkli Höyük. Photo courtesy of Mihriban Özbaşaran, director of the Aşıkli Höyük excavation.*

If the Çatalhöyük mural is seen as a map, one reason an interpretation referring to Hasan Dağı is advantageous in a Neolithic context is that this mountain is in Cappadocia, the region where valuable raw materials were sourced. As Chapter 4 showed, a review of 50 years of obsidian studies from Çatalhöyük shows that the material had utilitarian purposes, but according to Carter (2011) the material also had considerable cultural value. It was used to form relationships through trade, exchange and gifting, and also to form cultural identities through hoarding and ritual behaviour. The two most important sources of obsidian were in the southern Cappadocian sites of Nenezı Dağı and East Göllü Dağı (Carter 2011, 4). While no obsidian was sourced from Hasan Dağı (Carter 2011, 4), the mountain peaks were visible along the trade route to both known locations of obsidian from Çatalhöyük, as we see from the map in Figure 7.6, showing the view of Hasan Dağı from the north from Aşıkli Höyük.

The Cappadocian region and its connection to obsidian were also of heightened interest to the Neolithic peoples living at the time of level VII, the level from which the painting was excavated. Just after the painting, in level VI, obsidian studies show that people were bringing obsidian from further away, in the northern Cappadocian sites of West Acıgöl and East Acıgöl and using different processing techniques (Carter 2011). It may be that the artisan who painted the wall in level VII was illustrating the region from which they came or where they were travelling to in order to bring obsidian back to Çatalhöyük.

Showing in painting the exploration of the landscape and the utilization of its resources in a new way echoes what we know from the artefact record, especially for obsidian. Obsidian flaking techniques and sources changed between levels VIII and VII. Starting in level VII, obsidian sources came from further away, on the other side of Hasan Dağı (Carter 2011); this demonstrates that people were moving through Cappadocia at this time, explaining how the views of this area could be in the mind of the artisan rendering this painting. What we know of the obsidian trade and technology and how it changes in level VII shows an influx of new knowledge, materials, and people from farther distances from site. The scene in VII.14 showing the exploration of the landscape could have been created by someone involved in the obsidian trade or from the area near Hasan Dağı. Looking at the evidence for pigments at this time in Section 4.1, an influx of innovative copper materials, potentially sourced from Cappadocia, also came in at this level. The VII.14 painting may have served as a narrative device, a kind of calling card, to communicate to the settled population of Çatalhöyük about the place from where the new people, materials, and skills were coming.

*7.2.1.2.2 Upper Register: A Human Figure*

As mentioned in Chapter 1, recent research has uncovered the original colour scheme and reinterpreted the image (Meece 2006; St George 2012). A re-examination of the original artefact of the Volcano/City plan mural in the collection of the Museum of Anatolian Civilizations in Ankara (Figures 7.7-9) yielded an unexpected discovery.

Mellaart (1967, 177) viewed the lines streaking from the right of this figure and up and out of the peak as depicting a volcanic eruption, with fire coming out the top. However, no explanation is offered either by Mellaart or Meece for the lines between the peaks of the upper register figure. On close inspection, it can be seen that this is clearly a different sort of line from the curved streams of smoke or dots of ash above and to the right of the peak (Figure 1.6).

The examination of the replica drawing between the peaks of the mountain figure, show two vertical lines converging to a single line with a short perpendicular line, and the vertical line goes on to rise far above the mountain figure (Figure 1.6). These lines are unlike the ‘plumes of smoke’ above and to the right of the right peak.

The examination of the replica drawing between the peaks of the mountain figure shows two vertical lines converging to a single line with a short perpendicular line and the vertical line goes on to rise far above the mountain figure (Figure 1.6). These lines are unlike the ‘plumes of smoke’ above and to the right of the peak.

*Figure 7.52 Photograph of the original 'Volcano/City Plan' mural in the Museum of Anatolian Civilizations in Ankara.*

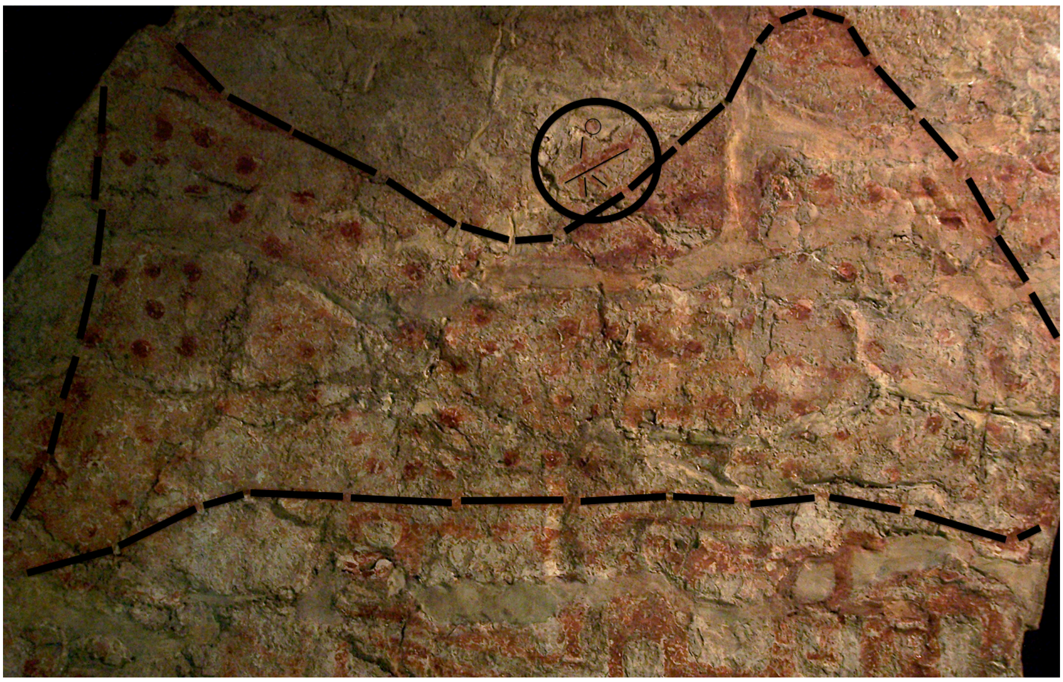


*Figure 7.54 Mural with author's annotations showing the outline of volcano with a human figure (ringed) between the peaks. Author's own photograph.*

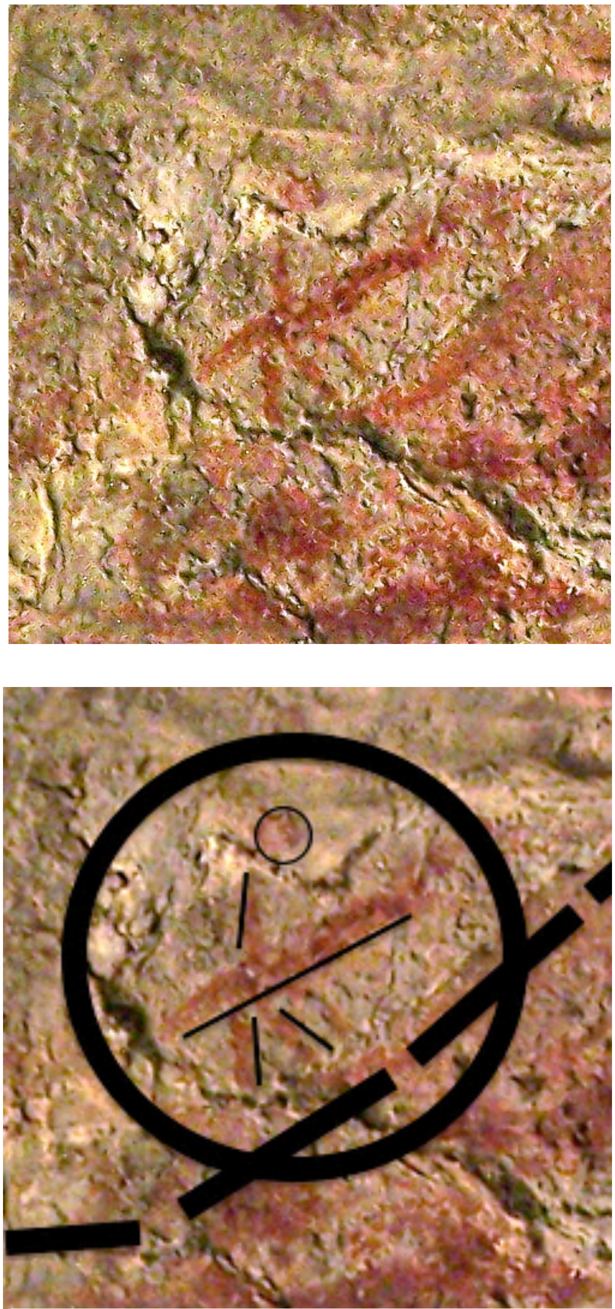


*Figure 7.55 Detail of human figure (top) with author's own annotations (bottom). Source: Author's own.*

Nor do they make sense read as smoke, as they begin between the peaks, not at the top of the volcano. On close inspection of the original mural artefact in the museum, the long vertical line is short with a space then a dot just above it. The proportions of the lines appear to form a human figure, with the two vertical lines as legs, the single converging line as a torso, a perpendicular line across the torso, and a dot above to indicate the head.

The human figure formed by these lines (Figure 7.9) comes not from the peak, but the top horizontal edge of the mountain between the peaks. Most remarkably, this person in the image, the mountaineer, had yet to be noticed or discussed in the many references to this mural through Mellaart's writings or any sources since. It is not clear why there is such a disparity between the replica drawing and the original artefact, especially with such a relevant detail. Yet, the figure with human-like proportions in a style similar to other renderings of people in the Çatalhöyük painting canon is undeniably present in the original mural.

*Figure 7.56 Three representations of humans in Çatalhöyük paintings with stick figures. All figures show a perpendicular line through the torso to indicate clothing, like the figure discovered in the 'Volcano/City Plan' mural. Details from a) top left III.1 (ID 68b), b) top right V.1 (ID 62), c) middle left III.1 (ID 68a)*

The human figure is rendered much like others in the Middle and Late periods, with a round head, a line for the torso and lines for each leg and arm (Figure 7.9). Stick figures are used to convey the human form in all paintings, save one.[33] Three examples in Figure 7.10 show this stick figure style. The convention of lines through the torso is used in human figures and, as thought by Mellaart (1967) may convey clothing figures, a kind of garment, possibly a loincloth or animal pelt. The mid-torso line is seen in almost all of the human figures in the Middle and Late Period compositions. These are seen in other renderings of human figures shown in Figure 7.10a through c, and in the ÇPID as ID 58b and d, ID 62, ID 59, 61; one is well-known as the cover of Hodder’s (2006) ‘Leopard’s Tale’ (ID 68, Figure 7.10a).

The human figure, the mountaineer, lends strong evidence to the reading of the upper register figure as a mountain or volcano, rather than the alternate leopard skin

[33] A rare exception to the use of stick figures in human forms is the isolated figure of a white, voluminous woman in the Late Levels, seen in building IV.1, ID 65.

*Figure 7.11 Mellaart 1963 p. XXII (b) Figurine from Level A.II.1, in blue limestone, 5cm, of female with garment around torso, indicated with incised dots, interpreted as leopard skin by Mellaart.*

interpretation offered by Meece (2006). The narrative element of this painting alters when we see it as more than a static landscape or map, depicting a significant landmark and bird's eye view of the town. With this addition of a person on the mountain, it becomes a story of a person in that scene and the story of that person's experience, exploring the volcano in the distance, overlooking the village below.

The finger dots within the silhouette of the upper figure were interpreted by Meece (2006) as spots on a leopard skin. If they are not spots on a leopard as asserted by Meece, what are they? Dots in general, are used in painting at Çatalhöyük in various

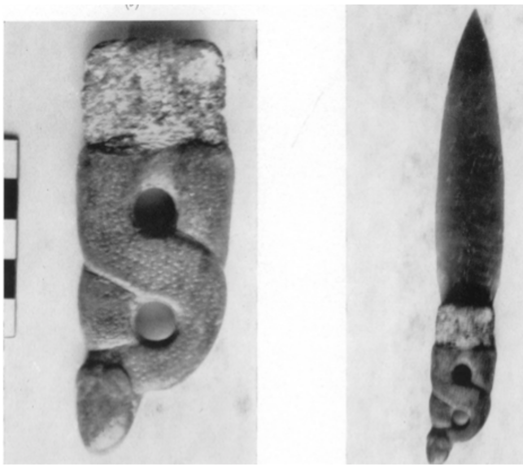


*Figure 7.57 A flint dagger with bone tool handle. The handle is in the shape of a snake in a figure of 8. The texture of the snakeskin is indicated by incised dots. Source: Mellaart 1964 Plate XXVI (b-c).*

ways. As we see in the human figure on the cover to the 'Leopard's Tale' (2006), ID 68b, small black dots indicate texture on the person's hair and costume. In a contemporary painting by the same artist, finger dots are used to convey leaves on a tree (ID 25e). Sculptures at Çatalhöyük also have incised dots to indicate texture on various surfaces. Examples of this can be seen on bodies and body adornment. In Figure 7.12, dots indicate the texture of the skin of a snake on the bone knife handles; in Figure 7.11, dotted texture on the torso of the figurine indicates texture of textile or animal skin clothing.

Therefore, in the ‘Volcano/City Plan’, one potential reading of the dots is that they indicate texture, in general, of the mountain terrain, or again, in the reference to foliage, trees on the mountain. There is scope for interpreting the dots on the upper figure as either of those, texture or trees, on the mountain.

*7.2.1.2.3 Lower Register Figures*

But what of the alternate explanation of the lower register figures? Meece (2006, Figures 7a-b) pictures the motifs in VII.14 alongside several other motifs she claims are similar ‘geometric’ designs. The six examples used to illustrate this point are the concentric lozenges (ID 3), rosettes (ID 72), hexagonal cells in VIB.8 (ID 32), and other geometric motifs (ID 7 & 8). One of the compared designs is not geometric; but rather, it is of handprints from VIB.15 (ID 33). None of the motifs used by Meece as comparable geometric forms have a strong resemblance to the rectangular motifs along the lower register in the Volcano/City Plan.

In Meece’s argument, the rectangular shaped figures in the lower register cannot be of houses or the map of a village because this view would be outside the experience of Neolithic peoples. ‘The inhabitants of the site would almost certainly have not understood their village as an exposed horizontal layer (a very archaeological concept!), with their roofs absent and walls partly removed, but rather a conglomeration of different levels’ (Meece 2006, 5). However, I would argue that little imagination would be necessary for Neolithic peoples to see buildings as they are depicted in VII.14, in section from a bird’s eye view. Neolithic peoples entered and exited their homes through ladders leading to the roof and spent time on top of the building. Also, as a regular practice, houses at Çatalhöyük were ‘abandoned’ or closed. Buildings were reduced to their footprint by a process of toppling the roof and upper walls, truncating all but the lower portion of the house walls. The negative space of the building was then cleaned and filled in with clean soil. New houses then used the remaining lower part of the walls as a base (Hodder 2006, 17). The rectangular motifs depicted in rows along the lower register of the VII.14 painting closely resemble this, the schematic of a floor plan of a house. This most certainly would have been familiar to inhabitants present during house abandonment.

To summarise: findings from this study refute and discount the alternate interpretation of the VII.14 painting by Meece and support Mellaart's interpretation of the 'Volcano/City Plan'. This painting, as well-known as it is, does also illustrate the importance of investigating original artefacts and archival documentation, rather than reproductions.

### *7.2.1.3 An Artist with New Perspective*

The 'Volcano/City Plan' is contemporary with other paintings, and together with them makes up a trio of landscapes which are part of an expansion and diversification in the content of painting types in level VII. After the Early period, 12 new types of elements and motifs come in during the Middle levels (Table 5.7). Of these, the most unusual are compositions that pioneer a sense of perspective with the placement of the figures. Mellaart (1967) and Todd (1976) labelled these image types as 'landscapes' and 'architecture', with that classification retained in this typology.

As seen in Figure 7.13, a detail of the Level VII GIS map, typology evidence shows two other landscape scenes in close proximity to one another in the same building, just a few houses to the southwest of the Volcano/City Plan. The first image Mellaart termed the 'Tree of Life', with the tree and dotted leaves, grazing animals, and pairs of 'footprints', finger dots trailing away from the image (ID 25e). The other landscape composition is rendered with animals in a similar placement to the first, within the foliage of the tree and down below, as if looking at grazing animals in a field (ID 25d).

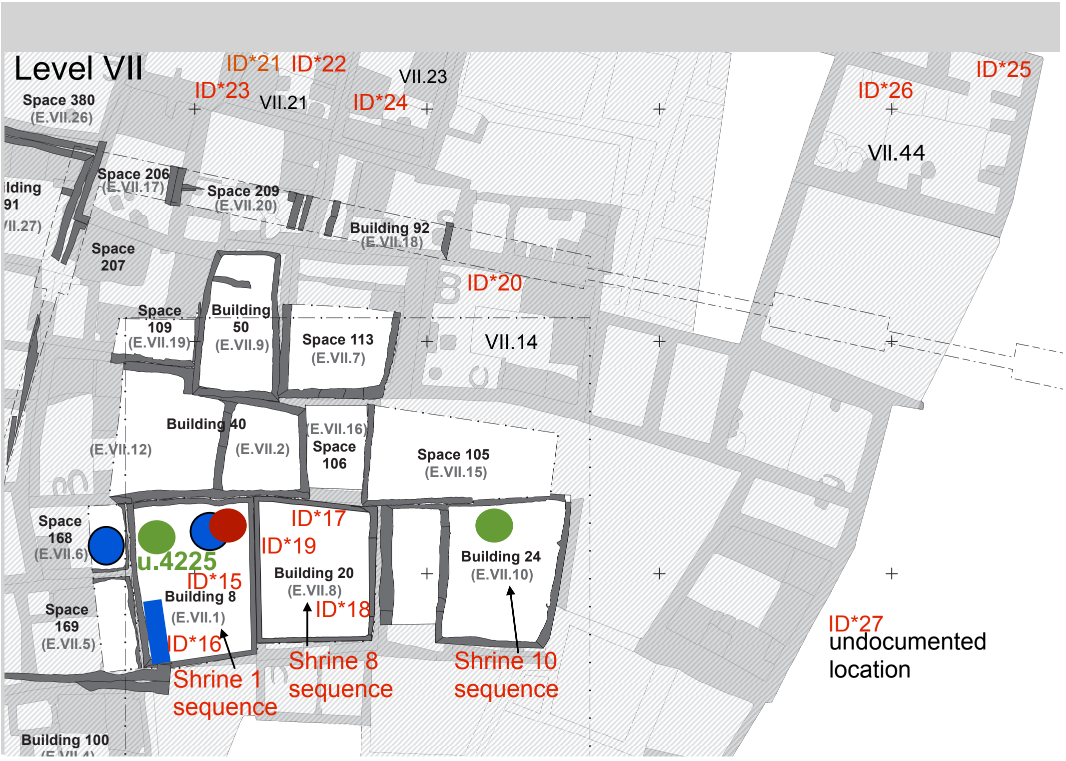



*Figure 7.58 Level VII map detail showing the proximity of paintings by an individual artist in ID 20 and ID 25.*

Stylistically, the two landscapes show radical differences indicating that they were painted by different hands. The first image has thick lines on the tree trunk and branches, the same width as finger dots of the leaves and animal tracks in the composition, indicating those figures were painted with fingertips rather than a brush. The second image is rendered in a more angular, less painterly style; the tree and branches are rendered in thin lines, branches angled down, rather than up as in the first.

The strongest evidence that the two artists of these different images were aware of each other, with the second landscape imitating the first, is their placement. They are in the same house. The ‘Tree of Life’ design is in the north alcove (ID 25f) and the second landscape (ID 25d) is a relatively smaller version of the idea painted under the comparatively large, raised relief of leopards in building 44, level VII.

#### *7.2.1.3.1 Evidence for an Individual Artist*

Further examination of style and technique uncovers strong evidence of an individual artist being responsible for two paintings in level VII. The content, style, and technique of the ‘Volcano/City Plan’ (ID 20) and the Tree of Life (ID 25e-h) show strong similarities. The content shows both to have the perspective of the wider landscape. The style is similar, with rounded, rather than angular figures in both compositions. The rounded edges indicate being rendered with fingers rather than the brush.

The technique in both paintings has key elements of design rendered with finger dots. In the Tree of Life, dots render foliage on the tree and pairs of dots from the right of the tree and on to the adjacent wall. Further proof that the same ‘tool’, the finger, painted the elements of the tree, leaves, and trail of dots, is that the width of the line on all the elements is the same as the diameter of the finger dots; this similarity in width of drawn line and finger dot diameter is also seen in the ‘Volcano/City Plan’, where the same width of finger was used to paint the volcano figure and make dots. It can be interpreted that the artist’s technique involved using finger dots to indicate foliage in both designs: leaves on the branches of the ‘Tree of Life’ and trees within the volcano figure.

Furthermore: In both paintings, there is a narrative, even theatrical, character to the paintings played out by the minor lines and elements in the composition. The Tree of Life not only has the tree and animals in place, but also a trail leading away, turning the corner, and carrying on to the adjacent wall. One can imagine the artisan as they paint, telling the story of the animals as they search for food, marching and leaving a trail of pairs of dots that twist and turn, then lead up to the tree, where they can graze. In the ‘Volcano/City Plan’ lines show a trail leading along the base of the mountain, perhaps the trail travelled by the person on the mountain, with streaks coming out of the peak, showing that this mountain once exploded with plumes of smoke and fire, and a story of how the explorer came from ‘over there’ with a few finger dots punctuating the tale as the painter told it. The significant similarities between the two paintings in VII.14 and VII.44 indicate the two paintings are by the same, individual artist.

Between levels VIII and VII there is an expansion of what people display in their wall art from the Early levels, from a single subject/motif/geometric design to scenes with multiple figures, to ones which have perspective in landscape and utilise storytelling in painted scenes. The most significant departure from previous paintings is that of the ‘Volcano/City Plan’ as it renders a distant place in the landscape, Hasan Dağı, and for the first time in the canon of painting at Çatalhöyük, we see a person in relation to the landscape. This image and the group of two other landscape paintings show a widening of perspective in painting content. Level VII ushers in a period of innovative and unique wall art content which carries on into level VI with several new types of composition, discussed in the next section.

### 7.2.2 Level VIB

Level VIB is the most prolific in terms of wall art, with a total of 21 paintings; 12 painted walls are from nine buildings in the South Area and nine painted walls in six buildings in the North Area.

Continuity of content continues into level VIB as seen in Table 5.1. Geometric motifs continue on in VIB, with crosses and rosettes, lozenges, triangles, and textile patterns. Also, from the preceding level, string patterns (ID 39a, 44a, 48) and handprints (ID 32, 33, 42, 47) recur.

Paintings suggestive of textiles continue in level VI, but with a variation in patterns. Rather than the concentric lozenges seen before in VII (ID 15), in level VI they are diagonal lines as seen in ID 28, 29, ID 39b. Motifs of crosses and flowers, referred to as fertility symbols by Mellaart (1967, 155), recur in the textile designs found on the north and east walls in the Shrine 1 sequence, in VIB level (ID 28 and 29).

Innovative content in the group of botanically themed paintings is exemplified by a painting in Building 8. It exhibits singular content, with a ‘structure’ that is aptly described by Mellaart (1967) as a ‘honeycomb’ in red (ID 32a-c). Within the ‘cells’ of the honeycomb are small white figures which Mellaart asserts are stylized flowers and insect motifs, potentially showing the life cycle of a chrysalis (see ID 32c and d). In his description, the stylized flowers are the crosses with circles in their apex, and the insects are ‘S’ shapes with streaks that Mellaart sees as wings on a caterpillar. This painting is of a unique type and has no counterpart in the other artworks on-site. It has its own group, labelled ‘honeycomb’ in Table 4.2.

One of the most notable recent finds is the relief of a mask from the North Area (ID 40). This mask is unlike any other wall art yet discovered. As with the splayed figures, the question arises: is the face human or animal – zoomorphic, or anthropomorphic? To examine this, we will first put the mask into context with other wall art reliefs of this period, then re-examine the evidence of the mask.

### *7.2.2.1 Splayed Figures*

At levels VII and VI we see a type of raised relief that is new and only occurs in these levels. These reliefs are of splayed figures with arms and legs perpendicular to the torso, often with upturned hands and feet. In the Middle period, there are eight walls with splayed figures. Earlier examples in level VII are in pairs (ID 16 and 27) or appear as a single figure in the case of building 23 (ID 24). Later, in level VI, the reliefs occur as single figures (ID 34-36, 38, 50), whilst in level VIB, the figure was used in a 'shrine' in building VIB.31 as a tribute, with splayed figure reliefs on three of the four walls (ID 34-36). Painting on the other examples of these figures is less common, with only hands or feet painted red in three examples from VII, (ID 27; Mellaart 1962, 49), VIB.31 (ID 35), and VIB.45 (ID 36) (Mellaart 1964, 45).

Building 23 shows an example of an exceptional painting with net-like patterns across the design, a row of concentric lozenges down the centre of the figure, and concentric circles around the belly button (ID 24, Figure 7.14a). As may be relevant in looking at the mask in the next section, upon excavation of splayed figures, the heads and 'hands' of these figures were found to have been removed, presumably on abandonment of the house.

The first interpretation of these figures is by Mellaart (1967, 113; 1989, 46), who claims they are 'goddess' figures.  However, in light of later excavations, Hodder (2006) asserts that the splayed figures are more likely connected to zoomorphic forms. This interpretation is supported by evidence of a complete stamp seal found in 2005 with a silhouette identical to that of the splayed figure (Figure 7.14b). Unlike the splayed figures, the stamp seal had head and ears intact. With the shape of the ears and muzzle on the complete stamp seal its resemblance to the reliefs is clear, Hodder reads the most likely interpretation of both to be a bear (Hodder, 2006, 2011).


a b

*Figure 7.59 a) Splayed figure relief, ID 24 in the ÇPID, Appendix I. b) Stamp seal. Photograph source: http://www.catalhoyuk.com/images/archive_rep05/002_Figure.jpg.*

This research supports the reading of the splayed figures as a bear. In examining the archaeological record, the faunal evidence confirms contact with bears at Çatalhöyük, most notably at level VII in which the splayed figures begin to occur. In total, there are over 100 entries for the Ursus genus in the faunal database; most of the units listed have a single find of a tooth, a metacarpal, or a metatarsal bone attributed to Ursus. These are often in a midden or contexts that are not attributed to a specific building (http://www.catalhoyuk.com/database/catal/ accessed 20 August 2015). The most substantial evidence for bear bones *in situ*, however, is from the Mellaart Shrine 10 (Hodder building 24), where a full paw was found near the North end of the west wall. The description of the unit indicates that the claw was previously plastered in a wall installation:

> The cluster contains the fingers of a bear. Bones that belong to the palm are missing. There are cut marks on the lowest set of bones, giving the evidence that the claw could have belonged to a bear hide, the palm being cut off like the rest of the bones except the skull. But unfortunately, there is only one claw found in the deposit so we cannot say this for sure. The position of the claw was quite interesting. All bones were articulated. The claws were peculiarly tipped backwards, on top of the middle bones and the middle bones were lying over the lowest bones.

> Between the lower bones, plaster stuck on them came out and this may be that the bear hide was hanging down from a wall. (http://www.catalhoyuk.com/database/catal/UnitSheet.asp; unit 3603 entry accessed 20 August 2015)

As we see on Figure 4.8, the building from which the plastered bear claw comes at level VII.10 is in close proximity to the buildings with splayed figure reliefs. In fact, the plaster-covered bear claw was in the building between the reliefs of the splayed figures at ID 16 to the east, and below the reliefs in the overlying, later level in VI.31, IDs 34, 35, and 36, to the west. Thus, the faunal record evidence confirms that bears were part of the life experience at this level when splayed figures were made.

Additional evidence that the figures are not goddesses or human comes from the record of the paintings, where it can be seen that they have red outlines on their paws. Mellaart notes this in three examples of splayed figures from level VII (ID 27; Mellaart 1962, 49) and from VIB.45 (ID 36) and VIB.31 (ID 35; Mellaart 1964, 45). These red paw outlines are also seen in examples of the feline ‘leopard’ reliefs, and this lends weight to the interpretation that the figures are of a dangerous animal with bloodied paws.

Given the evidence, these splayed figures are most likely reliefs of bears and connected to interactions with them, leading to the procurement of a bear claw installed in the wall in a neighbouring house. This group of bear reliefs indicate a connection between households which decorated their walls with this figure, and, as we shall see in the next section, to households in the North area.

#### *7.2.2.2 Level VIB Behind the Mask: Animal or Human?*

Returning now to the question about the mask: the most recently excavated plaster relief from North Area, level G is of a face with obsidian fragments as eyes, a slightly protruding form for a nose and painted lines outlining and transecting the face (ID 40). The obsidian eyes from the mask were sourced from East Gollü Dag (Doyle 2015, 282-3). This is the only case so far of the installation of a mask as wall art.

In the archive report from last season, the ÇRP team put forward an interpretation of the relief as a human face. Based on evidence from other reliefs and sculptures in the Near East, ÇRP researchers Meskell and Der (ÇRP Archive Report 2015, 285) put forward in the Archive Report the interpretation that it is most likely a human face, but leave scope for zoomorphic or hybrid species interpretations. However, looking closely at the canon of wall art from within Çatalhöyük, we see the evidence is stronger for the mask being related to an animal figure.

In fact, it is more likely to be of an animal face belonging to one of the splayed figure bear reliefs. The mask would fit well within the decoration, dimensions, and shape for the bear reliefs. The face has lines painted on it, much like the net-like design painted over the bear relief in building 23 (ID 24). Mellaart does not report exact dimensions for all figures, but the height of the VIA.8 figure (ID 50) is 1.10m, with the head being 30-40% of the total height of the figure (Mellaart 1963, Pl. IXa). The mask matches this dimension in height at 40cm, and it has the same triangular shape as the silhouette of the head of intact remains of bear figures in VIB.31, (ID 35) and VI.45 (ID 36).

At Çatalhöyük, there is also evidence that people removed painted plaster fragments for the purpose of curating and re-using them. The practice began in the first cross painting in the Early levels, with more examples of it in Late levels. Human skulls were known to be kept as part of the ancestor worship – such as the plastered and painted skull buried with a woman in building 42, and the female and juvenile skulls placed as house abandonment offerings in Building 3 (Hodder 2006, 210).

It is quite possible the heads of the bear reliefs were seen as valuable in a similar way and kept and re-used as offerings in newer houses. Therefore, the curation and re-use practices of Neolithic peoples and history of painting and wall art practice up to this level at Çatalhöyük strongly suggest that the mask in the North area building 132 is not a human face but was a procured head from one of the bear reliefs from the South. The clinching evidence for this would be to reunite the mask artefact with detached splayed figure reliefs in the Museum of Anatolian Civilizations in Ankara. If that were not possible, precisely measured and scaled archival photographs may indicate if the mask fit within the missing head piece of the bear figures.

### 7.2.3 Level VIA

As in the other Transition levels, wall art is prolific in VIA. As seen in the overall results in Table 4.3, the count of nine paintings in the South Area puts it in the high range for frequency of paintings in a given level. Complexity rises, with Compound motifs more prevalent than in other Transitional levels, comprising almost half of the total. Nearly all these have geometric content. Anthropomorphic forms rise to approximately half of paintings in this group. Zoomorphic motifs are reduced here, occurring in only two paintings; this is less than 10% of the content, compared with almost 25% in level VIB.

The majority of the content in VIA recurs from previous levels, showing stronger continuity and less innovation than previous Middle levels. Handprints continue in VIA with three examples of graffiti-style, positive prints; the range of paintings of this type is examined in the next section. Other paintings rendered in a spontaneous manner are the amorphous, curved shapes in building 80 (ID 46a), which are difficult to classify. More geometric motifs continuing here from previous levels are full wall, skilfully composed textile patterns as in ID 51. Zoomorphic content that carries on in this level comprises an additional bear relief and bovine cut-out. Additional examples of brick patterns and string paintings are also found here as part of the group of paintings connected to architecture. This architectural group, including paintings made with string, continues from level VII and into VIB and VIA, and is discussed in the following section.

#### *7.2.3.1 More Botanical Themes*

Botanical themes continue into level VIA. The cross is a central motif in the red and black textile design in VIA.50, ID 51. These crosses echo the form of the cross and rosette motifs which appear in the Early level examples, as in the first painting fragment under level X (ID 1) and in a full wall design (ID 7) – demonstrating a strong continuity of form and practice from the Early levels through the end of the Middle period.

Geometric forms that connect to textile patterns continue on from the Early period. Level VI has the most paintings of the textile type, with a total of six (IDs 15, 28, 29, 31, 39, 42).

#### *7.2.3.2 New Content: Phallic Reliefs*

Two new designs occur in VIA; the first is figures of individual humans not relating to animals (ID 54a). The second is two examples of cut-outs, or sunk reliefs, painted red, cut in phallic shapes (ID 56, 66). The phallic cut-outs are the first overt references to the penis. One of the red cut-outs shows a horizontal orientation, parallel to the floor (ID 66), the other shows a diagonal, erect shape from the floor from the left rising to the right (ID 56). One of the phallic cut-outs was photographed by Todd during the first phase of excavation, but he did not interpret the sunken relief figure as phallic, later claiming 'sexual scenes and portrayal of the male genitalia are notably absent' at Çatalhöyük (Todd 1976, 45).

Mellaart (1967, 101) also noted that male genitalia were not portrayed in paintings and claimed the 'impressive exponent of male fertility' was in the display of animals such as bulls and rams. In contrast, without mention of the phallic the cut-outs, Hodder and Meskell (2011) assert that despite the absence in overt imagery, the Anatolian Neolithic culture was phallocentric. The supporting evidence for their theory concerning Çatalhöyük is based upon the use of plastered horn bucrania throughout the levels and images of bulls in hunting scenes. The bucrania are not, by definition, phallic in shape, being wider than they are long. However, the authors maintain it is the horns that are masculine, sharp, and phallic in form. The bull imagery may indicate a focus on the masculine; however the compositions only occur in the latest levels of occupation, levels V through III, and therefore they are not useful cultural indications of phallocentrism throughout the Neolithic occupation.

The evidence in this research does bring forward additional examples of phallic wall art that support a focus on the phallus in two households. However, the term phallocentric may not apply given what we observe from a full review of the corpus of paintings and reliefs. The range of content throughout the Middle levels and indeed throughout the occupation indicates numerous groups of paintings by peoples with a variety of foci.

### *7.2.3.3 Handprint Paintings: Variations on a Theme*

The earliest and most prevalent single motif in paintings in the Middle levels is handprints. More than any other group, handprints display a variety of forms and levels of painterly skill. The eight paintings are an excellent example of the same motif having a diversity of expression, from simple to elaborate, from quick, impromptu graffiti to more time-consuming, painterly, skilled compositions. There are two basic handprint types: positive prints which are painted with the flat palm of the hand, and negative prints which painted around the hand. We have single positive handprints such as ID 52 and 63 and the latest evidence on a platform surface in Building 80 (ID 54a). The single handprint often appears as an impromptu addition – a graffito – to another painting, such as the hand in the left-hand corner of the textile design in VIA.50 (ID 51). These appear as spontaneous paintings as opposed to compositions. More intentional hand placements are seen in the North Area in a row of neatly applied right hands with fingers pointing right; this example has handprints by the same hand in the same orientation in ID 47a.

Negative handprints seem to be drawings of hands. Or rather, they are schematics of hands. By schematic, it is meant that these are simplified and possibly symbolic, but undoubtedly not direct impressions of hands. For example, looking at the row of hands in a horizontal orientation, fingers pointing left, along the platform in Building 49, we see hands that look as if they were painted to mimic the row of hands in the neighbouring house in building 77 (ID 47a), but with the shape formed by painting the negative space around the hand (ID 42). The fingers are sausage-like, wide and without tapering or shape, tracing a wide, cartoonish outline of a hand appearing more like the painting OF a hand, rather than the painting WITH a hand. The negative, schematic, hands occur in the South area as well with fingers pointing upward in rows of hands along the floor under the painting in ID 32a-b. These schematic handprint paintings signal social relations even more overtly by mimicking other paintings.

Rows of handprints demonstrate more time taken in planning and composition. In a full wall design of this in VIB.15, rows of upturned hands are painted along the wall.

There are at least 57 schematic hands on this wall, according to excavation reports. In the colour plate from Mellaart *et al* 1989, the background appears blue-black, with the hands in negative space (ID 33). Neatly round circles are painted within each palm, rather than the natural irregular shape. These hands may be symbolic of individual people. Or perhaps these are designs repeated from earlier phases – reproductions, traced from underlying earlier phases of painting. As with copies, the form and detail are lost, but they are harkening back to the previous generation painting with a copy.

#### *7.2.3.4 String Theory*

In the Shrine 8 sequence at level VII, building 8 (ID 19), there is a remarkable, intricate and skilled design with handprints of a different quality. The painting consists of two horizontal rows of alternating red and black handprints. Right hands are in red, left hands are in black, and the negative space in the palms has a dot. This is the only known case of a polychrome handprint design. Between the hands are elaborate patterns of red strings in a cat's cradle.

This most complex composition tells a story of connection to other technologies. We know that the use of strings is implicit in several Neolithic technologies, such as bead and textile making. Another use of strings may have been as a tool for measurement and laying out living spaces in architecture. The hands and strings in this painting, in which there is an overt display of the tactile use of them, draws our attention to the pragmatic skills of the inhabitants of Çatalhöyük in making crafts and architecture. The content of this painting may serve to connect and show, perhaps even pay homage, to these skills. Whatever the intention is of the hand paintings group, the planning and display of a full wall design such as we see in VIB.15 and VIII.8 and the social connection of copied designs demonstrates that the sense of identity expressed in handprints was significant in the symbolism throughout the Middle levels.

This theory of the inclusion of strings as a tool in several technologies as well as paintings is supported by what we see in graffiti type fragments of paintings. In VIB.50, (ID 39a), the red lines are very precise and straight. As anyone who has tried can tell you, drawing or painting a straight line is extraordinarily difficult. These lines appear to be made by a string dipped into paint, pulled taught, and applied to the wall. In building construction even up to today, builders use ‘plumb lines’ in this way. A plumb line is a string saturated with coloured chalk that is applied to the wall in a straight, level line, and then plucked to mark the line on the wall. We also know that at Çatalhöyük, people used textiles to apply pigments with cases of red textiles dipped in paint and applied to skulls in burials (Mellaart 1963, 5, Pl. XXV*a*).

Therefore, the straight lines in the painting fragment from ID 39a indicate that they were made with a string in a plumb line rather than painted free hand. The design is fragmentary, but may have been a part of something more, such as we see in VII.8. When viewed as a whole, a coherent group of string paintings is formed from the complete design of VII.8 (ID 19) and fragments of string paintings in IDs 39a, 44, 48, and 57a. This group further connects and relates the content of paintings to day-to-day life on-site with other technologies such as beads, textiles, and architecture.

Connections of painting designs to building construction are also seen in one of the most recently excavated full wall paintings with a brick pattern in building 80 (ID 55) in the South Area and in the North Area building 49 (ID53b). Again, in isolation, these designs may be loosely linked to architecture, but seen in context of the other evidence of similar designs found in Middle period buildings in the 1960s, a pattern of regular use of the motif emerges in houses in VIB.50 (ID 39b) and VIA.50 (ID 42). In conjunction with the other architectural painting showing rows of buildings in a city plan in level VII.14, the link from painting to architecture strengthens. Through the examination of the contemporary paintings in the Middle levels, a strong connection between paintings and architecture is seen in groups which include images with strings, bricks, and the city plan.

### *7.2.3.5 Level VI Continuity*

Moving from the Early to the Middle levels, we continue to observe the superimposition of buildings with similar wall art content. This is seen with both the cut-outs and the animal reliefs. The early, black animal sunken relief in level IX.8 is repeated on the north walls in the same position in the successive buildings, IX.8 (ID 4), VII. 8 (ID 17), and VI.8 (undocumented; Mellaart 1964, 70).

This practice is also seen in case of the feline figure reliefs. The second pair of felines found on-site is located the north wall of VII.44. These appear in silhouette, with heads modelled to appear facing into the room. The only other pair of feline reliefs is found directly above these, again, on the north wall. (See ID 37 for a coloured image of this pair with black rosette spots and red, bloodied paws (Mellaart 1967, Pl. VI)).

## 7.3 Summary

Middle level painting sees a marked increase in complexity in the types of forms and motifs identified in Table 5.6. Complexity is demonstrated with an analysis of painting motifs and forms in Table 5.8, which shows a marked increase in Compound compositions that do not fit neatly into the Simple typology. Paintings with content that would be straightforward to classify in a Simple type – geometric, anthropomorphic, zoomorphic – are fewer in these levels. More content is made up of zoomorphic and anthropomorphic content than in the Early levels, with 12 paintings with human forms up from 1 in the Early period and 15 animal forms up from 3 in the preceding period. Levels VII and VI are the most prolific in wall art by far, with the highest number of paintings in VIB.

Continuity from the Early levels into the Middle levels is demonstrated in this chapter. As with the Early levels, geometric forms are the most prevalent type of painting in the Transition period. This chapter also establishes that paintings with geometric forms continue to convey connections to textiles and botanical life. The continuation of forms – especially of botanical themes and animal reliefs – continues through to the end of the Middle levels.

Innovation in materials and technology is demonstrated through the pigment palette expansion from the use of common colourants in prehistory to include malachite and azurite. Section 7.1 demonstrates that azurite was used not only *in vivo* as a cosmetic and burials as a prestige good but was also experimented with in wall painting.

Handprint designs with a range from spontaneous prints to compositions with painterly skill were discussed. The handprint designs connect painting to other technologies with the use of strings. This design, viewed together with other paintings of strings, bricks, and buildings, connects paintings to the built environment and the technology of architecture in general. The proliferation of handprints at these levels, as well as the increased depictions of humans, confirms the assertion made by Stordeur (2010) and Hodder (2011a) that awareness of identity and individuality change and increase in the Neolithic. Moreover, detailed typology in this research pinpoints this shift as occurring in the Middle levels, between VII and VI at Çatalhöyük.

In the Middle levels, geometric forms begin to connect to architecture as seen in paintings of motifs of houses in a city plan, brick-like designs, and string paintings. These innovations in painting content are seen beginning with the bird's eye view of houses in VII.14, continuing with the newly excavated brick paintings in building 80 (ID 55), and string paintings from Level VIA.

Innovation in painting groups is seen in twelve new painting and relief types in VII and VI. Reliefs and cut-outs have unique content in VII and VI, not seen in earlier levels. Investigation of archaeological data demonstrated the likelihood of a strong association of splayed figures with the faunal remains of bears. This confirms the position taken by Hodder (2006) and Russell and Meece (2005) that the splayed figures are zoomorphic in type, rather than Mellaart's 'goddess' interpretation. Furthermore, after examination of contemporary archaeological and wall art evidence, the recently excavated face mask appears to be more closely associated with animal rather than human interpretations. This mask is most likely to be the face of one of the reliefs of a bear removed from the South area and re-installed in the North.

In this chapter, we also examined sunken reliefs -- phallic in shape and painted red – as the only overtly phallic references in wall art content. The red cut-out content confirms the position of Hodder and Meskell (2011) that wall art at Çatalhöyük is phallic in nature, although these were not examples cited in their case. The review of the considerable range of content at these levels refutes that the phallocentric theme is as paramount in house decoration as those authors insist.

The other contested figure in wall art, that of a blue cow cut-out in VII.1, is confirmed with secondary evidence by both Mellaart and Todd and findings of blue pigments in nearby burials contemporary to the painting. This refutes the position taken by Çamurcuoğlu (2012; 2013) that blue colourants were not used in wall paintings.

As we saw in level VII paintings, a new perspective came in with a map and landscapes. New evidence of a human figure in the VII.14 'Volcano/City plan' composition and a review of archaeological data and contemporary painting strongly supported the reading of the image as a map and landscape and refuted the argument put forward by Meece (2006). Also, an identification of a specific artist at this level was proven as well as is achievable from existing documentary photographs, given the original murals were not able to be preserved for direct comparison.

# CHAPTER 8 LATE PERIOD SYNTHESIS

## 8 Introduction

In the last two chapters, we have derived more robust interpretations of wall art through synthesising past and present excavation data and connecting them to the artefact record. Results so far have also established the connection between wall art and other artefacts and day-to-day activities at Çatalhöyük such as bead and textile making, as well as agriculture and architecture. Strong ties of continuity in the content of art have been established in levels X-VI. In this chapter, we examine how paintings practice has new developments in technology and content. By the Late levels, the strong correlation between a higher frequency of art and the longevity of households in history houses is clear.

This chapter focuses on material from the Late levels. In the South area, this period starts from level V at approximately 6,330 cal BC. Paintings and wall art are present up to level II in the South, Team Poznan (TP) area ending 6,180 cal BC. In the North Area, late levels correspond to the date range from 6,450-6,090 cal BC, called level H, and the level is equivalent to V-VI in the South Area. For the spatial analysis in this chapter, see full page maps of these levels with painting findspots in Appendix IV Maps 11-14. For typological analysis, images of wall art at these levels are in the database in Appendix I from ID 58-77.

In this chapter, we will first provide a thorough discussion of the new painting techniques and forms that develop in the final levels of Neolithic occupation at Çatalhöyük. Subsequently we will discuss the remarkable continuity of the painting practice. In particular, we observe motifs that are used continuously throughout the occupation of the site.

Section 8.1 discusses results of pigment findings in the Late levels. Innovations continue, not in the expansion of the palette, but in new techniques for wall decoration that use existing pigments in a new treatment. Section 8.2 examines the new and continuing painting content in each level. In the Later period, a pioneering style of 'hunting' narrative scene is introduced, with unique skill in rendering naturalised humans and animals. These comprise of 40% of the 20 painted walls at these levels. Overall, though, this period is characterized by less investment in painted house decoration and a change in wall art with the introduction of tomb architecture and decoration.

Results of the typological analysis are presented in the sections per level with a summary at the end of the chapter.

## 8.1 Late Level Pigments

Pigments in the Late levels undergo fewer new developments. The pigment palette reduces in scope to the common pigments of red and yellow ochre, carbon blacks, and calcium-based whites. Of the rare pigments that come from greater distances, we see no occurrences of the malachite or azurite from Cappadocia. Only one case of the use of cinnabar can be inferred from Mellaart's excavations.[34] During this time, expansion of the range of artists' materials and displaying them in painting is not as prolific as it was in the Early and Middle periods.

The practice of colourants in burials becomes less frequent in the late levels V-II. Fewer red burials occur at this time and no blue or green pigments are in use. Known evidence shows that only four of the twenty-one red ochre burials occur in levels V-III (Mellaart 1965, 18) with no occurrences from II-0. Noteworthy examples are a red ochre burial of a child reported by Mellaart (1967, 207) in E.IV.8, and, in one case of a secondary burial in III.1, a cloth was saturated with paint and applied to a skull, leaving a faint impression of the textile and a distinct line of the cloth's edge (Mellaart 1963, 5, Pl. XXV*a*). Therefore, colourants play a lesser role in mortuary practices in the Late levels.

Materials analysis in Chapter 3 investigated a new technique, possibly a reuse of ochre colourants. Red ochre mixed with a gypsum and calcium based mudplaster made a pink-coloured wall and floor plaster in a building attributed to Levels V-IV in the Istanbul team excavation area. Either the mixture to make a new kind of wall plaster from fresh ground pigment was intended from the start, or, more interestingly,

[34] Mellaart (1965b, 183) and Todd (1976, 42) both report the fugitive red pigment, turning from red to grey, in their accounts of a few of the human figures in the Hunting Shrine in F.V.1.

this might be a case of reuse of an existing wall plaster with a painting that was removed from a potentially significant wall or building, then powdered and formed a mixture for wall plaster. However, the pink plaster came about, it shows a novel use of colourants in wall decoration and continued innovation with pigments at this time.

The lack of deposition of copper-based pigments and native copper show that either access to the source of them has changed, the source is cut off, or depositing them in burials is no longer in practice. The sourcing of materials from the landscape does change at this time. We know this from the obsidian evidence. Carter *et al* (2011) show that cores and blades found in level V onward are sourced from further east than before. Therefore, landscape exploration continues, but does not include the procurement and trade of colourants and copper artefacts as before.

The disconnect between landscape and paintings seen in artists' materials is echoed in the content of what people are choosing to display in painting; there is a lack of content in the Late levels that refers to the landscape or has the wide scope of perspective that we saw in the Middle Levels, thus pointing again to a lost link between art and landscape exploration.

## 8.2 Late Level Paintings

### 8.2.1 Level V

The five painted walls in this level in the South Area come from a single building from Mellaart's phase of excavation. It is one of two 'hunting shrines' in level V and III that are painted on all four walls and even the floor (ID 62) with dynamic, narrative hunting scenes that are considered to be the 'classic' images of Çatalhöyük. These paintings show an unprecedented level of skill in rendering naturalized animal and human figures. In these paintings we see human figures interacting with large animals such as bulls, stags, and boars. An interesting case is the large bull that dominates the north wall of the 'hunting shrine' of building 1, surrounded by people, with stags in the foreground and people with bows. The animals are surrounded with groups of people pulling tails and raising net traps (ID 61). For the first time, birds are represented in a naturalised manner in the hunting scene (ID 60) rather than painted in the schematic vulture type.

A finding of this study is that the hunting shrines connect to zoomorphic-focused content from the Middle levels in a cluster of hunting-focused wall art. The hunting scenes of the Late levels are an extension of the same interest in hunting and focus on animal life shown by the previous generation. In level VIB, recall the 'shrine' with three of the four walls of splayed/bear figures appearing just to the north. We see from more recent evidence in the artefact record and with a closer look at the faunal artefact evidence, that the splayed figures are in fact not Mellaart's anthropomorphic 'goddess' figures, but bears depicted as dangerous animals with bloodied paws, as seen in the last chapter. The location of the hunting shrine of Level V is just to the south of the VIB.31 Bear Shrine and just under the building with hunting scenes in Level III. Potentially this neighbourhood, or quarter, is the locus of peoples with interests centred upon the fauna of the site, a hunting quarter.

### 8.2.2 Level IV

Four paintings occur at this level, including one geometric painting and one anthropomorphic painting in the South area and the rest in North level H.

Innovation in representation of the human form occurs. The human in IV.1 uniquely has a more feminine voluminous shape as opposed to the slender stick-like figures that are commonly used. Also unique is the colour of this figure; it is rendered in white – rather than the usual red (ID 61b, 68a-b) or black (ID 61c). The use of all white for a human figure is unique to this example; the only other instance of white used in human representation is the half-red half-white figure on top of the back of the bull in the level V shrine (ID 58 a-b).

Recurring forms at this level from the North area are faint remnants of handprints (ID 63). These are the latest recorded handprints in the chronology. They appear to be an example of a spontaneous, positive handprint design, rather than the composed designs we see in some cases in earlier levels.[35]

Continuity in the South Area is seen with another red, painted phallic cut-out (ID 66). It is clearly influenced by the preceding example of this type from VIA, with the exception that it is oriented in a horizontal line, rather than the diagonal, 'erect' form in VIA (ID 56).

The evidence of painted designs in the North area is fragmentary with low legibility, but a unique geometric form can be made out from the remnants (ID 64).

### 8.2.3 Level III-II

New innovations continue to come in to painting practice at the latest levels. As the Master Summary Table 5.1 shows, Level III in the South has nine paintings from the Mellaart phase of excavation (ID 67-73), with another four paintings in the more recently excavated TP area (ID 77). Another 'hunting shrine' at this level (ID 67-69) increases the frequency of compound anthro- and zoomorphic types to nearly a third of paintings content, with three of the eleven paintings. Geometric forms make up over half, with six of the total and four zoomorphic types.

[35] Examples are rows of positive prints in level VII (ID 19) or rows of schematic handprints in South VIB (ID 32a, ID 33) and North VIB, G (ID 42).

The first significant Level III development is related to changes in architecture. For the first time, we see burial chambers, like tombs, rather than the sub-floor burials under platforms in previous levels. Two burial chambers that have been excavated so far in the recent TP area show walls decorated with unique content. The first is a scroll pattern that is incised, rather than painted, into the plaster (ID 75). The second is a textile-like design, rendered in white on a buff-coloured background (ID 74). It is similar in form to textile designs in the late levels in III.8 (ID 70), however the context of the tomb and the colour of white rather than the higher contrast of red, are new practices. This use of white on buff is used again in the last painting in the chronology, the relatively contemporary building excavated in the TP area, B. 122 (ID 77).

### *8.2.3.1 Botanical Themes*

Remarkably, we see a continuity of form and practice in levels III and II with those of the earliest occupation levels. The similarity that persists from the Early levels are the rosette and textile-like designs. Full-wall compositions that are botanical in theme recur here as they did in level VIII.14 (ID 7). This late example features recurrent rows of the form of the rosette in III.8 (ID 72a-c).

### *8.2.3.2 Continuity – Heirloom Fragments*

This research shows that the Neolithic peoples' removal of a fragment of painted plaster for house deposits in the first painting in level X is not an isolated event, but a regular occurrence. This curation of paintings to use in the subsequent generation of a household began with the first painting in the chronology and continues to the final levels. Note, for example, that the first painting on-site the fragment with a rosette was curated from a previous building and buried under the grain storage under X.1.

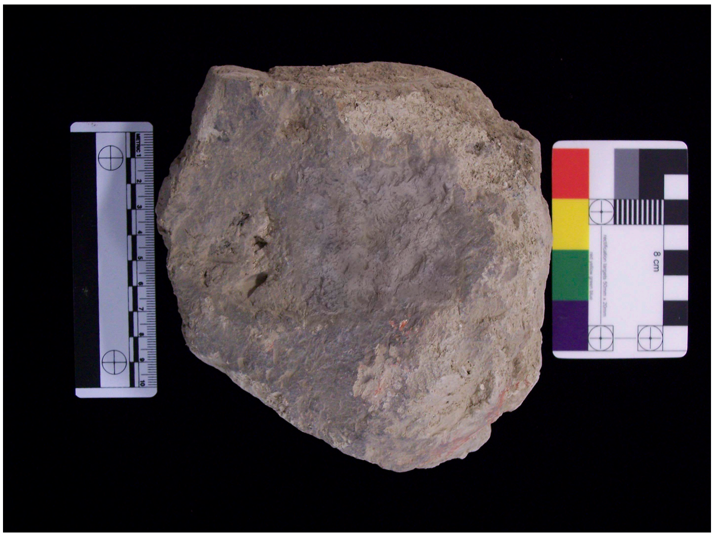


*Figure 8.60 Building 96 heirloom fragment.*

In the Middle levels, we found another curated fragment painted with cinnabar (that degraded to grey-black surface colour) in B. 96 (Figure 8.1). In the latest levels is a fragment with a human figure painted on it (ID 76). The painted fragment is not placed as a house deposit, like the others, but removed from another composition and placed in the burial chamber in B.72 in the new form of tomb in Level III. Using paintings as a form of 'heirloom' shows one more way in which the peoples of Çatalhöyük valued their connection to past generations.

Heirloom painting fragments from each level indicate two things: 1) continuity of practice, 2) foci of Neolithic peoples. Curating is a choice made by the curator of the fragment. Cutting through the thick plaster layers to remove fragments, especially with the blades and knives available at the time, took a significant amount of effort (the author can attest to this, having done this first-hand on-site with modern tools). By the person or people of a household intentionally choosing that particular fragment for use as a house deposit or burial good, they signalled the increased significance of the painting and increased focus on its content.

Looking at the three examples from the three periods, we can see how their choice emphasized the character of each period. In the Early Period, the curated fragment is of a rosette under X.1 which resembles the centre of a crucifer bloom. As previously discussed, the pioneering population at the foundational levels of Çatalhöyük benefit from the focus and emphasis on the strong connection to botanicals and fecundity. In the Middle period, the fragment used as a house deposit in B. 96 has the unique red cinnabar from far reaches in the landscape. As seen in Chapter 5, the paintings and pigments of this period show exploration of greater distances in Anatolia. Therefore, the choice to curate a painted fragment shows a value of the rare and exotic colouring materials from the further reaches of the landscape, rather than of a particular motif. And now in the Late levels, there is the form of a human, most likely a notable ancestor or community member, buried in the tomb of B. 72 (ID 76). This, along with the evidence of the marked increase in anthropomorphic content in the Late levels, indicates what we know to be a greater focus on the people of the site and their identity both as individuals, as seen in the isolated painted heirloom fragment, and as a community, seen in the groups of people working together in hunting scenes of levels V and III.

The continuity of the practice of heirloom paintings highlights the ongoing value of ancestry to draw from and build upon previous generations. This is done in a material sense with curated fragments from the houses of generations past. The pieces of wall paintings are a form of ‘heirloom’ to the next generation, each emphasizing the facet of life valued by the household and the character of the period.

## 8.3 Summary

Innovation continues throughout the period with new motifs in each level, with unprecedented skill in rendering naturalised forms in hunting scenes. The hunting shrines also demonstrate continuity as they are carried on over three households over three periods and a few hundred years in levels V-III.

Typological results show few examples of single humans in paintings; most people are depicted in groups rather than individually. In the late levels, two individual humans are recorded, although these are fragments and may likely have been part of larger compositions. Most of the anthropomorphic content occurs in narrative scenes relating to animals, but in different ways in each period. For instance, the vulture paintings of the Early and Middle periods show humans with vultures in scenes which are interpreted as mythological in nature. Humans relate to animals in a significantly different manner in the narrative of the hunting scenes of the Late period; in these, humans are seen in a group working collectively.

Anthropomorphic content increases steadily with time, from one depiction of humans in the Early levels, to a quarter of all middle level paintings with human figures, and over half of all Late level motifs. Increases in anthropomorphic paintings signal a newly developed focus on ideas of personhood and how people see their individual identity as well as their relation to the community.

> ‘There is more open space in the levels from VIA onwards, and some evidence of multi-roomed, multifunctional houses. At the same time, the settlement seems to have gradually dispersed after Level V (that is about 6,350 BC) and perhaps decreased in size- the strong sense of social unity and cohesion seems to have broken down to some degree’ Hodder 2006, 101.

Hodder continued to hold and refine this position until more recently in his final excavation volume (see Hodder 2014, 175).

Some discontinuity is evident. Several painting and relief types do not continue into the Late levels. For instance, reliefs of leopards or splayed figures were not found in the South or North areas. However, continuity is also observed. The Late period has strong connections between paintings and other technologies established in the Middle and Early levels. This chapter has already discussed continued history making use of painting fragments as ‘heirlooms’ from the earliest occupation until the latest. Continuity and the botanical–textile–artefact links to paintings are evidenced in the recurrence at the latest levels of full wall designs with botanical themes in III.8 (ID 72), as we saw in Early levels VIII.14 (ID 7). These findings refute the position taken by Czeszewska (2014) that the continuity of Çatalhöyük breaks down in the Late levels.

While these ‘hunting scenes’ are considered typical of a ‘classical’ style of art at Çatalhöyük and used by Hodder and Meskell (2011) as evidence of a ‘phallocentric’ culture focused upon the blood and violence of hunting, one observes that these scenes are not typical of the canon of paintings – far from it. They occur in only two buildings in the levels deposited closer to the end of the occupation. While the compositions are remarkable and of an impressive sophistication of painterly skill, they are not typical or ubiquitous relative to other painting groups such as full wall textile or botanically themed paintings.

The next chapter summarises and concludes the thesis and proposes future work.

# CHAPTER 9 CONCLUSION

## 9.1 Overview

The **primary research** question addressed by this project is: *How can our understanding of the peoples and their culture at Neolithic Çatalhöyük be furthered by the integrated analysis of artists' materials, wall paintings, and archaeology?*

In order to address this question, the different threads of investigation – pigment analysis and painting typology – were undertaken separately, and then brought together in the final chapters to create an integrated picture of how the site developed over a period of ±1,100 years (7,100 to 5,950 cal BC). Chapter 1 presents a survey of previous work on the site and its artefacts, beginning with Mellaart's original excavations from 1961-5, reported in *AS* 1962-6. This highlights a number of relevant issues, such as controversies about iconography and conflicting reports about the use of rare pigments (particularly the blue) on the site. Important questions addressed in later chapters of the thesis include:

1) The interpretation of ambiguous images, such as the famous Volcano painting on Level 7, for which Mellaart and Meece developed conflicting readings, and the designation of certain figures as animal or human.
2) The artefact–painting connection involving the interpretation of geometric motifs connected to botanical life, textiles, and beads.
3) The debate about the domestication of symbols through time.

Chapters 3 and 4 cover the technical study of the pigments used in the paintings, followed by an analysis of the archaeological context and a detailed chronology and spatial examination.

This research is distinguished from prior work in three ways. Firstly, the technical examination is more comprehensive than prior studies. Two new techniques are employed, namely Fourier Transform Infrared Spectroscopy (FT-IR) and X-ray Diffraction (XRD); over fifty samples were analysed with FT-IR and four samples with XRD. And over fifty samples were analysed with X-ray Florescence (XRF), relative to the handful of readings previously published.

Secondly, in prior work, only the primary mineral in each sample was characterised. Here, where available, the other sample constituents were analysed. This more holistic approach to the mineral matrix made it possible to identify components of the sample which might be associated with the geological origin of the mineral or lend evidence to methods of pigment processing, yielding new insights to the blue pigments in particular.

Thirdly, the holistic approach to evidence recognised the significance of the connection of copper-based pigments with copper artefacts on-site. Through including copper artefacts and examining the two together in the chronological and spatial analysis, a deeper understanding was gained of the timeline of artists' materials, both as a class of their own, and in relation to other technologies.

Chapter 5 presents a re-examination of the paintings themselves. It describes the creation of a new comprehensive catalogue with the highest count of documented wall paintings to date (77 in total). This base is then used to analyse the typology of the paintings, and the frequency of the occurrence of the various motifs over time.

In Chapters 6 through 8, the analyses of the pigments and the paintings are synthesised to create a detailed picture of the development of wall painting practice and the role of art. The discussion is divided into the three chronological periods of the site: Early (Levels XII–VIII, 7,100–6,610 cal BC), Middle (levels VII–V, 6,610–6,350 cal BC) and Late (Levels IV–0, 6,350–5,950 cal BC). What emerges is a new holistic understanding of the nature of the culture at each level. Connecting the images to the lived experience of the people as well as to ideology reveals a culture characterised by constant innovation. Overall, the research indicates a gradual expansion of the colour palette and sophistication of imagery from the Early to Middle periods. This expansion reflects a cultural focus on the surrounding landscape and a period of exploration. Then, in the Late period, there is a shift in focus towards life on the site and a reduction in the range of the colour palette, particularly as far as the rare pigments are concerned, indicating a period of cultural contraction.

During the research, a number of original databases and research outputs were generated, and these are presented in the Appendices. They include:

- The Master Tables of Painting Typology and Colourants (Appendix 0).
- The Çatalhöyük Paintings Image Database (ÇPID) ordered chronologically and cross-referenced to maps of findspots and archival source material for each painting (Appendix I).

- The materials analysis archive of results for highest number of archaeological pigment samples with techniques of FT-IR and XRF for all samples and XRD to high-priority blue samples (Appendix II & III).

- GIS maps for each chronological level that are annotated with the findspots of all known paintings and rare artists' materials (Appendix IV).

The following sections present a more detailed listing of specific findings in each of the three main sections: pigment analysis, painting typography and integration.

## 9.2 Pigment Analysis

This part of the research aimed to answer the following sub-questions:

4) What does the technical analysis tell us about how Neolithic peoples at Çatalhöyük used each colour?

5) How did pigment usage change over time?

6) What does pigment trade and sourcing tell us of the Neolithic peoples' relationship to the landscape over time?

### 9.2.1 Blue and Green Pigments

This thesis has conclusively proved that azurite at Çatalhöyük was the first known use of the mineral in human history. This precedes reports of azurite in China in artists' pigment reference literature by nearly 3,000 years, and reports from archaeological sites in Iran and France by approximately 1,000 years. The chronology of the use of blue and green (see Section 4.1) shows that it was used for a relatively punctuated period of time only in the Middle levels.

Blue use was not, as had been previously reported, confined to burials and personal adornment. It was also experimented with in wall paintings. This was discovered by overlapping data from both excavation phases, which validate the now-confirmed blue cow figure in Level VII reported by Mellaart and Todd. Investigation has shown that this coincides with several cases of azurite and malachite in burials in the same house.

Spatial analysis showed that blue and green pigments and copper artefacts cluster in the same stack of a history house over multiple generations. This suggests that these particular 'Copper Households' retained a strong connection to copper materials and technologies and did so over long periods of time, passing down artistic skills and traditions through generations. Thus, the connection to the artists' materials went together with the longevity of history for people of this house.

Materials analysis (see Section 3.2) reveals that the blue pigment, uniquely, was never mixed with other colours by the Neolithic artisans, in contrast to the way that, for example, cinnabar and ochres were. The variation in the hue of blue colourants, which previous research had suggested was due to different particle sizes, was shown by XRD analysis to be the result of the presence of dolomite, known to co-occur, in the original geological mineral. This new evidence suggests that the purity of the blue powder was of significance, and its rarity and exotic colour was highly valued.

The placement of blue on the shoulder of buried people indicates an association with the upper part of the body, as well as what is seen when looking up at the sky. The other element in the environment that was blue was the essential substance water. With this evidence in mind, the most robust interpretation of the use of blue in the Neolithic is that it was associated with the natural phenomena of water and sky, with these seen as divine in nature. Its use would also point to a high reverence for the contexts in which it was used. Blue use in burials with primarily female remains, together with the use in the blue cow figure, indicates a cultural association of the colour with the feminine. Putting all the evidence together therefore indicates a symbolic association of blue with two powerful natural phenomena: the feminine and the divine.

As for landscape and sourcing, analysis of the spatial relationships of Çatalhöyük with other contemporary archaeological sites and Neolithic and modern copper mining locations indicated that the most likely source used for copper metals and pigments was in south-eastern Anatolia, which is a considerable distance from the site (See Section 4.4). Archaeological evidence has established strong links to the obsidian trade with Cappadocia at the same time that we find blue and green pigments in use in buildings and burials at Çatalhöyük. Also, blue paint on plaster at Tepeçik Çiftlik indicates copper pigment trade to Cappadocia. Therefore, as seen in Chapter 4, inhabitants of Çatalhöyük may have been receiving copper materials from a trade location in that area, rather than from the mining source.

Furthermore, as discussed also in Section 4.4, there is some evidence to suggest that prospecting for pigments in the landscape led to the discovery of copper pigments and metals – making the desire for colours with which to paint instrumental in the development of early metallurgy, rather than vice versa.

### 9.2.2 Cinnabar

Materials analysis (see Section 3.3) demonstrates that the first occurrence of meta-cinnabar is in a freshly excavated plaster fragment. The findings here substantiate other archival reports by Mellaart, Todd, and French that red pigments have turned black in certain paintings. This increases the number of accounts of cinnabar in paintings from Mellaart's excavations and its frequency of use overall.

Chronological analysis shows that cinnabar was used throughout the ±1,100 years period. The ‘Red Shrine’ in the earliest levels shows a large quantity of cinnabar was available to the house occupant, enough to cover the corner of the room over the platform floor and a dado (see Chapter 4.1). However, its use decreased over time, with it being used more and more sparingly from the Middle and into the Late levels. Geographical analysis shows several potential sites for mercury ores, the closest of which is about 20km from Çatalhöyük. The decline in use to only a few figures and its presence in mixtures during the Late period may therefore be due to the general decrease in landscape exploration which we have already noted happened at this time.

The ‘Heirloom’ fragment in level VII, likely to have been removed from the ‘Red Shrine’ in level VIII, shows that the occupants of the house valued the pigment enough to curate the fragment and bury it under a new house. As the fragment has just a flat application of colour, it is clear the cinnabar pigment (not the design of the painting) is of significance and perhaps also carries an association with the space from which it came.

As for the symbolism of the colour: the pattern of use established in Section 4.2 suggests that Neolithic peoples did distinguish cinnabar from other common ochres. Human remains show cinnabar only on the head region, with ochres elsewhere. A symbolic connection to blood is evidenced by the use of cinnabar to ring the paws of animals in raised relief figures of felines and bears. Its sparing use in mixtures in some wall paintings may indicate that the colour was precious and sparingly used, but also added significance to a batch colour with just a small amount added to the bulk.

Detailed analysis by XRF and SEM reveals that cinnabar particles in samples of bulk azurite are not geological in origin but considered a ‘contamination’ of the blue colour, rather than an intentional mixture of the two colours. Archaeologically, this indicates that the two different rare pigments were processed in the same spaces or with the same tools in the North area.

### 9.2.3 Ochre

As found in previous studies, this research confirmed that ochres were ubiquitous throughout the occupation. However, contrary to most prior technical investigations at Çatalhöyük, these findings show that ochres are not a homogenous class of mineral pigment. Micro-XRF and FT-IR analysis (see Section 3.4) of the bulk of Çatalhöyük ochres showed considerable variation between samples in this group. Separating the samples by context showed that the variation in constituents of raw mineral ochres indicated different geological origins; samples came from the sedimentary environment around the site, but also had additional minerals indicating an igneous origin. This demonstrates that ochre can illuminate more about variations in raw materials and trade, but this is not currently recognised or practiced in most technical investigations.

The processing of ochres by the Neolithic artisans was better understood through the SEM examination, which found a micro-artefact of obsidian in a raw pigment sample of ochre (See Section 3.5). This indicates that obsidian blades were used to scrape minerals into a usable pigment powder. This refutes the interpretation of the study by Matthews that obsidian and mica particles in a paint layer were present because they were intentionally added by Neolithic people to make a more reflective surface. This study shows there are pragmatic explanations for both of these in the paint layer; the obsidian was a processing tool and the mica a known associated mineral in iron oxide minerals. Their use as intentional additives is therefore possible, but in doubt.

Beyond the technical examination, the new findings regarding ochre symbolism in Chapter 4 are that it is arguably distinct from that of the other red pigment, cinnabar. Mellaart calls red at Çatalhöyük ‘the blood and life’ of its people. It is likely the ochres were part of the everyday life of its inhabitants, found in some amount in most buildings, whereas cinnabar was like the blood, i.e., more concentrated in value and significance.

## 9.3 Painting Analysis

This section aims to answer the sub-questions:

3) What is the best method with which to analyse types of paintings at the site: with a broad or a narrow typology?

4) Can individual artisans be identified?

This research created a new database of paintings on-site, merging data from both excavation phases – the original work by Mellaart in the 1960s, and the Hodder excavations since 1993. Unlike previous attempts, this catalogue is comprehensive; for each painting the metadata includes the archaeological context of each painting as well as textual and photographic references to publications and excavations reports (see Appendix I). The total number of paintings was found to be 77. This is higher than previous estimates by Czeszewska, who identified only 65. As details of her accounting were not presented in the work, it is not clear why the numbers differ; this research took into account a greater number of buildings – 48 as opposed to 36 in Czeszewska's research (see Section 5.1). As such, this database has the highest number of paintings of any to date.

In order to make a detailed summary of the iconography of the paintings, it became necessary to develop a new methodology for determining the typology. Previous researchers in the ÇRP team adopted a Broad characterisation, which designated paintings as geometric, anthropomorphic, or zoomorphic. This was found to be inadequate due to the complexity of the imagery. For example, compositions like the hunting shrine in Level V contain both animal and human figures.

A new typology with 29 distinct forms and motifs, or 'Elements' (Table 5.4) was therefore designed. This means that only paintings with a high degree of similarity are grouped together, facilitating more robust interpretations of the content of ambiguous paintings. It also allows us to take account of connections to other artefacts in the material record, leading to a much more sophisticated analysis of trends. For instance, quantification of Element types shows that the complexity of paintings at Çatalhöyük increased consistently over time (see Section 5.4, Table 5.5), and this would not have been evident when using the simpler typology. The new typology has potential applications beyond the scope of this research. For instance, it could be applied to cave or rock art in prehistoric contexts.

These new methodologies, in combination, resulted in some exciting discoveries concerning the imagery. One was the identification of the earliest painting, the image of which was in the archival photography from the 1960s but had not previously been connected to the excavation description. This image of a red cross was found under a grain storage room under Level X, and dates from about 7,000 cal BC (see Section 6.2). Another finding came about from examining the 'Volcano/City plan' mural in the Museum of Anatolian Civilizations in Ankara. Viewing the original artefact revealed a previously undetected human figure – a mountaineer – which lent additional evidence to the interpretation of the image as a volcano, rather than a leopard skin (see Section 7.2.1).

The more sophisticated typology, chronology, and spatial evidence facilitated a correlation with archaeological evidence for more robust interpretations. The best example of this is the ambiguity of forms in wall reliefs, namely the splayed figures and the newly excavated mask discussed in Section 7.2. Ambiguities in the interpretation of these as either animal or human were resolved by connecting their spatial and temporal relationships to the faunal record. Previous observation of their resemblances to stamp seals by Hodder (2006) support the interpretation of splayed figures as animal motifs. However, spatial analysis of these reliefs showing that faunal evidence of Ursus remains at this level (and specifically near the splayed reliefs) provides considerably stronger evidence to support the connection to bears. Furthermore, splayed figure bear designs all have their heads and all paws removed before house closure; the new mask from the North would fit neatly in the place of a missing head of a bear relief. Considering the long tradition of removing plaster fragments of paintings to deposit in new houses, and the slightly later chronological level of the mask from the splayed reliefs, the face mask is most likely to have been a trophy from a bear figure.

As for the question concerning the identification of individual artists, the answer is that stylistic analysis has discovered an individual artist with a new perspective, a sort of Kandinsky of Çatalhöyük. This artisan painted the two key architecture and landscape style images in one of the most inventive levels for painting content, level VII (see Section 7.2). Another indication of social connections between contemporary households was also discussed in Section 7.2. There are clear examples of mimicking designs, such as the two landscape compositions in VII.44 which show artisans copying the more skilled composition by another hand. The investigation of handprint motifs also shows imitations of certain designs.

## 9.4 Synthesis

Having established the temporal and spatial relationships of both the pigments and paintings within their archaeological contexts, this section of the thesis aims to weave together the separate threads to create a comprehensive view of the culture of the site over the ±1,100 years period. It addresses the following questions:

6) How, when, and where do the content of painted images (typology) and artists' materials (pigments) change through time from Early, Transitional, and Late levels of occupation?
7) What does the paintings' practice and imagery reflect of the culture of Neolithic peoples at Çatalhöyük?
8) What is the influence of artists' materials on the technology and content of painted images at Çatalhöyük?
9) What is the relationship of wall painting practice with the production of other artefacts, e.g., obsidian, metals, beads, and textiles?
10) Was the content of the paintings influenced more by ideology or lived experience?

Overall, this research has revealed some distinct trends within the chronology of the site. Rather than a single Çatalhöyük 'Classic' style of art, each period has its own character. The Early period (Chapter 6) has the highest proportion of geometric motifs; the interpretation offered connects these to technologies such as agriculture, bead making, and the weaving and design of textiles. There is only one human image, and three animal compositions, two of which are bovine and Simple in type, the other being the more complex vulture painting on level VIII. The colours are largely ochres, which were available locally, but there are also examples of exotic pigments in the 'Red Shrine' in level VII, which is covered in cinnabar. This shows that from the very beginning, artists' pigments were being brought from a great distance and were considered valuable.

The Middle period is the most prolific in terms of painting frequency. There is a new perspective on landscape and architecture, as evidenced by the Volcano painting; over 25% of paintings are thought to have some sort of architectural or landscape content. Human figures begin to form a higher percentage of motifs relative to the Early levels, whilst most of the animal imagery is in the form of painted reliefs, often in pairs, such as the felines and bears on Levels VI and VII.

There is a significant expansion of the colour palette to include copper pigments, which can be seen in paintings such as the blue cow on Level VII. The geographical correlations established in this thesis of archaeological sites earlier than or contemporary to Çatalhöyük with copper evidence indicate the most likely area of copper trade (Cappadocia) and sourcing (south-eastern Turkey). Correlating the available archaeological evidence in this study helped to identify locations with high likelihood of sourcing. However, additional, future work comparing geochemical data from Çatalhöyük samples with those from other archaeological sites and known Neolithic copper sources would provide even more definitive evidence of sourcing. All this would indicate a culture which put a high value on exploration, with considerable time and effort invested in increasing its knowledge of the surrounding landscape.

In the Late period, we see a more dramatic shift in content from relatively few human figures to a situation where they appear in the majority of paintings, both as individuals and as groups.  Content reflects the cultural shift from outward to inward between the Middle to Late levels that was noted in the pigment analysis.

Iconographic analysis showed animals at this time begin to be seen together with humans much more frequently. This confirms Stordeur's (2010) observation of the 'domestication of symbols' in Neolithic imagery but places it later at Çatalhöyük than previously estimated. She estimated a date of 8,200 BC, whereas this analysis would place the transition at between 6,450 and 6,220 cal BC. Therefore, the shift Stordeur identifies throughout the Neolithic in the Near East is reiterated, occurring later at Çatalhöyük in Anatolia.

The Late period has a limited colour palette relative to the previous period; it is predominantly ochre with a few examples of cinnabar and no blues or greens at all. Yet innovation with locally available materials persists, as is evidenced by the mixture of red ochre and plaster to make a coloured wall plaster in Levels V-IV, discussed in Section 3.5.

Despite these changes, there is also evidence for considerable continuity over time. The thread of interest in botanical life is the one constant observed in the stylistic analysis. Gell would call this an *axis of coherence* (see Section 2.5). As just stated, how humans and animals are depicted change over time, but interest in plants is unchanging. Each period has paintings strongly associated with botanical life; these include the isolated bloom painting fragment buried under the grain storage in the earliest architecture, elaborate and skillful full wall designs in both the earliest (VIII) and latest (III) levels, with trees from the landscape shown in between. This research would therefore tend to support Mellaart's position that much of the geometric content of Çatalhöyük was connected to themes of botanical life and fecundity, and thus to agriculture, in contrast to Hodder, who does not recognise domestic themes in the paintings.

This thesis has also identified a phenomenon of curated 'heirloom fragments'. These demonstrate an enduring tradition with three examples, one in each period, from the earliest known painting to the latest tomb (see Section 8.2). Each fragment exemplifies something about the period from which it comes, whilst at the same time illustrating a significant communal memory.

As for the relationship to technology, this thesis maintains that a form of skeuomorphism is observed at Çatalhöyük. Definitive links to other technologies such as beads, textiles as well as architecture have been established. The content of the paintings was therefore influenced by lived experience, especially agriculture, craft technologies, architecture, and the landscape. It was also of course influenced by ideology, as thought by both Mellaart and Hodder (although the nature of this ideology is a source of debate), but until now, the importance of the pragmatic aspects of lived experience had been underestimated.

### 9.4.1 The Role of Art in the Neolithic

As presented in the first chapter, the role of art is best determined by examining the entire assemblage of paintings. This thesis compiled a detailed catalogue with which to study wall paintings, as required by Moorey (1999) for robust scholarship. For the first time since Mellaart's (1967) monograph of the site, the corpus of paintings is examined alongside the colourants and archaeological artefacts.

Evidence from the stylistic analysis, drawing from Gell's theory of investigating works of art, determined the *larger unity*, or how each part relates to the whole of a culture's character indicated by its art. It showed Çatalhöyük centred around two main concepts: innovation and connection to the past. These are seen in the simultaneous phenomena of new developments with continuity. Materials, techniques, and iconography have a growing repertoire at every level. A few examples of innovation from the evidence in the thesis including making sunken and raised plaster reliefs in the Early levels, remarkable exotic copper pigments from great distances in the Middle levels, and a unique style of naturalistic rendering of humans and animals in the Late levels.

These changes run alongside the remarkable continuity of art practices throughout the life of the site – examples include the 'heirloom' fragment' practice, re-making designs on the same wall in subsequent buildings like the feline reliefs, and the use of elaborate full wall designs with botanical motifs as early as level VIII and as late as level III. And, of course, continuity is clear from the considerable time and effort put into house decoration throughout the life of the site.

From the evidence seen here, the role of art at Çatalhöyük is primarily communicative in multiple dimensions; through time and space, artisans of every level of skill connect to others in the past, present, and future. Wall art communicates from an artisan or household to their contemporaries and shows horizontal social connections, seen with designs repeating in contemporary neighbouring houses, such as the handprints or splayed figures. But also, a vertical connection from the past to the present is strongly detected in the repetition of a specific art practice in the next generation, such as copper metal and pigments in the House of Copper in the Shrine 1 sequence (Section 4.2), or three generations of hunting shrines from levels V through III.

The strongest evidence of Stanley-Smith's (1981) *primacy of display* theory is twofold. The first and most pervasive art form at Çatalhöyük is wall art – from the painted 'heirloom' fragment as the first artefact on-site. The second aspect of primacy is that from then on, Neolithic peoples' practice of display on house walls was ubiquitous throughout the occupation of the site, with the use of colourants to some extent in nearly every household, as observed by Mellaart.

Art at Çatalhöyük is a device with which to communicate, display, and, as demonstrated in this thesis, create history. Quantification of the frequency of wall designs and rare artists' materials in history houses versus all buildings (Section 4.3) proved a considerably higher rate of art in houses with significant history. Clearly, households with success in maintaining skills and knowledge over generations had a strong association with artistic practice. Even more significantly, the converse can be inferred – that a strong association to artistic practice facilitated the successful longevity of the households.

## 9.5 Future Work

Future work would involve building upon the body of evidence collected in this research and connecting it further to the excellent existing scholarship at Çatalhöyük in other technologies. Seeing the relationship of paintings to figurines over time or personal adornment in non-metallic beads, such as stone and shell, would be of interest.

As for the technical analysis of pigments, spectra from the XRF and FT-IR techniques were gathered with the intention to create them as archival resources that can be utilised beyond this project. The analysis was performed and archived in this thesis to make the most of the samples while available. It was known at the time of sampling that exporting archaeological materials from Turkey was becoming increasingly difficult, and now with the end of the permit held by the ÇRP it may not be at all possible. Time limited the extent to which these results could be analysed, especially the ochre samples which may have an even more interesting story to tell when examined in more depth.

The broadest application for future work is, of course, to utilise the holistic approach developed here at other archaeological sites. The approach of extracting extensive information from the materials analysis and integrating it with designs, as in the method designed for this project, informs both aspects of iconography and archaeology. Also, the 'Element' typological method developed for the thesis would be of value when applied more broadly in a regional scale – across Anatolia or another area of high interest in art in archaeological contexts especially in prehistory.

## 9.6 An Archaeological History of Art

The holistic and original research design employed for this thesis demonstrates a considerable leap forward in knowledge of Neolithic peoples at Çatalhöyük. It illuminates their relationship to their material world, especially the buildings, bodies, and burials, as well as each other, their community and the wider landscape. Overall, this thesis demonstrates the value of weaving together the seemingly separate threads of 1) materials analysis to a fine art standard to tease out the most information from archaeological samples, and 2) incorporating the strong tradition in archaeology and history for a detailed examination of chronology, spatial relationships, and typology. As stated in the introduction, a central aim was to utilise the strengths of each discipline in a new way to develop a customised Archaeological History of Art.

The new findings just listed answer the research questions in full: findings are considerable, original, relevant to our understanding of the culture and peoples under investigation and illuminate new avenues for future work. In research design, results, and outcomes this thesis met the aim of an original contribution to human knowledge.

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