



Pigment Use at Neolithic Çatalhöyük

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From the Middle Paleolithic onwards, pigments have been used variably in different social and ritual activities as well as in the expression of symbolism through material culture (e.g., Brooks et al. 2018; D’Errico 2008). In the Levant and Anatolia, symbolic practices with pigments became increasingly common in the epipaleolithic and pre-pottery Neolithic periods (e.g., Bocquentin and Garrard 2016; Goring-Morris, Hovers, and Belfer-Cohen 2009; Richter et al. 2019; Baird 2012; Baird et al. 2013).

The Neolithic site of Çatalhöyük in central Turkey, occupied from 7100 cal to 5950 cal BCE (Bayliss et al. 2015), is one of the largest sites in a wider pattern of Neolithic settlements in Anatolia (Baird 2012; Hodder 2013). The site is well-known for its dense occupation and elaborate symbolic assemblages (Hodder 2006, 2014; Hodder and Meskell 2010). Excavations first took place from 1961 to 1965 under the direction of James Mellaart, followed by Ian Hodder from 1993 to 2017. The occupation levels of the site are divided into the Early (7100–6700 cal BCE), Late (6500–6300 cal BCE) and Final occupation periods (6300–5950 cal BCE). In general, an increase of population density and collective social and ritual elaboration was noticed from the Early to the Middle occupation periods (Hodder 2014). Around 6500 cal BCE it is argued that the occupants of Çatalhöyük shifted towards greater mobility, increased economic independence of houses, and fragmentation and dispersal of its population (Hodder 2014).

Unio shell palette with cinnabar. Photograph by R. Veropoulidou; Veropoulidou in press, fig. 8.g.

During almost one thousand years of the habitation of Çatalhöyük, pigments and colors have played an important role. Based on data collected during the twenty-five years of research under the directorship of Ian Hodder (1993–2017), this article presents an overview of pigments from different contexts at Çatalhöyük and discusses diachronic changes, symbolic meanings, and social relevance of pigment applications within this Neolithic society.

Characterization of Pigments at Çatalhöyük

The most common pigments at Çatalhöyük consist of stable metal oxides, known as ochres. Their shades consists of mainly red, orange, brown, and yellow. Red ochre, known as hematite or iron oxide (Fe_2O_3), was found as nodules (fig. 1), as loose powder, or on the surface of objects. Ochre use was particularly common on wall paintings and in burials (see below) and encountered in different depositional contexts across the site including middens, room fills, floor deposits, and construction/make-up layers. Yellow ochre at Çatalhöyük was primarily composed of goethite (FeO) and mainly used on wall paintings during the earlier occupation levels (Çamurcuoğlu 2015). Ochres are thought to be collected from a variety of sources, including the limestone hills forming the northern boundary of the Konya plain and the volcanic rocks from Erenler-Alacadağ about 60 to 70 km to the southwest of the site (Doherty 2017; Erdoğan and Ulubey 2011).

Another tint of red at Çatalhöyük is encountered in the form of cinnabar (HgS), also known as vermilion. Research conducted in and around Konya, the closest modern city to Çatalhöyük,

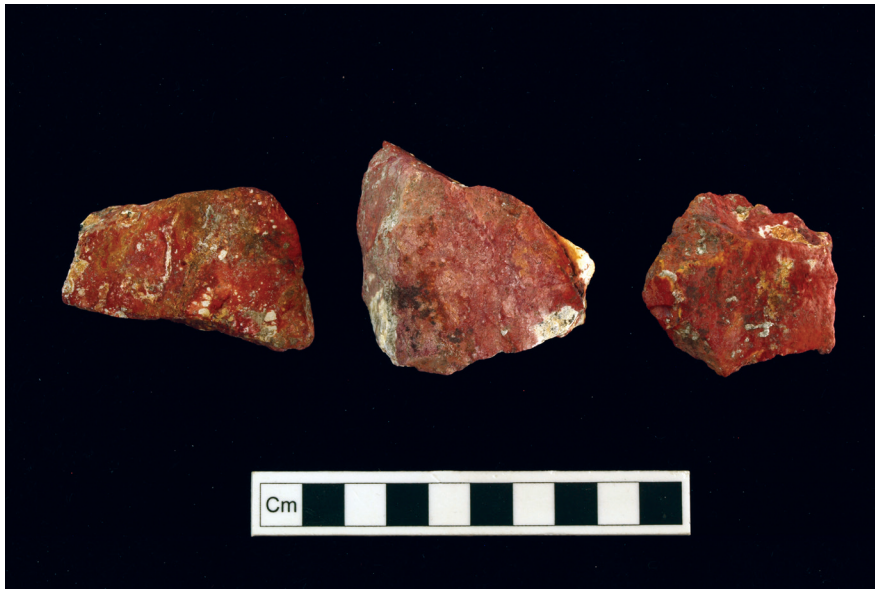


Figure 1. Red ochre nodules (Fe_2O_3) from Çatalhöyük. Photograph by C. Tsoraki.



Figure 2. Blue azurite $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$ recovered at Çatalhöyük. Photograph by J. Quinlan.

shows that the region is rich in lead, iron, copper, and mercury oxide sources (Bahar 2018). While there are a few instances of cinnabar and red ochre mixed together on wall paintings from Neolithic Çatalhöyük (Çamurcuoğlu 2015; Doherty 2017), cinnabar seems mainly concentrated on human crania from a small number of burials (see below).

The site also revealed blue azurite $\text{Cu}_3(\text{CO}_3)_2(\text{OH})_2$ (fig. 2) and green malachite $\text{Cu}_2\text{CO}_3(\text{OH})_2$, both mainly encountered in burial contexts but much less common than red pigment. Both pigments form as secondary minerals in the upper oxidised zones of copper ore deposits and are always found together in nature (Eastaugh et al. 2008).

Black pigments at the site were derived from carbon black, representing shades from black to blue and brown in color, obtained by burning animal bones, fat, and woody plant material (Çamurcuoğlu 2015). Black was intentionally used on the wall paintings at Çatalhöyük. Charred inclusions were also commonly found in the burial fills, but the pigment's intentional inclusion in these deposits is debatable.

Finally, white pigments were derived from calcium carbonate in various forms. The most common natural form of calcium carbonate is calcite. It occurs mainly in sedimentary rocks like chalk and limestone, in metamorphic rocks like marble, and occasionally in igneous rocks (Gettens, FitzHugh, and Feller 1974). The white plasters of Çatalhöyük are a significant aspect of the color palette of the site used on the walls and floors of buildings, and occasionally in burials (for an overview see Schotsmans et al. in press; Vasić, Knüsel, and Haddow in press).

Tools Associated with Pigments

At Çatalhöyük the archaeological evidence for processing, containing, and application of pigments includes ground stone palettes, shell containers, and pigment applicators made of animal bone.

Microwear analysis of schist palettes using a stereomicroscope (7.5–64x magnification) and a metallographic microscope (100–200x magnification) showed wear traces consistent with mineral contact material and a frequent presence of light red-colored ochre on the use-faces of these tools (fig. 3; Tsoraki in press a). Their morphometric characteristics, raw material choice, and wear patterns strongly indicate that palettes were employed for small-scale processing of pigments that had already been reduced to small particles, producing a fine-grained powder as the final product (Tsoraki in press a, in press b).

The shell assemblage at Neolithic Çatalhöyük includes a very small group of shells with traces of pigments (N=19 which is 1.4% of the shell artifact assemblage (N=1300) and 0.06% of the studied shells (N=29395)) of which ten were found during 2010–2017 excavations and nine were previously reported by Bar-Yosef Mayer (2013), but reexamined for use-wear and closer examination of pigments (Veropoulidou in press). From the 19 studied shells with pigments, 15 shells were categorised as “palettes” and four as painted shells. The vast majority belong to *Unio* species (N=14) (Veropoulidou in press; Schotsmans et al. in press). Of these, one (21622) bears a perforation to furnish a handle to facilitate the use of the palette, to strap it from the belt or the wrist, or for suspension as bead or pendant. One additional palette is an *Ostrea edulis* (oyster) valve (23765) (fig. 4). The inner sides of these palettes (concave for *Unio*, flat for *O. edulis*) bear traces (stains, coating, lumps) of different pigments of orange and red to vibrant vivid red hues (fig. 5 and banner photograph). Portable X-ray fluorescence (PXRF) analysis indicated that four palettes contained ochre (fig. 5) and eight palettes had cinnabar (banner photograph) (Schotsmans et al. in press, table 1). The remaining three were not analysed or did not provide a clear spectrum. The staining traces were usually lighter and thinner at the central part of the valve, but thicker and more substantial near the concave part, while in some examples lumps of pigment were present under the cavity of the umbo. The traces



Figure 3. Schist palette used for processing red-colored ochre. Photograph by C. Tsoraki.

and the occurrence of brush strokes, as seen on the banner photograph for example, can be interpreted as an indication of the use of pigment mixed with a binder. Two palettes (17939 and 21622) show deep furrows and scratches on the inner side, traces that possibly resulted from a tool used to prepare or mix the pigment. Another two examples (31585 and 17457) bear flat brush strokes of pigment.

Regarding the distribution between contexts, seven palettes were excavated from middens or room fill and eight palettes were found in funerary contexts (Veropoulidou in press; Schotsmans et al. in press).

The use of shells as “palettes” is also supported by the context of finds, as for instance in a burial in Building 150 where a shell coated with cinnabar was placed at the right shoulder of an adult male (Sk.32818). The individual’s frontal bone had a stripe of cinnabar (see below). Another example was found placed on the feet of a two-year old child in a basket (Sk.17939) in Building 49. Apart from the intense traces of cinnabar on the inner side of the shell and the scratches of a tool on the inner surface, it had been ground to a triangular (pointed) shape. A perforation was drilled near the corner of the triangle. Taking into account its location in the burial, it is likely that this was a palette that was secondarily used as a bead/pendant for the ankles of the child. The child itself



Figure 4. *O. edulis* (oyster) palette. The black discoloration is caused by the burned building. Photograph by J. Quinlan; Veropoulidou in press, fig. 2.k.

did not show any traces of cinnabar. In the same building and same space another infant was recovered (Sk.17457) deposited on matting or in a basket observed by preserved phytoliths, with three shells, blue pigment with a bone spatula, a copper tubular collar with preserved twisted threads, a shell bead necklace, and a stone bead anklet. Two of the three shells bore traces of pigment characterised as cinnabar in shell 17457.X4 and ochre in shell 17457.X6. The skeletal remains of the infant did not show any pigment staining, but PXRF analysis indicated that the phytoliths contained cinnabar. The fact that the infant’s containment showed a high cinnabar content, together with the presence of the cinnabar shell next to the infant, indicates that its basket or matting had been colored with cinnabar.

Pigments could have been applied with perishable materials such as a brush with animal hair, or with less perishable material such as pigment applicators made from animal bone. A number of rounded and/or blunted bone points could tentatively be interpreted as hair or clothing pins and/or pigment applicators (Russell 2016, 2005; Russell and Griffiths 2013; Vasić, Knüsel, and Haddow in press; Vasić 2018). However, it is difficult to discern their exact use with certainty. A few bone artifacts from Çatalhöyük clearly demonstrate their association with pigment application. At least six potential bone applicators were

interpreted as related to pigment use, based on their discovery “dipped into” a pigment lump (16308.x2 and 8184.x4) or because they were recovered next to pigment lumps such as in a pouch (13147.x1, 17457.x8, 21634.x13 and 21634.f1) (Vasić 2018). All of them were associated with blue or green pigment and only present in adult females’ or infants’ burials (Vasić, Knüsel, and Haddow in press; Vasić 2018; Schotsmans et al. in press).

Pigment Applications

Artifacts

Among the artifacts that were colored with pigments were figurines, one clay sphere, two clay balls, and four painted shells.

At least three clay figurines and one limestone figurine showed evidence of red pigments, ranging from specks and traces to very clear red paint (Meskell et al. 2016; Nakamura and Meskell 2009; Meskell and Nakamura 2005).

Within the categories of clay objects and clay balls, the use of pigments is extremely rare. One clay sphere and two clay balls (fig. 6) showed evidence of red pigment related to the Early occupation period (Bennison-Chapman in press a, in press b). In all three cases, the entire exterior surface was painted, using a red colored pigment. The red color appeared to be very faint and difficult to analyze with PXRF. Based on the absence of mercury (Hg) and sulphur (S) on both clay balls, it is assumed they had been covered with ochre (Schotsmans et al. in press).

The painted shells consisted of one marine species of the *Ranellidae* family (in all likelihood *Ranella olearium*, Linnaeus 1758) (fig. 7) and three painted freshwater gastropod specimens of large size, two *Lymnaea* or *Stagnicola* sp. (fig. 8; 1.4% of the number of identified *Lymnaea/Stagnicola* specimens) and one *Viviparus* (0.04% of the number of identified *Viviparus* specimens). The marine species *Ranellidae* showed light red pigment, orange light brown spots, and thin black lines. Two tubercles that appear naturally on the *Ranella olearium* and that were enhanced by slight grinding and smoothing may render it as representing a female’s torso. All four painted shells were from the Late occupation period.

Architectural Paintings and Installations

Within domestic contexts at Çatalhöyük, red pigments were used for the decoration of wooden posts. Mellaart (1967: 58) describes that the wooden posts were plastered and frequently painted red. Kabukcu and Asouti (2014) observed red pigment, likely iron oxide, on wood charcoals (17519) from Building 77 indicating that wooden implements were painted red before their exposure to fire. Similarly, red pigment was often used on plastered animal skulls set into the walls and platforms, known as installations. A unique example of a painted plaster head installation was found within Building 132 as part of a larger wall feature. The face, which can be interpreted as either human or animal, was painted red and contained two obsidian flakes in place of the eyes (fig. 9). Earlier layers of red ochre paint were



Figure 5. *Unio* palette with ochre. Photograph by E. Schotsmans.

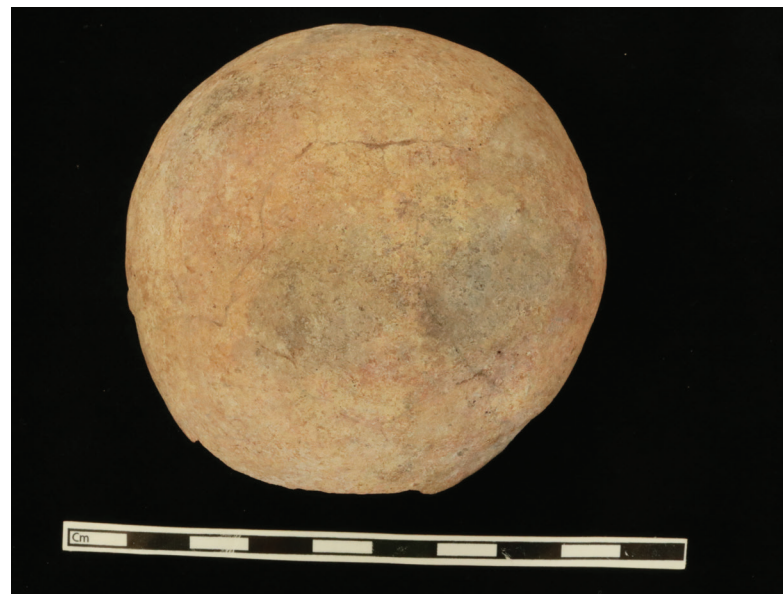


Figure 6. Clay ball with evidence of red pigment. Photograph by L. Bennison-Chapman.



Figure 7. Shell (*Ranellidae*) painted artifact. Photograph by R. Veropoulidou; Veropoulidou in press, fig. 2.1.



Figure 8. *Lymnaea* sp. painted bead/pendant. Photograph by R. Veropoulidou; Veropoulidou in press, fig. 1.c.



Figure 9. Plaster head installation with obsidian eyes and ochre paint from Building 132. Photography by J. Quinlan.

also identified together with black paint directly under the obsidian eyes, suggesting the eyes were painted before the final obsidian flakes were put into place (Lingle et al. 2015; Busacca and Lingle 2017).

In addition, most of the buildings excavated to date have yielded evidence of some form of paintings, although with a great variability in density (Çamurcuoğlu 2015; Busacca 2020). Paintings (N=178) occur on a variety of plaster-lined house interior features, such as walls (42.3%), platforms (24.7%), niches, benches, post/pillars (each 6.6%),

floors (4.9%), and others (Busacca 2020). The vast majority of the studied architectural paintings were composed of monochromatic red layers (58.6%), but there were also hand motifs and geometric motifs including linear motifs, bands, circles, spirals, zigzag lines, crosses, quatrefoils, rosettes, and others (fig. 10). Anthropomorphic or zoomorphic motifs were less common and were mostly recovered during the Mellaart excavations (Busacca 2020, in press). Architectural paintings were attested throughout the site's occupation, especially during the Early and Middle occupation periods, with a decline in painting activity beginning with the Late period and important changes in painted motifs (Busacca 2020; Czeszewska 2014).

Mortuary Practices with Pigments

In total, at least 816 human individuals were recovered from stratified Neolithic contexts during the Hodder excavations. Considering only primary and secondary depositions (N=567) and taking into account direct pigment traces observed on the bones, as well as burial associations with pigments, a total of 62 individuals showed pigment use as part of funerary practices (11% of the sample). A detailed description of the depositional categories can be found in previous publications (e.g., Boz and Hager 2013; Haddow et al. in press).

Direct pigment traces were observed on thirty-six individuals (6.3% of the sample) (fig. 11). Twenty-three of those skeletons were primary depositions (64%), ten were primary disturbed depositions (28%), and three were secondary ones (8%). When looking at age, adults dominate the sample with 56%, which includes all young adults (20–34 years old at death) (N=6), middle adults (35–49 years old at death) (N=6), old adults (50+ years old at death) (N=7) and non-specific adults (20+ years old at death) (N=1). Pigment was found on five children (14%), eight infants (22%) and two prenatal individuals (5%). Sex could be determined in nineteen cases with 39 percent male and 14 percent female, including ten males, four possible males, two females, and three possible females (Schotsmans et al. in press).

Direct pigment traces on the skeletons were always red in color, consisting of either iron-oxide or cinnabar. PXRF analyses indicated that cinnabar was uniquely found on the cranium (N=14), while iron oxide was observed on the cranium and/or on the postcranial skeleton (Schotsmans et al. in press; Schotsmans et al. forthcoming). How was ochre applied? Was it put onto the matting, the clothes, or directly onto the skin? Or was it added afterwards when the body was skeletonized? In some cases ochre was concentrated on one side of the skeleton (e.g., Sk.21884), while sometimes only patches of ochre were observed on or around certain body parts (e.g., Sk.32762 or Sk.32045). When analyzing the articulated skeletal remains of adult female Sk.21884, buried on the right side, the skeletal elements from the uppermost (left) side of the skeleton were more intensely stained than the lowermost (right side), including the patellas (Schotsmans et al. in press, fig. 14). This suggests that ochre was applied to the deceased after being placed in the burial. The partial discoloration of the left femoral head confirms that the skeleton was flexed and fleshed when the ochre was applied, leaving the main part of the femoral head unstained. The abundant presence of phytoliths in the burial suggests the use of a matting, although the archaeological evidence makes it difficult to reconstruct the specific use of the latter (i.e., placed over or around the body). Therefore, it is difficult to conclude whether the matting was painted with ochre or whether ochre was sprinkled on top of the deceased, before closing with matting. Data from the burial assemblage of Neolithic Çatalhöyük suggest the coexistence of different methods of pigment application.

As mentioned above, cinnabar was only applied to the cranium/head of 14 individuals, often only observed on the frontal or temporal bone. This is 2.5 percent of the total sample or 39 percent of the skeletons with direct pigment traces, from six primary burials, seven primary disturbed burials, and one secondary burial. Cinnabar on the cranium was encountered in seven adult burials, one adolescent burial, one child, and five infant burials. From the seven adults, six were likely male and one possible female. These data suggest that the application of cinnabar to the head was a practice reserved for male individuals (Schotsmans et al. in press; Schotsmans et al. forthcoming). In some cases this resulted in a clear stripe observable on the frontal and temporal bones (fig. 12), often in association with phytoliths on top of the cinnabar (fig. 13). This can be a possible indication of the wearing of a headband painted with cinnabar, or of a headband on top of already applied cinnabar (fig. 14). In terms of the timing of application, these stripes have mostly been observed on individuals from primary (N=7) and primary disturbed (N=6) depositions, which suggests that cinnabar was put onto a fleshed head.

Pigments have also been found as burial associations in funerary contexts, in the form of either lumps or stained objects (e.g shells, animal bones, a wooden bowl, and an obsidian mirror). Pigments as burial association were identified in 25 burials out of the 567 primary and secondary depositions excavated during the Hodder-era (4.6%) with pigments consisting of mainly red, but also blue and green (Schotsmans et al. in press). An additional multiple burial contained blue and red pigment, but it was unclear to which individual these were associated. Pigments as burial associations were encountered in 19 primary depositions (76%), four primary disturbed depositions (16%), and two secondary burials (8%). When looking at age, the proportion is almost even



Figure 10. Architectural painting with geometric motif from Building 80. Photograph by J. Quinlan.



Figure 11. Direct ochre traces observed on the skeletal remains of primary burial Sk. 8598. Photograph by J. Quinlan.

between adults (48%, N=12) and younger individuals (52%, N=13). The thirteen individuals whose sex could be determined (one adolescent and twelve adults) consisted of nine females (36%, eight females and one possible female) and four males (16%, three males and one possible male). Blue and green pigments were observed in burials of adult females (N=5), adolescents (N=2), children (N=1), or infants (N=3) (Schotsmans et al. in press; Vasić, Knüsel, and Haddow in press).

In general, two trends are observable concerning sex and treatment with cinnabar and blue/green associated pigments. Adults who received cinnabar treatment on the cranium were mainly male, and adults buried with blue or green pigments appeared to be female. This might suggest that the cranial application of cinnabar

had been preserved for male individuals and burial associations with blue and green pigment were meant for females.

When looking at funerary treatment with pigment, both as direct pigment traces and as burial goods, the percentages of individuals with pigments from the Early, Middle, Late, and Final occupation periods amount to 39.7% (N=21 out of 53 excavated individuals), 10.4% (N=33 out of 319 excavated individuals), 4.6% (N=8 out of 175 excavated individuals), and 0% (N=0 out of 20 excavated individuals) respectively (Schotsmans et al. in press, fig. 19). This shows that the funerary treatment with pigment was more common in the earlier occupation levels than in the later ones, although the small sample size of excavated burials from the Final occupation levels require caution.

Contextual and Spatial Associations

A comparative overview of numbers of buried individuals and painted plaster layers for each building (considering only buildings that have been excavated at least to 75 percent of their occupational sequence) helps clarifying to what extent there is an association between paintings and funerary practices at Çatalhöyük (Busacca 2020; Schotsmans et al. forthcoming). Although not every building shows a direct association between number of buried individuals and number of painted layers, an association between multiple paintings and multiple burials in the same buildings is present: Of the nine buildings showing a number of painted layers above the average of ten, eight of them also show an above-average number of buried individuals (more than 14). In these buildings, therefore, heightened painting activity is accompanied by heightened burial activity (Schotsmans et al. forthcoming; Busacca 2020). In addition, stone palettes and shells with pigments also tend to be associated with buildings that have wall paintings (Tsoraki in press a, in press b; Veropoulidou in press).

During the Middle occupation period, a clear intra-house spatial association between paintings and funerary activity is apparent. Paintings and burials tend to be located at close distances within the house, usually along the north and eastern walls, as revealed by a comprehensive spatial analysis focusing on the location of architectural paintings (Busacca 2020). A marked shift in painting locations and contextual associations occurred at the beginning of the Late occupation period. Most importantly, painting activity decreased, and paintings ceased to be spatially associated with burials, showing a more dispersed distribution and even an association with features such as hearths and ovens (Busacca 2020). This trend could be linked to the important site-wide changes that occurred from the Late occupation level onwards (Hodder 2014).

Diachronic Summary

A diachronic focus enables the investigation of changes through time. Considering the use of pigments in general, the results show that pigments were used throughout the whole occupation, confirmed by the schist palettes for pigment processing, but with changing functions and intensity. Schist palettes were



Figure 12. A cinnabar stripe is present on the frontal bone of skeleton 32818. Photograph by M. Milella.



Figure 13. Phytoliths above cinnabar pigment on petrous temporal bone of skeleton 5177. Photograph by E. Schotsmans.

Discussion and Conclusion

In the Near East, changes towards long-term residence go hand in hand with an expansion in symbolism (Goring-Morris, Hovers, and Belfer-Cohen 2009; Goring-Morris and Belfer-Cohen 2010), including the presence of pigments in funerary contexts (Erdal 2015; Bocquentin and Garrard 2016; Richter et al. 2019). In central Anatolia, evidence of pigment processing and pigment usage is attested in various contexts in the Epipaleolithic settlement of Pınarbaşı (Baird et al. 2013; Baysal 2013), and in the aceramic Neolithic sites of Aşıklı Höyük (Özbasaran 2011) and Boncuklu Höyük (Baird 2006, 2010; Baird, Fairbairn, and Martin 2017).

According to Jones (2002), the use of substances from spatially distant sources and the deployment of these substances to create pigments and colored artifacts means that many artifacts represent relationships among the living. The operational sequence and the pigments themselves offer the potential for enchainment of social relations (Chapman 2000). Following these arguments, pigments at Çatalhöyük could have played a role in building identities and social structure, but also in social differentiation. Preliminarily, the fact that only a small portion of the buried population displays evidence of treatment with colorants would suggest that this was not a cultural practice accorded to all members of the community. This raises questions about factors possibly motivating such selection. On the basis of the available data we can exclude that sex and/or age-at-death were relevant variables for being differently treated. When looking at specific pigments, cinnabar was more likely applied to male individuals, and blue or green pigment was more likely present in female burials. Both cinnabar and blue/green pigment were also found in burials of subadults. Red ochre was used in various contexts and found in burials of both sexes in all age categories. These interpretations should be treated with caution as sample size numbers are very low. However, it is clear that the majority of the inhabitants of Çatalhöyük did not receive treatment with pigment. Perhaps some individuals were selected for ancestorhood? As Kuijt argued, time would have facilitated the forgetting of the dead, with the remains becoming depersonalised within a couple of generations, thus subsequently turning into ancestors (Kuijt 2008). A form of “ancestral memory” might explain the association between painted walls and burials, or, even more, between painted walls and burials with pigment. Along the same line, Last argued that the paintings were not simply decoration and that “the images participated in mediating the relationship between the living and the dead, create an overlap between domestic and ritual practice” (Last 1998, 367). For Çatalhöyük, the connections between daily practice, social rules, and social memory have been discussed in the past (e.g., Hodder and Cessford 2004). In Çatalhöyük all buildings repeatedly acted as domestic houses with different degrees of production



Figure 14. Artistic interpretation of an individual wearing a headband over painted cinnabar. Drawing by G. Devilder.

used extensively for pigment processing activities throughout the whole occupation sequence at Çatalhöyük, with an increase in the number of palettes in the Late occupation period (Tsoraki in press b). Clay balls in general were mostly found in the Early and Middle occupation periods, but clay balls with pigment were extremely rare and only recovered from the Early occupation period. Shells with pigments only belonged to the Middle and Late occupation periods (Veropoulidou in press). Pigment treatment for funerary purposes was more common during the Early occupation of the site with a decreased use of pigments in burials during the Middle and Late occupation periods (Schotsmans et al. in press). Architectural paintings were mainly attested during the Early and Middle occupation periods, with a decline in painting activity at the start of the Late period (Busacca 2020, in press). The observed changes in paintings and funerary pigments fit with observations by Hodder (2014) who states that in the Early levels ritual ties and sodalities were based on sharing resources with a focus on collective social and ritual structures. In 6500 cal BCE there was marked shift towards fragmentation, fewer ritual ties, and the dispersal of population across the landscape (Hodder 2014).

activities and as well symbolic elaboration (Hodder and Cessford 2004; Hodder 2018). This symbolic elaboration and social memory were strengthened by pigments on walls, on objects, and in burials. The architectural paintings and colorful objects might have triggered this visual memory and created a connection between images, objects, and people. Tactile memory might have taken place through handling, rehandling, and circulation of human remains and objects.

The exact significance of the different colors remains unclear. The meanings associated with color are culturally constructed so that interpretive generalizations are not suitable for this discussion (Erdoğan and Ulubey 2011). For example, among ethnic groups, red is often associated with life, blood, or power (Scarre 2002). Blue and green could refer to growth, fertility, and ripeness (Bar-Yosef Mayer 2019). From a functional perspective, ochre could have been used as insect repellent, for its anti-bacterial properties, or as a hide preservative (Rifkin et al. 2015; Hodgkiss 2014; Wadley 2010; Watts 2002). Note however that a distinction between symbolic and utilitarian functions of pigments may be misleading, given the fact that these spheres are often entangled into each other. Finally, the data show that a distinction was made between cinnabar and ochre. The low number of cinnabar applications could indicate that these individuals received a special status that differentiated them from the others. Cinnabar vapors are hypnotic and sedative when the mineral is heated (Ho et al. 2003; Liu et al. 2008). This could have changed the state of consciousness of the people handling cinnabar and perhaps trigger communication between the ancestors and the living, which might also explain its limited use or its use for special occasions.

Analyses and interpretations of pigments are limited by the degradative nature of archaeology. Many questions remain regarding factors influencing the fading of colors and the effects of postdepositional processes. In addition, undoubtedly other colorful materials of an organic nature were also part of the Çatalhöyük color palette (e.g., Russell 2019). These considerations might suggest that our data are an underestimation of the actual frequency of colors and pigments at Çatalhöyük. In addition, it is important to mention that only a small percentage of the site has been excavated (<6%), which strongly hampers a generalization of the results of this study.

In conclusion, the Çatalhöyük inhabitants applied pigments for different purposes including the coloring of objects, architectural decoration, and treatment of the dead. Considering the symbolic importance of pigments amongst various human cultures, it is likely that a careful selection was applied. Pigments in burials were only accorded to a small portion of the buried population. Objects with pigments were not very common and encountered in different contexts. All colors had meanings; they created connections between daily practice, social memory, and ancestors. Mortuary practices with pigments and architectural paintings both decreased towards the Late occupation periods. The data confirm Hodder's (2014) observations that the inhabitants of Çatalhöyük became increasingly less dependent on cohesive ritual ties during the Late occupation levels, while in the Early levels they may have been held together by memory and ancestry.

In other words, over 1000 years of habitation of Çatalhöyük, the inhabitants moved towards a more mundane life.

Acknowledgements

The authors would like to thank Ian Hodder, the human remains team, and all members of the Çatalhöyük Research Project. A special thanks goes to Lisa Guerre, Ceren Kabukcu, Jason Quinlan, Bilge Kucukdogan, Marco Madella, Fatma Toksoy-Köksal, and the anonymous reviewer. This project received funding by IDEX Initiative d'Excellence Bordeaux (ANR-10-IDEX-03-02) and the France-Stanford Center for Interdisciplinary Studies. Schotsmans's research was funded by the European Union's Horizon 2020 research and innovation programme (grant agreement 794891). Tsoraki's research was funded by the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreement no. PIEF-GA-2012-328862-Project CRAFTS.

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