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Stylistic Analysis of Late Epigravettian Animal Engravings from Riparo Tagliente

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SUMMARY

RÉSUMÉ

1. The Late Glacial Context 1

1.1 Chronological and Environmental Context of the Late Glacial *2*

2. The Late Glacial cultural context 2

2.1 The Epigravettian: Definition and Historiography *2*

2.2. Epigravettian Graphic Production in Italy *3*

2.2.1 Graziosi's Interpretative Model of the Artistic Provinces 4

2.2.2 Graziosi's Legacy: Martini and Montoya 5

3. Riparo Tagliente (The Tagliente Rockshelter) 6

3.1 Discovery and History of Research *7*

3.2 The Stratigraphic Sequence *7*

3.2.1 The Main Stratigraphic Sequence (The transversal trench) 7

3.2.2 The Late Epigravettian Deposits of the inner area (protected by the rockshelter) 8

3.2.3 Chronological Framework of the Epigravettian Sequence 8

4. Archaeological Record 9

4.1 Archaeofaunal Remains 9

4.2 Osseous assemblages 9

4.3 The Late Epigravettian Lithic Assemblage *10*

4.4 Ornamental Objects *10*

4.5 The Portable Graphic Production *11*

5. Research Objectives and Questions 15

5.1 Research Questions *15*

5.2 Research Objectives *15*

6. Style in Upper Palaeolithic Art: Theoretical and Analytical Framework 16

6.1 The Development of the Concept of Style *16*

6.2 Leroi-Gourhan and Stylistic Chronologies *17*

6.3 Operational Definition of Style *19*

6.4 Stylistic Comparison as a Tool for Cultural Analysis *20*

7. Corpus and Methods 22

7.1 Recent Developments in the Documentation and Analysis of Upper Palaeolithic Graphic Production *22*

7.2 The figurative corpus of Riparo Tagliente *24*

7.3 Documentation and Analytical Methods *26*

7.4 Data Processing *27*

CHAPTER 8. STYLISTIC ANALYSIS OF THE FIGURATIVE CORPUS 29
8.1 Characteristics of the Engraved Figurative Corpus *31*
8.1.1 Graphic construction 31
8.1.2 Internal graphic features and filling 32
8.1.3 Anatomical features and details 33
8.1.4 Posture, Orientation, Perspective and Movement 34
8.2 Stylistic Patterns *34*
8.2.1 From individual graphic devices to recurrent combinations 34
8.2.2 Parallel lines as a recurrent graphic device 35
8.2.3 Anatomical combinations 36
8.2.4 Combinations of contour, internal detail and anatomical representation 36
8.2.5 Orientation and perspective as components of the graphic configuration 36
8.3 Diachronic Variability *37*
8.3.1 Distribution of individual graphic variables 38
8.3.2 Filling and internal graphic elaboration 38
8.3.3 Co-occurrence of graphic variables 39
8.3.4 Anatomical variables and preservation 40
8.3.5 Synthesis of chronological variability 40
9. DISCUSSION: RIPARO TAGLIENTE ASQSEMBLAGE IN THE BIGGER PICTURE 41
9.1. Results in relation to the Late Epigravettian stylistic sequence *41*
9.2. Comparison with Magdalenian graphic conventions *41*
9.2.1 Continuous outline 43
9.1.3. Horns and antlers 48
9.1.4 Proportions and overall graphic organisation 49
CONCLUSIONS 49
BIBLIOGRAPHY 51
APPENDIX A: CATALOGUE OF THE ANALYSED ARTEFACTS 60
RT1001 ..... *60*
RT1002 ..... *61*
RT1003 ..... *62*
RT1004 ..... *62*
RT1005 ..... *64*
RT1006 ..... *65*
RT1008 ..... *66*
RT1010 ..... *67*
RT1011 ..... *68*
RT1012 ..... *69*
RT1013 ..... *70*
RT1016 ..... *71*
RT1017 ..... *72*

RT1018 ..... *73*
RT1019 ..... *74*
RT1021 ..... *75*
RT1023 ..... *76*
RT1025 ..... *77*
RT1026 ..... *78*
RT1030 ..... *79*
RT1031 ..... *80*
RT1032 ..... *81*
RT1033 ..... *82*
RT1036 ..... *83*
RT1039 ..... *84*
RT1040 ..... *85*
RT1043 ..... *86*
RT1044 ..... *87*
RT1046 ..... *88*
RT1047 ..... *89*
RT1050 ..... *90*
RT1051 ..... *91*
RT1053 ..... *92*
RT1055 ..... *93*
RT1056 ..... *94*
RT1058 ..... *95*
RT1059 ..... *96*
RT1060 ..... *97*
RT1062 ..... *98*
RT1063 ..... *99*
RT1065 ..... *100*
RT2001 ..... *101*
RT2002 ..... *102*
RT2003 ..... *103*
RT2004 ..... *104*
RT2007 ..... *106*
RT2008 ..... *107*
APPENDIX B. ANALYTICAL VARIABLES 108

Summary

This work presents a systematic stylistic reappraisal of the figurative engraved graphic production on portable supports from Riparo Tagliente (Verona, Italy), one of the key Late Epigravettian sites of northern Italy. Although individual artefacts from the assemblage have been published over several decades, the figurative engraved corpus had not previously been examined exhaustively through a standardised stylistic framework.

The aim of this research is to characterise the graphic conventions employed in the construction of animal representations, to investigate their variation through the Late Epigravettian sequence, and to assess their connections with contemporary graphic traditions in Western Europe, particularly the Later Middle and Upper Magdalenian and, where relevant, the Early Azilian.

The study considers a revised corpus of 48 artefacts, including 42 engraved artefacts corresponding to 45 engraved graphic units, together with five three-dimensional figurative objects and one artefact without an identifiable graphic unit, retained because it is displayed as a figurative object at the National Archaeological Museum of Verona.

The analysis is based on a standardised recording protocol applied at two complementary levels: the artefact and the graphic unit. The analytical framework records variables relating to graphic construction, internal graphic elements and filling, anatomical features and details, posture, orientation, perspective and movement.

The results indicate a recurrent but internally variable graphic repertoire. Continuous linear construction is the most widespread graphic procedure, while multiple and parallel lines are repeatedly incorporated into external contours, internal elements and anatomical details. Parallel lines are particularly frequent in the rendering of facial hair, but their occurrence in other contexts indicated that they do not correspond to a single graphic function. Anatomical features, including the eyes, mouths, ears and horns or antlers, likewise display different formal treatments rather than a single standardised mode of representation. The stylistic organisation of the corpus therefore emerges from the recurrent combination of several graphic procedures rather than from a homogeneous or rigid graphic formula.

The diachronic analysis identifies continuity combined with selective variation across the three phases of the Late Epigravettian sequence at Riparo Tagliente. Single, continuous and closed constructions recur throughout the sequence, whereas parallel lines display a more differentiated distribution, being comparatively uncommon in the earliest phase and more frequent in the intermediate and later phases. These differences do not indicate a progressive increase in graphic complexity or the emergence of clearly distinct chronological styles, but rather changes in the distribution and combination of particular graphic conventions.

The comparative analysis focuses on selected Later Middle and Upper Magdalenian assemblages, with Early Azilian material considered where relevant to the later part of the Riparo Tagliente sequence. Specific correspondences are observed in the construction of continuous contours, the treatment of the eye and facial hair, and selected aspects of horns and antlers, as well as in the proportions and overall organisation of some animal figures. These similarities concern particular combinations of graphic and anatomical features rather than isolated motifs. They do not demonstrate direct stylistic continuity between the Epigravettian and Magdalenian traditions, but they identify specific points of graphic convergence that provide a basis for further investigation of relationships between Late Epigravettian and other Upper Palaeolithic graphic traditions.

By establishing a structured corpus integrating previously published and unpublished material, this study provides a reproducible basis for the analysis of stylistic variation within Riparo Tagliente and for future comparative research on Late Epigravettian and other Upper Palaeolithic graphic traditions.

Résumé

Ce travail présente une réévaluation stylistique systématique de la production graphique figurative gravée sur supports mobiliers de Riparo Tagliente (Vérone, Italie), l'un des sites clés de l'Épigravettien final en Italie du Nord. Bien que des artefacts individuels de l'assemblage aient été publiés au cours de plusieurs décennies, le corpus figuratif gravé n'avait jusqu'à présent pas fait l'objet d'un examen exhaustif au moyen d'un cadre stylistique standardisé.

L'objectif de cette recherche est de caractériser les conventions graphiques employées dans la construction des représentations animales, d'étudier leur variation au cours de la séquence de l'Épigravettien final et d'évaluer leurs correspondances avec les traditions graphiques contemporaines d'Europe occidentale, notamment celles du Magdalénien moyen récent et supérieur et, lorsque cela est pertinent, de l'Azilien ancien.

L'étude porte sur un corpus révisé de 48 artefacts, comprenant 42 artefacts gravés correspondant à 45 unités graphiques gravées, ainsi que cinq objets figuratifs tridimensionnels et un artefact sans unité graphique identifiable, conservé dans le corpus parce qu'il est présenté comme un objet figuratif au Musée archéologique national de Vérone.

L'analyse repose sur un protocole d'enregistrement standardisé appliqué à deux niveaux complémentaires: l'artefact et l'unité graphique. Le cadre analytique enregistre des variables relatives à la construction graphique, aux éléments graphiques internes et au remplissage, aux caractéristiques et détails anatomiques, à la posture, à l'orientation, à la perspective et au mouvement.

Les résultats indiquent un répertoire graphique récurrent mais présentant une variabilité interne. La construction linéaire continue constitue le procédé graphique le plus répandu, tandis que les lignes multiples et parallèles sont régulièrement intégrées aux contours externes, aux éléments internes et aux détails anatomiques. Les lignes parallèles sont particulièrement fréquentes dans le rendu de la pilosité faciale, mais leur présence dans d'autres contextes indique qu'elles ne correspondent pas à une fonction graphique unique. Les caractéristiques anatomiques, notamment les yeux, les bouches, les oreilles et les cornes ou bois, présentent également différents traitements formels plutôt qu'un mode de représentation unique et standardisé. L'organisation stylistique du corpus repose donc sur la combinaison récurrente de plusieurs procédés graphiques plutôt que sur une formule graphique homogène ou rigide.

L'analyse diachronique met en évidence une continuité associée à une variation sélective au cours des trois phases de la séquence de l'Épigravettien final à Riparo Tagliente. Les constructions simples, continues et fermées se retrouvent tout au long de la séquence, tandis que les lignes parallèles présentent une distribution plus différenciée, étant relativement rares dans la phase la plus ancienne et plus fréquentes dans les phases intermédiaire et récente. Ces différences n'indiquent pas une augmentation progressive de la complexité graphique ni l'émergence de styles chronologiques clairement distincts, mais plutôt des changements dans la distribution et la combinaison de conventions graphiques particulières.

L'analyse comparative se concentre sur des assemblages sélectionnés du Magdalénien moyen récent et supérieur, avec du matériel azilien ancien pris en compte lorsque cela est pertinent pour la partie plus récente de la séquence de Riparo Tagliente. Des correspondances spécifiques sont observées dans la construction des contours continus, le traitement de l'œil et de la pilosité faciale, ainsi que dans certains aspects des cornes et des bois, mais aussi dans les proportions et l'organisation générale de certaines figures animales. Ces similitudes concernent des combinaisons particulières de caractéristiques graphiques et anatomiques plutôt que des motifs isolés. Elles ne démontrent pas une continuité stylistique directe entre les traditions épigravettienne et magdalénienne, mais identifient des points spécifiques de convergence graphique qui constituent une base pour approfondir l'étude des relations entre l'Épigravettien final et d'autres traditions graphiques du Paléolithique supérieur.

En établissant un corpus structuré intégrant du matériel publié et inédit, cette étude fournit une base reproductible pour l'analyse de la variation stylistique à Riparo Tagliente ainsi que pour de futures recherches comparatives sur l'Épigravettien final et d'autres traditions graphiques du Paléolithique supérieur.

Introduction

Portable graphic production provides valuable evidence for the study of past societies, offering insights into processes of interaction, cultural transmission and the circulation of shared graphic conventions (Paillet & Paillet 2022). The development of analytical techniques and approaches has further expanded the possibilities for the systematic study of Palaeolithic portable art (Alcolea-Gonzalez *et al.* 2015; Bahn 2010). Within this context, the figurative engraved assemblage from Riparo Tagliente has not previously been subjected to a systematic and comprehensive reappraisal based on a standardised analytical framework.

Riparo Tagliente occupies an important position in discussions of the Late Glacial recolonisation of the south-eastern Alpine region after the Last Glacial Maximum (Fontana *et al.* 2009, 2018). Its assemblage has also attracted attention because of the stylistic connections proposed between some of its representations and graphic traditions documented elsewhere in Europe, particularly within the Magdalenian of western Europe, as well as within later Epigravettian contexts in the Balkans and eastern Europe (Leonardi 1988; Martini 2005, 2012, 2016).

Against this background, the principal aim of this work is to provide a systematic stylistic analysis of the figurative engraved graphic production on portable supports from Riparo Tagliente. The study considers 48 artefacts, including 42 engraved artefacts that correspond to 45 engraved graphic units, and employs a standardised recording protocol to document graphic construction, internal elements, anatomical features, posture, orientation and perspective. The resulting database provides the basis for the analysis of recurring stylistic patterns and their chronological distribution within the Late Epigravettian sequence. A core subset of 12 graphic units is then used for more detailed stylistic and comparative analysis. The comparison focuses principally on selected Later Middle and Upper Magdalenian assemblages, with Early Azilian material considered where relevant to the later part of the Riparo Tagliente sequence.

The thesis first presents the climatic, environmental and cultural context of the Late Glacial and the archaeological framework of Riparo Tagliente, before introducing the theoretical and methodological framework and presenting the descriptive, stylistic, chronological and comparative analyses.

1. The Late Glacial Context

Riparo Tagliente (RT) is important both for its portable graphic production and for the evidence it provides for reconstructing the environmental conditions and human reoccupation of the Alpine region after the Last Glacial Maximum. The shelter was the first site to be reoccupied during this critical phase (Montoya *et al.* 2015, Fontana *et al.* 2018).

1.1 Chronological and Environmental Context of the Late Glacial

The Late Glacial is generally dated between 19 and 11.8 ka cal BP (Ravazzi *et al.* 2007). While its end is clearly marked by the abrupt climatic change at approximately 11.57 ka cal BP, its beginning is more difficult to define because the onset of deglaciation varied regionally (Ravazzi *et al.* 2007). In the south-eastern Alps, deglaciation began approximately 3500 years before the onset of the Bølling–Allerød Interstadial, with Alpine glaciers retreating from the piedmont amphitheatres between 21 and 18 ka cal BP and creating increasingly favourable conditions for human reoccupation (Ravazzi *et al.* 2007).

Epigravettian groups progressively reoccupied the south-eastern Alpine region during this phase, as documented by sites distributed from valley floors, such as Riparo Villabruna (Aimar *et al.* 1993), to higher-altitude environments, such as Grotta del Clusantin (Peresani *et al.* 2008). The landscape probably consisted of a mosaic of open woodland and scrubland associated with steppe and semi-desert environments (Bartolomei *et al.* 1982).

During the Bølling–Allerød Interstadial, the tree line rose rapidly to approximately 1700 m a.s.l., accompanied by increasing forest density (Ravazzi *et al.* 2007). Forests surrounding Riparo Tagliente were dominated by *Pinus sylvestris*, *Betula*, *Larix* and *Juniperus* (Cattani, in Bartolomei *et al.* 1982). Forest expansion continued during the interstadial, with a slight regression during the Older Dryas at approximately 13 ka cal BP, before the onset of the Younger Dryas at approximately 12.9 ka cal BP (Tomasso *et al.* 2018). With the beginning of the Holocene, forest expansion resumed.

2. The Late Glacial cultural context

2.1 The Epigravettian: Definition and Historiography

One of the first attempts to provide a unified framework for the post-Gravettian lithic industries of Italy was made by Georges Laplace (1966), following decades of terminological debate. In 1912, Henri Breuil distinguished two broad Upper Palaeolithic provinces, Mediterranean and Atlantic, the former included the coast of North Africa, Sicily, the Italian Peninsula and Provence, and the latter extending across central and western Europe, from Poland to the Pyrenees and the Cantabrian region.

During the first half of the twentieth century, several terms were proposed for the Italian Upper Palaeolithic. Raymond Vaufrey adopted the term *Grimaldian*, originally coined by Rellini and derived from the *Grotte des Enfants*, in preference to A. Mochi's *Talamonien* (1913) (Vaufrey 1928). Subsequent excavations at Riparo Mochi, however, showed that the *Grimaldian* resulted from a misinterpretation linked to excavation methods, and the term was abandoned. In 1954, A. M. Radmilli proposed the term *Bertonian* for an Upper Palaeolithic facies in Abruzzo, although this geographically defined term encompassed “plusieurs

complexes industriels appartenant à des moments successifs de l'évolution des industries post-gravettiennes et formant vraisemblablement une série phylogénétique" (Laplace 1966, p. 313).

By the mid-twentieth century, no consensus had been reached regarding the terminology used to define the Italian Upper Palaeolithic. Laplace therefore proposed the term *Tardigravettian* for the Italian post-Gravettian sequence, recognising a degree of continuity with the preceding Gravettian tradition (Laplace 1966). As regional variability became increasingly recognised, however, the idea of a homogeneous Tardigravettian was progressively challenged. Although the earliest phases retained a strong Gravettian background (Martini 2023; Palma di Cesnola *et al.* 1983), later research emphasised the development of regional traditions, and the term *Epigravettian* gradually replaced *Tardigravettian* (Bartolomei *et al.*1979; Mussi 2002). Laplace's tripartite framework was nevertheless retained, with the three phases subsequently referred to as the Early, Evolved and Final Epigravettian (Palma di Cesnola 1993; Martini 2023; Fasser 2024).

The difficulty of clearly distinguishing the Evolved and Final Epigravettian, together with pronounced regional variability across the Italian Peninsula, led Alberto Broglio (1997) to propose a bipartite subdivision. In this framework, the Early Epigravettian corresponds to industries dating to the second half of the Last Glacial Maximum, up to approximately 16.5 ka cal BP, whereas the Late Epigravettian encompasses industries associated with the Late Glacial (Broglio 1997). This subdivision is particularly relevant to north-eastern Italy and is the chronological framework adopted in the present study.

2.2. Epigravettian Graphic Production in Italy

Italian Late Glacial portable art has been interpreted through several broad graphic tendencies, including a Franco-Cantabrian sphere characterised by attention to anatomical proportions and details, a Mediterranean sphere marked by greater formal simplification, a more explicitly schematic style based on linear and essential graphic modules, and, towards the end of the Palaeolithic, an Azilian phase characterised by painted pebbles decorated with dots, lines and segments (Martini 2019). These forms of graphic production occur throughout the Italian Peninsula, although portable art represents the most widespread form of Late Upper Palaeolithic graphic expression.

Of particular relevance to Riparo Tagliente is the north-eastern Italian and south-eastern Alpine area, which includes important Late Epigravettian sites such as Riparo Dalmeri and Riparo Villabruna. Riparo Dalmeri, located at approximately 1240 m a.s.l., yielded 217 ochre-bearing stones, including 23 with 25 zoomorphic representations and 9 with 11 anthropomorphic figures (Broglio & Dalmeri 2005; Cusinato & Dalmeri, in Martini 2005). According to Martini

(2005), the zoomorphic corpus tends towards formal simplification while retaining variability in the representation of behaviour and attitudes.

Riparo Villabruna, located in the Cismon Valley at approximately 510 m a.s.l., is particularly significant for the association between a burial and painted ochre stones, interpreted as evidence of a possible ritual practice. Its graphic production shares several characteristics with that of Dalmeri, including relatively unmarked contours, extensive ochre coloration and limited anatomical detail (Broglio, in Martini 2005). Broglio (in Martini 2005) consequently suggested that the two sites may have been occupied by the same cultural group.

This regional context provides an important framework for understanding Riparo Tagliente. Unlike Dalmeri and Villabruna, whose graphic productions are particularly characterised by painted stones, the Tagliente corpus consists primarily of engravings. Previous studies have described its figurative engravings as showing careful attention to animal representation and anatomical proportions (Broglio, in Martini 2005).

2.2.1 Graziosi's Interpretative Model of the Artistic Provinces

The rapid increase in Upper Palaeolithic discoveries during the first half of the twentieth century highlighted the need for an interpretative framework capable of accounting for the growing variability of the Italian archaeological record. Paolo Graziosi provided one of the first major contributions to this debate through his earlier work (Graziosi 1932, 1936), culminating in *L'arte dell'antica età della pietra* (1956). He proposed two broad artistic provinces, the Franco-Cantabrian and the Mediterranean, conceived primarily as geographical areas characterised by different graphic tendencies while sharing a common cultural background.

The Franco-Cantabrian province was predominantly characterised by naturalistic representation, with carefully proportioned animal figures, abundant anatomical detail and dynamic compositions. The Mediterranean province, extending from the eastern coast of Spain through the Italian Peninsula to North Africa, showed a stronger tendency towards formal simplification and schematic representation. These distinctions referred to predominant graphic tendencies rather than exclusive repertoires, as figurative and geometric motifs occurred in both provinces.

Graziosi did not regard the two provinces as rigid stylistic entities and recognised areas of interaction between them, including Mediterranean contexts such as Addaura and Levanzo, where strongly naturalistic expressions occur. He nevertheless interpreted the Mediterranean facies as a later development of Italian Palaeolithic art, following the diffusion of Franco-Cantabrian traditions into the peninsula (Graziosi 1973).

This framework was subsequently developed by Radmilli (1992), who associated the progressive geometrisation of the Mediterranean province with the later development of Mesolithic portable art.

2.2.2 Graziosi's Legacy: Martini and Montoya

The interpretative framework proposed by Paolo Graziosi has strongly influenced subsequent research on Italian Upper Palaeolithic art. Fabio Martini further developed this model, viewing the Franco-Cantabrian and Mediterranean provinces not as mutually exclusive entities, but as broad tendencies that could coexist within the same geographical area, and even on the same object (Martini 2005a; 2012).

An example is an engraved equid scapula from Layer 8 at Grotta Paglicci. One face bears three simple zoomorphic profiles, rendered according to a markedly geometrising layout and described by Martini as a “less elaborate” visual language (Martini 2016, p. 56). The opposite face, however, preserves a hunting scene that “without any doubt” (Martini 2016, p. 56) recalls the naturalistic productions of Western Europe through its attention to anatomical detail and proportional accuracy.

Martini further developed Graziosi's model by emphasising the growing importance of eastern European influences during the latest phases of the Epigravettian, with Riparo Tagliente occupying a central position in this interpretation (Martini 2012). The engraved bison pebble from Tagliente, for instance, combines conventions associated with the Franco-Cantabrian tradition, particularly in the rendering of the muzzle and horns, with more schematic treatments that Martini interprets as local reinterpretations of these models. Martini also identified eastern connections in the three-dimensional production of the site. The so-called “hare” (Martini 2012, 2026), is characterised by a manufacturing process based primarily on scraping and by a schematic rendering comparable, according to Martini (2005, 2012, 2016), to Late Epigravettian productions of the Pontic steppes and the Danubian basin. He further noted parallels between the decorative motif on the object and an engraved pebble from Crimea (Martini 2012, 2016).

On this basis, Martini proposed that Italian visual culture during the final millennia of the Epigravettian became organised into two broad macro-areas. The Tyrrhenian area, including Sicily, retained stronger Franco-Cantabrian traditions alongside Azilian-inspired elements, whereas the Adriatic area showed closer connections with eastern European graphic traditions.

A further distinctive aspect of Martini's approach is his use of the concept of “visual culture” (Bellini, in Martini 2016). Unlike Montoya (2008), who seeks to establish a relationship between changes in lithic technology and transformations in figurative graphic production during the Recent Epigravettian, Martini considers visual culture to be a relatively autonomous domain, characterised by temporal dynamics that do not necessarily correspond to those of lithic technology.

Montoya (2008) nevertheless proposed a different model, identifying two stages in the development of figurative production. The first, preceding 13 ka BP, is characterised by a

naturalistic style, with Riparo Tagliente representing one of the emblematic expressions of this Franco-Cantabrian-inspired phase. According to Montoya (2008), the figures from Tagliente display careful attention to anatomical details and proportions, as illustrated by the ibex head, the so-called “big lion” from the burial and the bison. The second phase, dated to around 13 ka BP, is instead characterised by a progressive loss of anatomical precision and an increasing tendency towards schematisation. Montoya identifies examples at Riparo Villabruna A (US 17–6) and Riparo Dalmeri (US 15), together with an increasing presence of schematic and abstract figures and a greater use of ochre. He summarises this transformation as follows: “par comparaison avec les figures animales de la Phase 1 de l’abri Tagliente, on constate que leur représentation apparaît comme moins réaliste. On observe ainsi une simplification des contours et des traits du sujet qui se traduisent par un moindre soin accordé à la représentation de certains caractères anatomiques et surtout à une perte de proportions du corps” (Montoya 2008, pp. 50–51).

3. Riparo Tagliente (The Tagliente Rockshelter)

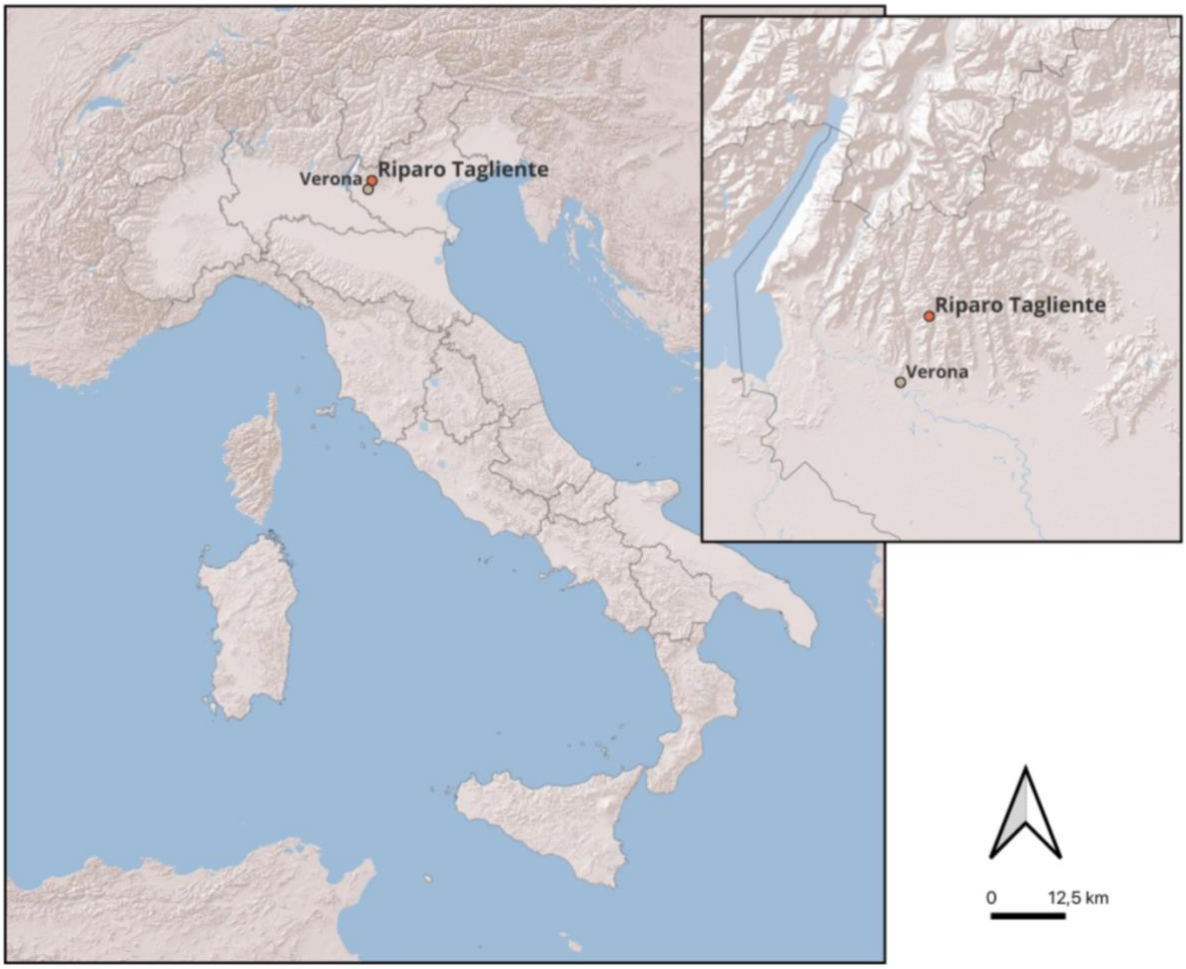


Figure 3.1 Riparo Tagliente’s location in northern Italy. The inset shows the geographical position of the site with respect to the city of Verona.

3.1 Discovery and History of Research

Originally known as *Covolo delle Tessare*, Riparo Tagliente was discovered in 1958 by Francesco Tagliente. The rockshelter is located at approximately 226 m a.s.l. on the left side of the Valpantena Valley, at the foot of Monte Tregnago in the Lessini Mountains, near Stallavena (Verona).

Following its discovery, the site was reported to the Natural History Museum of Verona, which began archaeological investigations between 1962 and 1964 under the direction of Francesco Zorzi, with the collaboration of A. Pasa and F. Mezzena. Excavations resumed in 1967 under the joint responsibility of the University of Ferrara and the Natural History Museum of Verona, initially directed by Piero Leonardi and subsequently by Alberto Broglio and Antonio Guerreschi. Investigations are currently conducted under the scientific direction of Federica Fontana.

The excavations revealed a long occupational sequence extending from the Middle Palaeolithic to the Late Upper Palaeolithic, including Mousterian, Aurignacian and Epigravettian occupations. Among the most significant discoveries is the Late Epigravettian burial. Although the grave had been disturbed during a later historical period, probably in the Middle Ages, an intervention affecting its upper part resulted in the loss of the remains from the pelvis upwards (Bartolomei *et al.* 1974). Despite these disturbances, several grave goods remained *in situ*, including an engraved limestone slab depicting a lion covering the body, a stone bearing traces of red ochre between the feet, and a bison horn near the right thigh (Broglio, in Martini 2005).

3.2 The Stratigraphic Sequence

As anticipated above, the archaeological sequence of Riparo Tagliente extends from the Middle Palaeolithic to the Late Upper Palaeolithic. The Mousterian and Aurignacian deposits are separated from the overlying Epigravettian sequence by a pronounced erosional surface produced by flooding episodes of the Progno di Valpantena stream (Bartolomei *et al.* 1982). This erosional event removed part of the archaeological deposit and is generally associated with the geomorphological changes accompanying deglaciation before the Bølling–Allerød Interstadial. The Epigravettian deposits subsequently accumulated above this unconformity and document repeated human occupations throughout the Late Glacial.

3.2.1 The Main Stratigraphic Sequence (The transversal trench)

The Epigravettian deposits vary considerably in thickness, from approximately 50 cm in the innermost sector of the rockshelter to more than 2 m in the outer area of the shelter, reflecting the greater accumulation of anthropogenic sediments outside the shelter.

Following the stratigraphic subdivision proposed by Bartolomei *et al.* (1982), the Late Epigravettian sequence is divided into three principal subphases: 2a, 2b and 2c. Subphase 2a (US 25–18) forms the basal portion of the sequence and consists predominantly of gravels deposited during fluvial incision associated with the Progno di Valpantena. Subphase 2b (US 18–15) consists of breccias embedded in a silty loess matrix and contains the earliest evidence of sustained Late Epigravettian occupation. The uppermost subphase, 2c (US 14–5), consists mainly of breccias alternating with anthropogenic deposits associated with repeated occupation.

3.2.2 The Late Epigravettian Deposits of the inner area (protected by the rockshelter)

The stratigraphy of the innermost sector differs from that documented in the external excavation area. Based on renewed excavations, Fontana *et al.* (2018) identified four successive occupational phases broadly corresponding to subphase 2b.

Phase 1, represented by US 13aβ and associated units, corresponds to the earliest Epigravettian occupation of the inner sector. Phase 2 records continued occupation and sediment accumulation within US 13aβ. Phases 3 and 4 correspond to the formation and expansion of US 13aα, the principal occupation horizon in the inner sector, consisting of compact silty sediments rich in ash and extending over approximately 18 m², with a thickness of 15–20 cm (Fontana *et al.* 2018). The final deposit, US 13a, consists of a hollow excavated into US 13aα and contains a hearth-pit and a small pebble accumulation (Fontana *et al.* 2018). These features indicate that the inner area of the shelter was used for domestic activities centred around hearths.

3.2.3 Chronological Framework of the Epigravettian Sequence

Available radiocarbon determinations indicate that the Late Epigravettian occupation of Riparo Tagliente spans several millennia of the Late Glacial. The earliest AMS determination currently available derives from US 13aα and dates to 17.219–16.687 cal BP (13.986 ± 60 BP), providing the oldest secure evidence currently available for Epigravettian occupation at the site (Fontana *et al.* 2015; Fontana *et al.* 2018). Additional determinations from US 15–16 and the 10–8 excavation trench indicate that occupation continued until at least 14.535–13.472 cal BP. Together, these dates provide evidence for repeated human occupation of the rock shelter over approximately four millennia and provide the chronological framework for the archaeological assemblages discussed below.

4. Archaeological Record

4.1 Archaeofaunal Remains

Reconstructing the faunal assemblage is important for understanding the environmental conditions and subsistence strategies of the Late Epigravettian groups who occupied Riparo Tagliente. The assemblage comprises more than 695 000 remains, of which 8620 have been identified to taxon, and is highly fragmented, with approximately 91% measuring less than 2 cm (Fontana *et al.* 2009). Fragmentation primarily reflects human processing of carcasses for the exploitation of meat and hard tissues, although trampling, weathering and carnivore gnawing also contributed to the formation and preservation of the assemblage.

The archaeozoological evidence identifies two principal faunal phases corresponding broadly to the environmental evolution of the site. The earlier phase (US 17–14) is characterised by taxa adapted to colder conditions, whereas the later phase (US 12–5) reflects the progressive establishment of more temperate environments (Peretto, in Broglio *et al.* 1982; Fontana *et al.* 2009, 2012).

Red deer (*Cervus elaphus*) is the dominant taxon throughout the sequence, with 4,522 identified specimens, while ibex (*Capra ibex*) is particularly abundant in the lower levels and subsequently declines. Roe deer (*Capreolus capreolus*) appears from US 14 and becomes increasingly important (Fontana *et al.* 2009). Other taxa include bison/aurochs, chamois, *Equus hydruntinus*, hare, beaver and marmot, together with several carnivores, including wolf, cave lion, lynx, wolverine and marten (Cassoli *et al.*, in Martini 2005).

Cut marks on some carnivore remains indicate that at least part of this fauna was exploited by the site's occupants, while analyses of foetal and neonatal remains and tooth eruption patterns suggest occupation during much of the year, particularly in summer (Cassoli *et al.*, in Martini 2005). Overall, the archaeofaunal assemblage documents both Late Glacial environmental change and the subsistence practices of the site's occupants.

4.2 Osseous assemblages

The osseous industry from Riparo Tagliente was manufactured mainly from red deer, roe deer and, to a lesser extent, ibex, and comprises approximately one hundred bone and cervid-antler artefacts (Fontana *et al.* 2009). The main category consists of spear points made from cervid antler, including five complete specimens and several fragments. Although their morphometric characteristics have no exact parallels in the published literature, they are generally assigned to the double-pointed spear category defined by Delporte and Mons (Cilli & Gurioli 2005).

The assemblage also includes pointed implements or awls made on bone and antler, as well as a bone spatula of approximately 15 cm, interpreted as a tool associated with hide-working

activities. A small group of around ten artefacts remains of uncertain function, including an ibex metacarpal with an incomplete perforation whose abrasion suggests deliberate manufacture. Overall, the osseous industry provides evidence for the exploitation of animal resources and for the technological practices of the Late Epigravettian occupants of Riparo Tagliente.

4.3 The Late Epigravettian Lithic Assemblage

Provenance studies indicate that most of the flint exploited at Riparo Tagliente originated within approximately 15 km of the site, or up to 20 km according to Fontana *et al.* (2018). The procurement territory included the Valpantena, Mizzole Valley, Boscochiesanuova and Grezzana. Maiolica was the most intensively exploited lithotype, accounting for approximately 80% of the assemblage, a pattern also observed at neighbouring sites such as La Cogola and Riparo Villabruna.

The Epigravettian lithic assemblages reflect a well-developed blade and bladelet technology characteristic of the Late Epigravettian of northern Italy. The retouched toolkit is dominated by burins, end scrapers and backed armatures (Guerreschi 1982). Elongated end scrapers predominate in the earlier units (US 16–11), whereas short end scrapers become more frequent in the later units (US 10–4). The armature assemblage includes a wide range of backed bladelets and points, among which small straight-backed armatures are particularly common (Guerreschi 1982).

4.4 Ornamental Objects

Ornamental objects constitute an important component of the Late Epigravettian material culture at Riparo Tagliente. The ornamental assemblage consists primarily of modified mammal teeth and marine shells, many of which preserve traces of anthropogenic transformation consistent with their use as suspended ornaments (Fontana *et al.* 2009, 2012; Cilli & Gurioli 2005).

Animal teeth include 96 atrophic red deer (*Cervus elaphus*) canines, of which 74 show no evidence of anthropogenic modification, 7 preserve traces of unsuccessful perforation attempts and 15 display complete perforations, suggesting their use as suspended ornaments (Fontana *et al.* 2009, 2012; Cilli & Gurioli 2005). The distribution of the perforated canines, which are predominantly associated with female individuals, may indicate a degree of selection in the manufacture of ornaments, although its significance remains uncertain. The canines occur throughout the Epigravettian sequence, particularly in US 7–10. Other modified animal teeth include a bovine lateral incisor and a wild boar lateral incisor, although their function remains uncertain.

Marine shells constitute the largest category of ornamental objects. The assemblage comprises at least 728 specimens representing 29 taxa, including 24 gastropods, 3 bivalves

and 2 scaphopods (Fontana *et al.* 2009, 2012; Cilli & Gurioli 2005). Approximately 90% of the assemblage belongs to *Tritia*, one of the most characteristic ornamental species within the Italian Epigravettian. Of the 256 perforated specimens, 208 belong to *Tritia*, indicating the preferential selection of this shell for ornamental use. Some shells also preserve traces of red ochre. Most specimens were recovered from the inner sector of the rockshelter, although smaller concentrations are also documented externally. With at least 728 specimens, the assemblage represents the richest Epigravettian shell collection currently known from north-eastern and Adriatic Italy (Fontana *et al.* 2009).

The assemblage also includes a single fossil specimen of *Aspa marginata*, a species that became locally extinct at the end of the Pliocene. Its presence has been interpreted as evidence for the deliberate exploitation of nearby Pliocene fossil outcrops, including those of Salò, Anzano di Vittorio Veneto and Bassano (Fontana *et al.* 2012).

4.5 The Portable Graphic Production

Riparo Tagliente preserves one of the richest assemblages of Late Epigravettian portable graphic production in the south-eastern Alpine region. The assemblage includes figurative, non-figurative and three-dimensional productions executed on organic and mineral supports. The currently known corpus consists of artefacts identified as decorated during excavation campaigns, although additional engraved objects may remain unidentified where traces are particularly faint or difficult to detect.

The engraved assemblage includes chert cortexes and nodules, bone and limestone blanks. Figurative and non-figurative productions differ partly in their choice of support: non-figurative engravings occur predominantly on lithic blanks, particularly chert cortexes, whereas figurative representations are distributed across a wider range of materials, including chert, bone and limestone. Although individual artefacts have been published over several decades (e.g. Leonardi 1988; Guerreschi 1984) previous studies have also contributed to the documentation of the assemblage, although attention often focused on a recurrent group of more complete figurative representations.

Ceregatti (2022) made an important contribution to its systematic documentation by proposing an inventory based on neutral identification codes, separating inventory from subsequent descriptive and interpretative analyses.

Figurative production



Figure 4.1. Selected figurative artefacts from Riparo Tagliente (photographs by the author)

Figurative engravings constitute a limited component of the engraved assemblage but represent the principal focus of the present study. Engraving is the predominant technique, while scraping and perforation are documented only occasionally.

The supports include chert, bone and limestone.

One engraved limestone slab recovered from the burial has been tentatively interpreted as representing female genitalia (Bartolomei *et al.* 1974; Guerreschi 1984, p. 274). If accepted, this would constitute the only anthropomorphic motif currently recognised within the assemblage. The remaining figurative representations depict animals, including probable horses, ibex, elk and bovids, as well as two engraved representations of cave lions, which are particularly noteworthy within the northern Italian Late Epigravettian record.

Non-figurative production

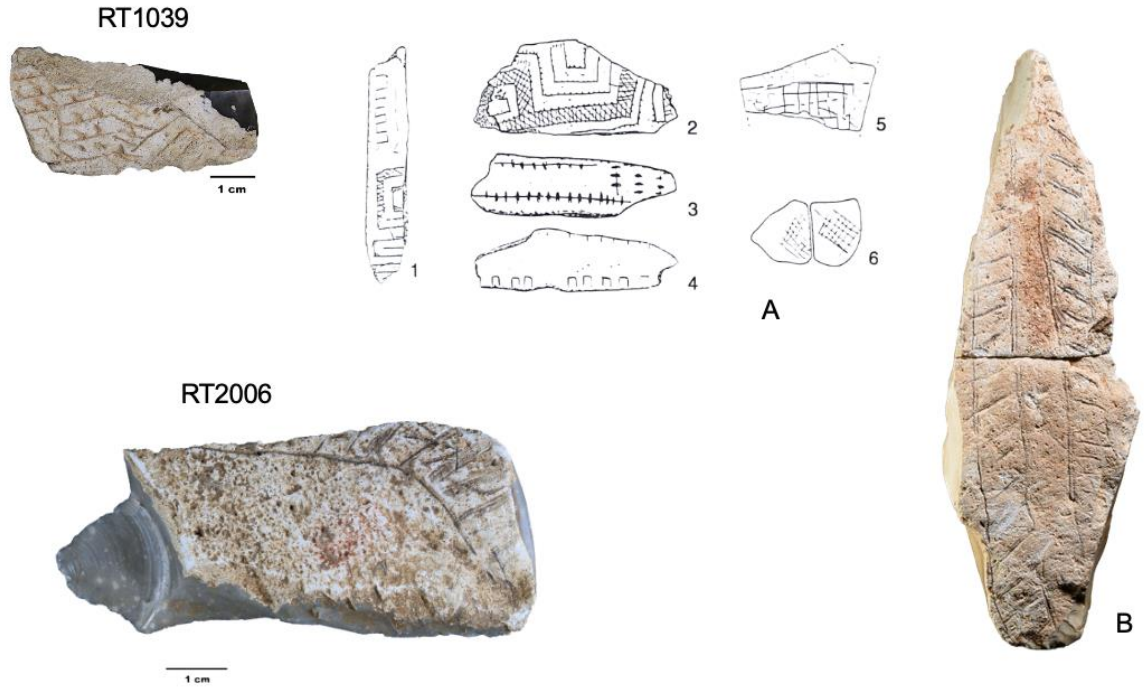


Figure 4.2. Examples of non-figurative graphic production from Riparo Tagliente. RT1039 and RT2006: photographs by the author; A) reliefs from the assemblage (Guerreschi 2005); B) photograph by Sigari.

Non-figurative or abstract engravings constitute the largest component of the engraved assemblage and occur predominantly on chert cortexes. They include structured geometric compositions, such as “ladder-like” and grid-like motifs, as well as simpler arrangements of isolated or parallel incisions. The term “ladder-like” is used here descriptively and does not imply a specific functional or symbolic interpretation. Some geometric engravings preserve traces of ochre, and deliberate fragmentation has also been documented among these objects (Guerreschi 1984). As non-figurative production is not the specific focus of this study, it is considered primarily on the basis of previous research

Three-dimensional objects

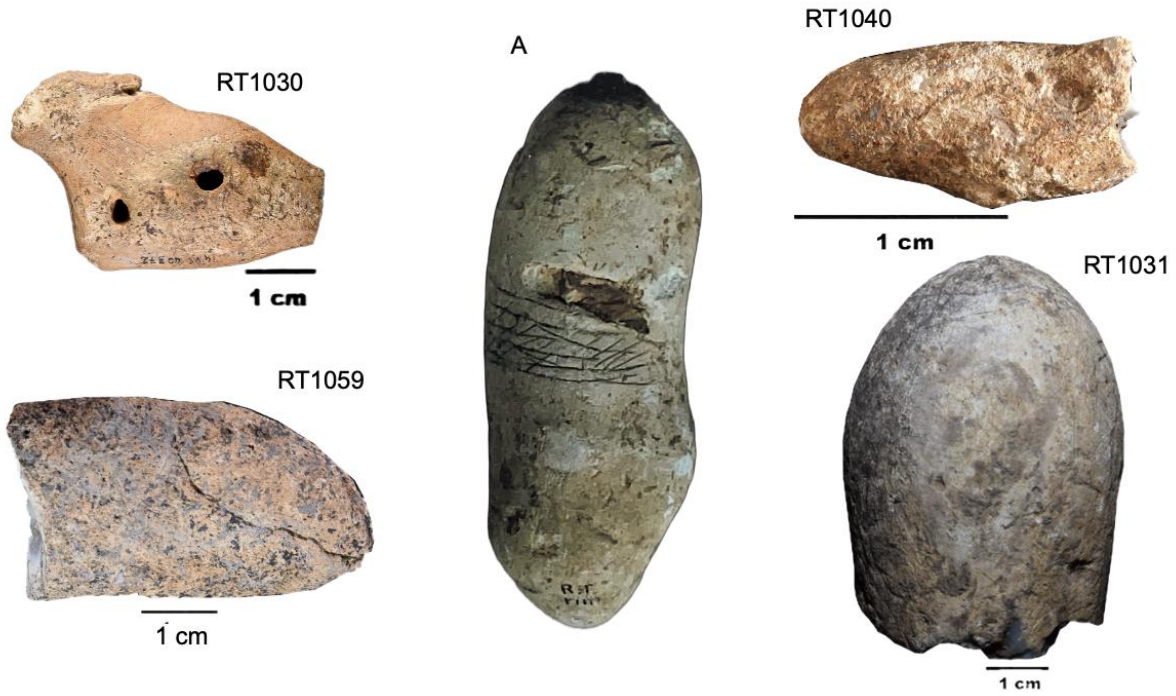


Figure 4.3. Three-dimensional objects from Riparo Tagliente: RT1030, RT1040, and RT1059 (photos by the author). A) Flint nodule bearing a band of linear engravings, possibly an amulet or figurine, from Riparo Tagliente (Guerreschi 1984).

A small number of artefacts combine graphic production with deliberate modification of the support itself. Their manufacture involved engraving and scraping, the latter contributing to the shaping of the overall morphology. Martini (2012, 2016) considered this technique particularly significant when discussing possible connections between the Tagliente assemblage and contemporaneous traditions of eastern Europe.

Among these objects is the so-called “hare” (Martini 2012, 2016), which has been interpreted as an animal representation. Other three-dimensional objects do not appear to depict identifiable figures. One example is an elongated chert nodule bearing fine linear engravings across its central band, interpreted by Guerreschi (2005) as resembling tattoos or decorative “belts”.

Colouring materials

Riparo Tagliente has also yielded a substantial assemblage of colouring materials, including yellow goethite and red haematite (Fontana *et al.* 2009, 2012; Cavallo *et al.* 2018). Mineralogical analyses indicate that most of the red pigment resulted from the thermal transformation of yellow ochre, while the Lessini Mountains provide an important source of these materials (Fontana *et al.* 2009; Cavallo *et al.* 2018).

The spatial distribution of ochre differs within the rockshelter, with yellow ochre occurring predominantly in the external area and red ochre concentrated mainly in the inner sector. This pattern has been interpreted as reflecting the acquisition of raw materials outside the shelter and their subsequent processing within the occupation area (Fontana *et al.* 2009). Pigments are also documented on engraved artefacts, marine shells and a stone recovered from the Late Epigravettian burial. Guerreschi (2005) proposed that the distribution of ochre and engraved objects may reflect different spheres of activity, with engraved artefacts associated primarily with everyday practices and ochre-painted stones with more exceptional or symbolic behaviours.

Taken together, the figurative, non-figurative and three-dimensional productions, together with the use of colouring materials, illustrate the diversity of graphic practices documented at Riparo Tagliente. Within this broader record, the figurative engraved corpus constitutes the focus of the present study**.**

5. Research Objectives and Questions

Although several engraved artefacts from Riparo Tagliente have been published over the past decades, their stylistic characteristics have not previously been systematically analysed as a corpus (Leonardi 1988; Guerreschi 1984; Graziosi 1973; Martini 2012). The present study addresses this gap by applying a structured analytical protocol to the site's zoomorphic figurative engraved production, integrating both previously published and unpublished material.

5.1 Research Questions

The present research addresses three interconnected research questions:

- Which stylistic conventions characterise the figurative repertoire of Riparo Tagliente?
- Can stylistic variability be observed throughout the Late Epigravettian sequence of the site?
- To what extent does the Riparo Tagliente assemblage share stylistic conventions with contemporary figurative graphic traditions west of the Rhône, particularly those of the Later Middle and Upper Magdalenian and, where relevant, the Early Azilian?

Together, these questions seek to characterise the stylistic variability of the figurative corpus from Riparo Tagliente and to assess its relationship with broader contemporary graphic traditions in Western Europe.

5.2 Research Objectives

To address these questions, the present study pursues two principal objectives.

The first is to provide the first systematic stylistic analysis of the figurative engraved graphic production on portable supports from Riparo Tagliente, integrating both published and unpublished material. Through the application of a structured analytical protocol, the study aims to characterise the stylistic variability of the corpus and investigate patterns of continuity and change through the Late Epigravettian sequence.

The second objective is to reassess the degree of stylistic similarity between the Riparo Tagliente corpus and contemporary figurative graphic traditions in western Europe, particularly those of the Later Middle and Upper Magdalenian and the Early Azilian. This comparative framework was selected because these traditions are broadly contemporary with different parts of the engraved assemblage from Riparo Tagliente and represent well-documented graphic traditions of the European Upper Palaeolithic. Their extensive documentation therefore provides a basis for systematic stylistic comparison. To ensure chronological consistency, only securely dated assemblages are included in the comparative analysis.

Ultimately, the study aims to establish a structured and reproducible analytical corpus that can support future comparative research on Late Upper Palaeolithic graphic traditions.

6. Style in Upper Palaeolithic Art: Theoretical and Analytical Framework

6.1 The Development of the Concept of Style

The interpretation of style has evolved alongside archaeological theory.

Within the culture-historical approach, style was regarded primarily as the expression of a cultural group. Individuals were considered passive transmitters of shared conventions, while stylistic variability reflected culturally inherited norms. In this perspective, style became one of the principal criteria for defining archaeological cultures and constructing chronological sequences (Domingo Sanz & Fiore 2014).

Processual archaeology challenged this interpretation by assigning a more active role to individuals and emphasising the relationship between style and function. Rather than being viewed exclusively as a cultural marker, style came to be understood as the product of multiple interacting factors, including technological constraints, functional requirements and social behaviour (Binford 1965). Consequently, stylistic variability was no longer interpreted solely as evidence of different cultural traditions.

Post-processual archaeology further expanded this perspective by emphasising agency, symbolism and social communication. Style was increasingly interpreted as an active medium through which individuals and communities negotiated identities and social relationships (Domingo Sanz & Fiore 2014). Within this framework, Wiessner (1983) distinguished between *emblemic style*, expressing group affiliation, and *assertive style*, communicating

aspects of individual identity. Similarly, Gell (1998) argued that recurrent stylistic attributes reflect broader systems of shared cultural knowledge rather than merely formal similarities. Despite their theoretical differences, these approaches share one important assumption: style is expressed through recurrent formal choices that can be identified, described and compared.

6.2 Leroi-Gourhan and Stylistic Chronologies

One of the most influential applications of the concept of style to Upper Palaeolithic archaeology was developed by André Leroi-Gourhan (1968), whose work strongly influenced the study of prehistoric art during the second half of the twentieth century. Within a culture-historical perspective, he proposed that stylistic change could be organised into a chronological sequence of four successive styles, each characterised by recurrent formal conventions and corresponding broadly to different phases of the Upper Palaeolithic.

Leroi-Gourhan's model assumed that figurative conventions evolved progressively through time, becoming increasingly standardised and naturalistic. Although this evolutionary interpretation has since been widely debated, his descriptive terminology remains fundamental and continues to provide the basis for much of the analytical vocabulary employed in the study of Palaeolithic art.



Figure 6.1 Representative bovids illustrating the stylistic sequence (Styles I - IV) proposed by Leroi-Gourhan. Examples are from Abri Cellier (Style I), La Grèze (Style II), Lascaux (Style III), and Altamira (Style IV).

Style I, corresponding broadly to the Aurignacian, represents the earliest stage of the sequence. According to Leroi-Gourhan, figures are generally “crude” (1968, p. 99) and often

limited to the head or forequarters of the animal. Anatomical details remain poorly developed, and representations are characterised by a marked degree of simplification.

Style II represents a transitional phase in which figures remain relatively schematic but begin to display recurring formal conventions. Horses are characterised by strongly arched necks, while bison exhibit markedly enlarged withers. Although proportions remain imperfect, these recurring features indicate the emergence of increasingly standardised graphic conventions.

Style III is characterized by a further development in the formal organisation of figures. Anatomical structures such as limbs, musculature and coats become more systematically represented, while recurring graphic conventions become progressively stabilised. According to Leroi-Gourhan (1968), this phase establishes a figurative code that reached its fullest expression during the Middle Magdalenian and became widespread throughout the Franco-Cantabrian region.

Style IV, which characterises the Middle and much of the Late Magdalenian, corresponds to the culmination of this stylistic development. It is distinguished by the abundance of decorated objects and by a pronounced degree of naturalism. One of its most characteristic diagnostic features is the M-shaped line connecting the forelimbs, abdomen and hind limbs, a convention that continues to represent one of the most widely recognised descriptive criteria in the study of Upper Palaeolithic figurative art.

Leroi-Gourhan's chronological model played a major role in shaping subsequent research on Upper Palaeolithic art. Although his framework was initially widely adopted, the development of direct dating methods from the 1990s onwards, particularly AMS radiocarbon dating, provided new evidence that challenged some of the chronological correlations established through stylistic analysis (Alcolea González & de Balbín Behrmann 2007). The discovery of Chauvet Cave was particularly influential in this debate, as direct dates indicated the presence of highly developed figurative representations during the Aurignacian, challenging a simple association between stylistic sophistication and later chronological phases.

These developments contributed to the emergence of a so-called post-stylistic approach, which questioned the reliability of stylistic criteria as chronological markers. The main criticism concerned the assumption of a progressive evolution from simpler to more complex graphic systems. Direct dating demonstrated that elaborate and naturalistic forms could occur at earlier dates than predicted by stylistic models, while stylistic variability could also reflect regional, cultural or functional differences rather than chronological change alone (Alcolea González & de Balbín Behrmann 2007). The distinction between Style IV and its proposed internal subdivisions was likewise reconsidered through stylistic and comparative studies, including the work of Clottes (1990).

The development of direct dating did not, however, lead to the complete abandonment of stylistic approaches. Alcolea González & de Balbín Behrmann (2007) argue that the apparent

contradictions between stylistic and absolute chronologies should be evaluated critically rather than interpreted as evidence for the irrelevance of stylistic analysis. Radiocarbon determinations may themselves be affected by methodological limitations, and their results need to be assessed alongside archaeological context, represented forms and technical characteristics. In this perspective, stylistic chronology remains a useful, although necessarily imperfect, framework when applied flexibly and in conjunction with other lines of evidence (Alcolea González & de Balbín Behrmann 2007).

This reassessment also led some authors to extend the stylistic sequence beyond Leroi-Gourhan's Style IV. Roussot (1990), for example, proposed a Style V in order to account for later graphic traditions that could not be adequately accommodated within the original sequence. Subsequent research has continued to debate the chronological and stylistic relationships between Late Palaeolithic and early Holocene graphic traditions, illustrating the limitations of treating stylistic categories as fixed and universally applicable chronological units (Roussot 1990; Bueno Ramírez 2007; Sigari & Bourdier 2026).

The history of Leroi-Gourhan's model therefore illustrates an important methodological point for the present study: stylistic similarities and differences can provide valuable evidence for describing and comparing graphic traditions, but they should not be interpreted as automatically expressing a linear chronological progression. The analytical value of style lies instead in identifying recurrent formal conventions whose chronological, regional and cultural significance must be assessed in relation to independent archaeological evidence.

The extension of Leroi-Gourhan's stylistic sequence beyond the Upper Palaeolithic remains debated. Guy (1993, 1997), for example, identified a series of characteristics regarded as distinctive of the French Epipalaeolithic (Laborian), including differences in the construction of figures, the treatment of contours and limbs, the organisation of internal details and the systematic absence of eyes. Likewise, Sigari & Bourdier (2026), in their reassessment of several Azilian and Late Epigravettian assemblages, argue for a marked discontinuity between the Early Azilian, which retains certain connections with the Final Magdalenian (see also Naudinot *et al.* 2017), and the Late Azilian. This discontinuity is evident not only in iconography but also in engraving techniques, the simplification of technical procedures, the increased predominance of monochrome red paintings and the preferential use of standardised pebbles as supports.

6.3 Operational Definition of Style

The present research does not seek to contribute to the broader theoretical debate concerning the nature of style. Instead, style is treated as an analytical tool for the systematic description and comparison of figurative representations.

Accordingly, this study adopts the operational framework proposed by Domingo Sanz & Fiore (2014), who distinguish three complementary dimensions of style: formal characteristics, concerning the morphology and organisation of graphic features; technological characteristics, including the choice of support, engraving techniques and manufacturing procedures; and functional characteristics, referring to the intended role of the object.

Within the present study, the analysis focuses primarily on formal characteristics, while selected technical aspects are considered insofar as they contribute to the description of graphic construction and production. Functional characteristics are not directly investigated because the archaeological evidence available for the engraved artefacts does not provide sufficient information to establish their intended use or function on a case-by-case basis.

The present study therefore focuses on formal characteristics and selected technological aspects that can be documented directly from the artefacts. The aim is therefore not to infer symbolic meanings from stylistic similarities, but to establish a reproducible framework for identifying and comparing recurrent graphic conventions within the figurative corpus of Riparo Tagliente.

This operational approach is translated into a structured analytical grid in which stylistically relevant features are recorded as observable variables. The resulting dataset provides the basis for the systematic comparison of graphic units within the Tagliente corpus and for the comparison of selected stylistic features with other Upper Palaeolithic assemblages.

6.4 Stylistic Comparison as a Tool for Cultural Analysis

Stylistic comparison constitutes an important means of placing archaeological assemblages within a broader cultural framework. Similarities and differences in graphic conventions can provide a basis for investigating possible patterns of interaction, transmission and cultural continuity beyond individual archaeological sites. They may therefore help assess whether communities shared stylistic traditions or were connected through broader networks of cultural exchange.

This perspective is particularly relevant when considering the mobility and territorial organisation of Upper Palaeolithic hunter-gatherer groups. Their use of space was likely structured differently from that of modern sedentary societies, with territories potentially characterised by greater flexibility, seasonal mobility and overlapping areas of interaction. As Sauvet (2014, p. 16) observes, « chaque groupe possède sa propre identité, mais celle-ci n’est pas attachée à un territoire défini ». Seasonal movements related to hunting, the procurement of lithic raw materials and other resources, as well as interaction between neighbouring groups, may have facilitated the transmission of technical knowledge, symbolic practices and graphic conventions across different regions.

Ethnographic observations provide examples of how social organisation and mobility can contribute to the circulation of stylistic conventions. Mauss and Beuchat (1904–1905), for instance, described seasonal patterns of dispersion and aggregation among Inuit communities. If comparable forms of seasonal mobility characterised Late Glacial hunter-gatherers, they could have contributed to the circulation of graphic conventions across geographically distant regions. At the same time, ethnographic research also demonstrates that artistic traditions may remain closely connected to local environments and social contexts (Chippindale & Nash 2004; Zawadzka 2016; Deacon 1988; Lewis-Williams 2010). Stylistic similarities should therefore not be interpreted exclusively as evidence of mobility or interaction but considered in relation to both broader networks and local contexts.

Archaeological evidence likewise suggests that stylistic traditions could circulate across relatively extensive geographical areas. Mountain regions, rather than necessarily constituting barriers, may also have functioned as areas of interaction between communities. The expansion of the Middle Magdalenian, for example, appears to have involved connections between the Pyrenean, Cantabrian and Aquitanian regions. Fritz *et al.* (2007) emphasised that connections between the Pyrenees and Cantabria were stronger than those between the Périgord and the Pyrenees (Tosello 2003; Sauvet 2008). The presence of Magdalenian assemblages as far as Poland further illustrates the broad geographical distribution of elated graphic traditions (Kozłowski *et al.* 2016).

These observations support the methodological relevance of stylistic comparison, while also highlighting its interpretative limitations. Similar graphic conventions cannot, by themselves, demonstrate direct cultural contact. They may instead result from shared traditions, repeated interactions, convergent developments, or the circulation of individuals and ideas. Stylistic comparison should therefore be understood as a heuristic tool for identifying patterns of similarity and difference, while the mechanisms underlying these relationships remain open to interpretation.

For this reason, the present study adopts the comparative criteria proposed by Sauvet (2014). First, the assemblages compared should be broadly contemporaneous, allowing “les différences comme les similitudes puissent être interprétées comme conséquences des relations que les groupes entretenaient entre eux” (Sauvet 2014, p. 16). Second, comparisons should involve the same formal category. In the present study, this criterion is addressed by focusing on figurative representations, principally zoomorphic motifs. This criterion is more difficult to apply to abstract or geometric signs because of their greater formal variability.

Finally, Sauvet recommends comparing artefacts belonging to the same technical category, such as engravings with engravings or paintings with paintings. This criterion cannot always be applied strictly, particularly when relevant stylistic similarities occur across different supports or technical media. In such cases, the present study pays particular attention to distinguishing

differences imposed by the support or technique from those that may reflect deliberate graphic choices.

7. Corpus and Methods

7.1 Recent Developments in the Documentation and Analysis of Upper Palaeolithic Graphic Production

Over the past three decades, research on Upper Palaeolithic graphic production has been characterised by both the expansion of the archaeological record and the development of new methods of documentation and analysis. The discovery and re-examination of decorated contexts have broadened the geographical and contextual framework within which prehistoric graphic production is investigated, while methodological advances have progressively enabled more detailed analyses of techniques, preservation and graphic features.

One important development has been the substantial increase in the number of documented decorated sites. This growth has resulted both from the discovery of new archaeological contexts and from the re-examination of previously investigated assemblages. In the Cantabrian region, for example, González-Echegaray recorded 55 decorated caves in 1978, whereas more than 135 sites are currently known (Alcolea-González & González-Sainz 2015). The recognition of open-air engraved sites, particularly on the Iberian Peninsula, has further broadened the traditional corpus of Upper Palaeolithic graphic evidence, with this region representing the richest European area for this category of evidence (Bueno Ramírez *et al.* 2007). Such contexts have encouraged renewed consideration of the relationships between graphic production, mobility, interaction and territorial organisation among hunter-gatherer communities (Bueno-Ramírez & Bahn 2015).

At the same time, increasing attention has been devoted to the systematic revision and contextual reassessment of previously known assemblages. This trend is reflected both in major monographic studies, such as the comprehensive publication of the Parpalló assemblage (Villaverde Bonilla 1994), and in the reanalysis of individual sites, including Grotta del Romito (Sigari 2020), Grotta Romanelli (Sigari 2023; 2026), Roc-aux-Sorciers (Bourdier 2016) and Cala dei Genovesi Cave (Tusa *et al*. 2013). Broader regional syntheses have likewise sought to integrate evidence from multiple sites in order to investigate patterns of cultural interaction and graphic variability (Bourdier 2010; Sigari 2020; Sigari & Bourdier 2026). Rather than considering decorated assemblages exclusively as isolated entities, these approaches emphasise the comparison of graphic conventions across regions and the identification of both similarities and differences.

Alongside these developments, methodological innovation has significantly expanded the ways in which prehistoric graphic production can be documented and analysed. Digital image

enhancement techniques, including DStretch and other colour-enhancement procedures, have facilitated the identification of painted motifs that are difficult to observe under normal viewing conditions, while uranium-thorium (U/Th) dating of calcite deposits has provided new chronological constraints for parietal art. In the study of engraving, microscopic analysis has provided new insights into engraving gestures and manufacturing processes, as demonstrated by Fritz's pioneering study of Magdalenian portable art (Fritz 1999). More recently, digital recording techniques, including high-resolution photogrammetry and Digital Elevation Models (DEM), have improved the documentation of extremely shallow engravings and facilitated the assessment of their visibility, preservation and technical characteristics (Jalandoni *et al.* 2017; Sanchez-Hernandez *et al.* 2025).

These developments have broadened the range of questions that can be addressed in the study of prehistoric graphic production. In addition to improving documentation, such approaches have contributed to the investigation of *chaînes opératoires*, engraving gestures, manufacturing processes and the relationship between graphic traces and their state of preservation. More broadly, they reflect a methodological shift from purely descriptive approaches towards increasingly systematic forms of recording and analysis, in which formal, technical and contextual evidence can be considered together.

The present study does not employ these techniques directly. Rather, it adopts the broader principle of systematic and reproducible recording that characterises much of recent research. The analytical protocol developed for the Riparo Tagliente assemblage focuses primarily on formal stylistic characteristics, complemented by selected technical and descriptive variables. These variables are recorded systematically for each graphic unit and provide the basis for the subsequent analysis of stylistic variability and comparison with other Upper Palaeolithic assemblages.

7.2 The figurative corpus of Riparo Tagliente

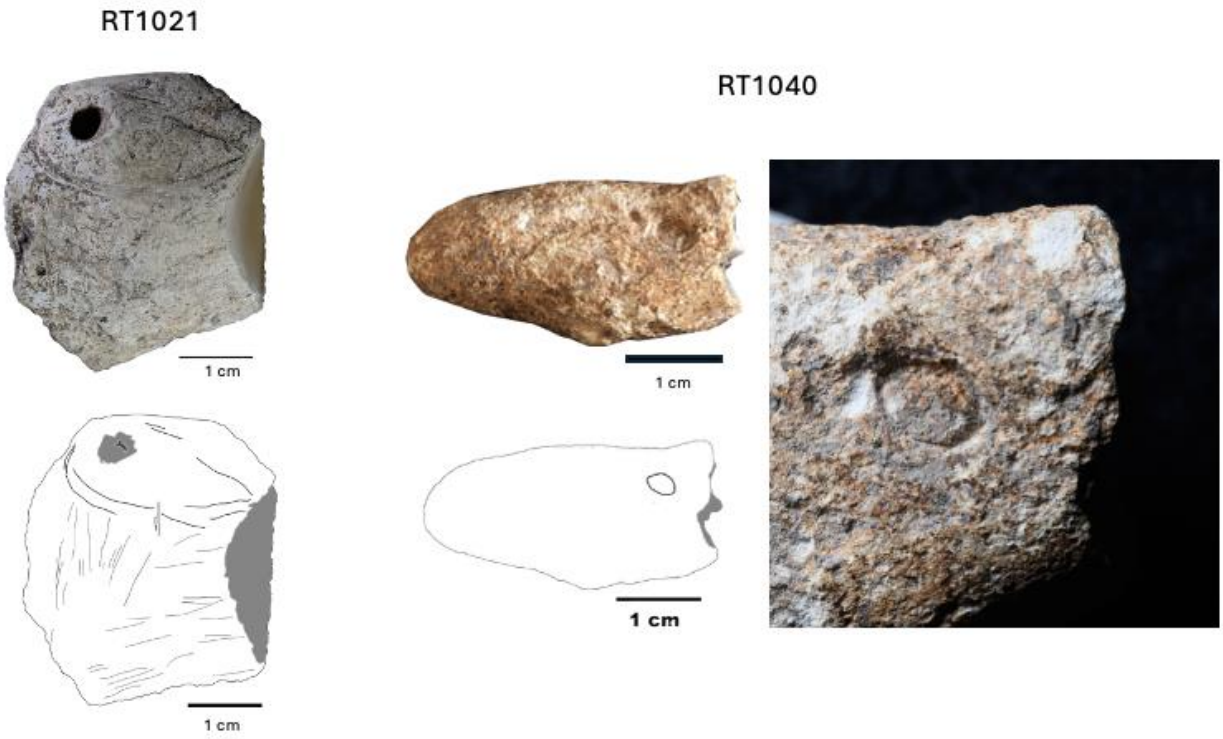


Figure 7.1 Examples of technical modifications of the supports: scraping (RT1021) and perforation (RT1040). For RT1021, photograph of the support and graphic rendering of the piece, highlighting the scraping traces and perforation. For RT1040, general photograph, detailed view of the perforation, and graphic rendering of the support.

Our documentary research, in the publications and the collections held in Verona and Ferrara, has brought together 42 engraved figurative, 5 three-dimensional figurative objects, and one artefact for which no graphic unit is retained in the present analysis. The latter was nevertheless recorded in the general database, as it is currently exhibited at the Verona Museum and is described as bearing figurative engravings interpreted as representing either a bovid or an equid.

An artefact refers to the physical object recovered from the archaeological context, whereas a graphic unit refers to an identifiable figurative representation occurring on that object. Most artefacts bear a single graphic unit, but three artefacts preserve two distinct graphic units: RT1025, RT2005 and RT2007. These are therefore recorded as RT1025A and RT1025B, RT2005A and RT2005B, and RT2007A and RT2007B, respectively. On this basis, the 42 artefacts bearing engraved figurative representations correspond to 45 graphic units.

The figurative corpus includes a variety of supports and manufacturing techniques. Engraved representations on two-dimensional supports (42) constitute the principal category and includes representations on chert cortex (31), pebbles (3), stone blocks (2), limestone plaques

(1), oolithic limestone (1) and bone (4). The corpus also includes five three-dimensional figurative objects, on which shaping was achieved through techniques such as scraping and, in one case, intentional perforation (RT1040), which was used to create the eye of the representation.

The engraved figurative corpus is itself characterised by substantial variation in preservation. Some representations are sufficiently preserved to permit the observation of a large number of stylistic and anatomical features, whereas others are fragmentary and allow only a more restricted set of observations. This condition is particularly important for the methodological structure of the study: the analytical grid was therefore not applied indiscriminately to every representation. Instead, the variables that could be recorded depended on the degree of preservation and visibility of the relevant graphic or anatomical feature. The treatment of these variables and the coding system adopted for observable and non-observable features are presented in the following section.

Within the 45 engraved graphic units, a core analytical subset of 12 graphic units was identified for the detailed stylistic analysis (RT1001, RT1002, RT1003, RT1006, RT2001, RT2002, RT2004, RT2005A, RT2005B, RT2007A, RT2007B and RT2008). This subset consists of the representations that provide sufficient preservation and graphic information to permit the application of the full analytical framework. The selection was not intended to replace the broader engraved corpus, but to provide a controlled analytical sample in which the maximum number of stylistic variables could be assessed consistently. The remaining graphic units are retained in the database and considered wherever their state of preservation permits the observation of individual variables.

Equid	1
Bovid	4
Caprid	2
Felid	2
Ungulate	2
Cervid	1

Tab. 7.1 Taxonomic composition of the core corpus of 12 graphic units.

To investigate stylistic variability through time, a separate chronological corpus was established (27 pieces). The chronological attribution is based on the stratigraphic position of each artefact and on the chronological framework available for the corresponding

archaeological unit. Fragmentary graphic units were retained when their stratigraphic and chronological information was sufficiently secure and the preservation of the relevant feature allowed its assessment.

7.3 Documentation and Analytical Methods

The database was organised at two complementary levels of documentation. The artefact-level record contains the general archaeological and contextual information for each object, whereas the graphic-unit-level record documents the individual figurative representations and their stylistically relevant features. Each artefact is identified by a unique ID. The prefix RT1 indicates artefacts currently held in Ferrara, whereas RT2 identifies artefacts held in Verona. Graphic units deriving from the same artefact are further distinguished by alphabetical suffixes where necessary (e.g. RT2005A and RT2005B).

The stylistic analysis was based on a structured analytical grid designed to transform qualitative observations of the engraved graphic units into a standardised dataset. The selection of variables was guided by the operational definition of style adopted in Chapter 6 and inspired by the framework proposed by Domingo Sanz & Fiore (2014), with particular emphasis on formal characteristics and on selected technical aspects relevant to the construction of the representations. The aim was to identify recurrent graphic conventions while maintaining a clear distinction between stylistic choices and features that primarily reflect the state of preservation of the artefacts.

The analytical grid comprises five criteria:

1) Graphic construction.

Variables record whether the figure is constructed through a single engraved line or multiple engraved lines, whether the contour is continuous or discontinuous, and whether it remains open or forms a closed configuration. These variables describe the structural organisation of the representation independently of its anatomical subject.

2) Internal filling.

The second group concerns the organisation of the graphic elements located within the external contour. The presence of interior filling is recorded, together with the form and, where applicable, the location. Internal graphic elements may occur as single, multiple or parallel lines.

3) Anatomical features and details.

The third group concerns the representation of anatomical features and details, including the head, limbs, eye, ear, mouth, nostril, facial hair and horn or antler. Where relevant, additional characteristics of these features are recorded, including their graphic configuration or shape. Horns and antlers are assessed only when these structures are anatomically applicable and

sufficiently preserved to be evaluated. Similarly, facial hair refers to beards in bovids and caprids and whiskers in felids.

4) State of preservation.

Preservation data are necessary for assessing the observational potential of each graphic unit and for determining which variables can be reliably recorded.

5) Posture, orientation, perspective and movement.

The final group concerns the spatial and dynamic characteristics of the representation. Orientation records the direction in which the depicted animal is facing, while perspective describes the spatial organisation of the representation according to the categories defined in the analytical glossary. Movement is recorded only when observable graphic evidence supports the interpretation of a dynamic posture, for example through the arrangement or position of the limbs. It is therefore not inferred from the identification of the animal alone.

7.4 Data Processing

Before statistical analysis, the dataset was checked for consistency and completeness, with particular attention to the identification of graphic units, the correspondence between artefact-level and graphic-unit-level records, and the treatment of observations that could not be reliably assessed.

The statistical analyses were conducted using RStudio. The dataset was imported into the R environment and processed to generate the descriptive statistics and graphical representations used in the subsequent analyses.

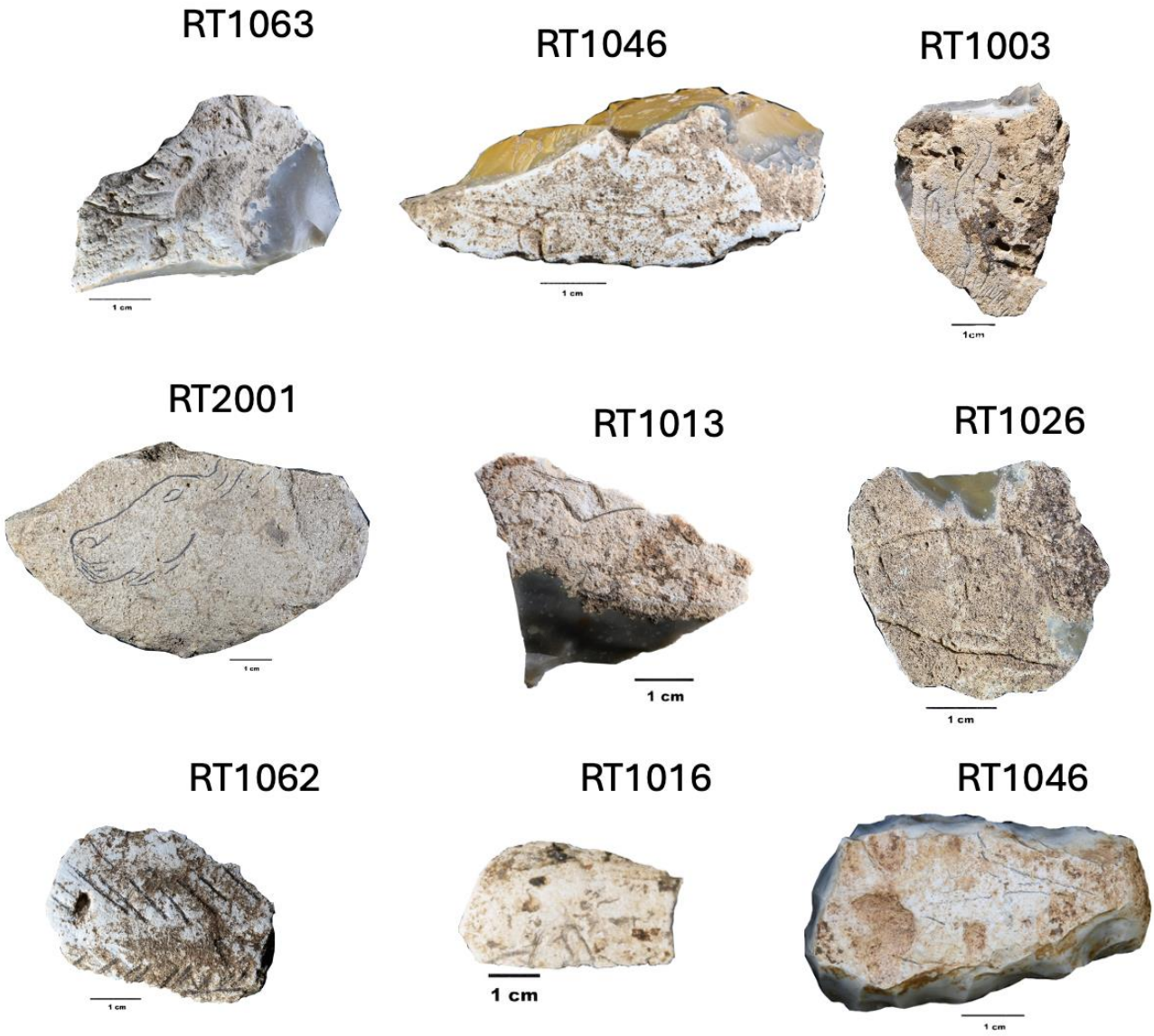
The processed dataset provided the basis for the descriptive, diachronic and comparative analyses presented in the following chapters.

The analytical grid was adapted to the state of preservation of each graphic unit. The complete set of variables could therefore only be applied where a sufficiently large portion of the representation was preserved and observable. More fragmentary graphic units were not automatically excluded from the analysis; instead, they contributed to the variables that could be assessed reliably on the preserved portion of the representation. The number of applicable variables consequently varies between graphic units. This approach makes it possible to retain the information provided by fragmentary representations while avoiding subjective reconstruction of features that are no longer observable.

For variables that require a binary assessment, a three-value coding system was adopted. A value of 1 indicates that the feature is present; 0 indicates that the feature is absent but observable; and NA indicates that the feature cannot be assessed reliably. NA therefore does not indicate absence. It is used when the relevant anatomical or graphic area is not preserved, not sufficiently visible, or when the variable is not anatomically applicable to the represented taxon. For example, an eye is coded as NA when the corresponding region of the head is not

sufficiently preserved to determine whether an eye was represented, whereas a value of 0 is assigned when the relevant area is preserved but no eye is depicted.

Not all variables are binary. Categorical variables are retained using descriptive categories rather than being converted into arbitrary numerical values. These include, for example, the configuration of the outline, the shape of anatomical features, perspective and orientation. Numerical values are used only where the variable represents a measurable count, such as the number of preserved limbs. The complete definitions and coding options for each variable are provided in the analytical glossary.


RT1063
RT1046
RT1003
RT2001
RT1013
RT1026
RT1062
RT1016
RT1046
1 cm

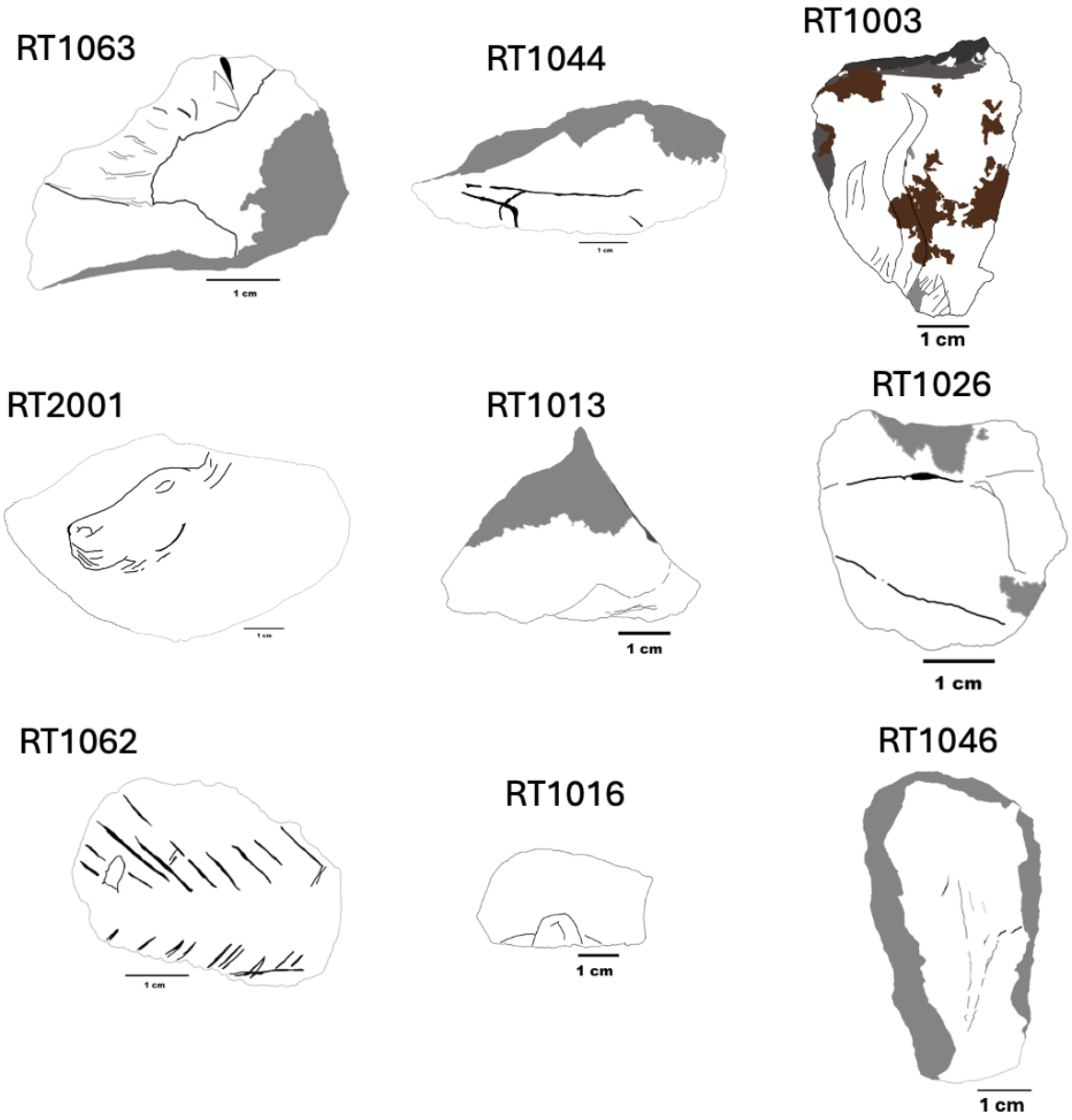


Figure 8.1. Photographic documentation and graphic tracings of the figurative artefacts from Riparo Tagliente.

8.1 Characteristics of the Engraved Figurative Corpus

8.1.1 Graphic construction

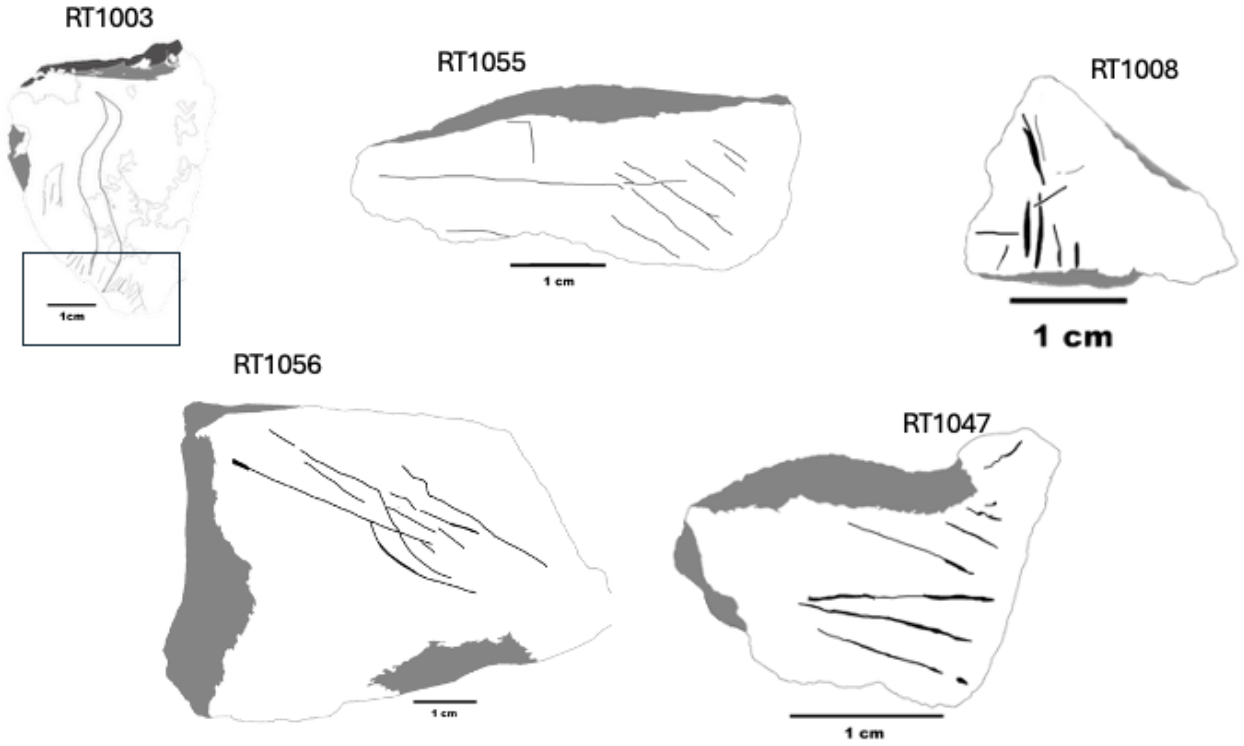


Figure 8.2 Examples of multiple and parallel line constructions in the Riparo Tagliente corpus. Tracings by the author.

The graphic construction of the analysed units is characterised by a predominant use of continuous lines. Of the 45 graphic units examined, 39 contain continuous lines, whereas 8 contain discontinuous lines. Continuous and discontinuous strokes may coexist within the same graphic unit and may occur in different parts of the same representation. RT1013, for example, combines continuous and discontinuous strokes in the rendering of the same anatomical feature.

Repeated linear constructions are also frequent. Multiple lines occur in 14 graphic units, while parallel lines occur in 25.

Of the 45 graphic units, 28 have a closed outline, including 22 in which continuous lines are also present. Continuous lines therefore occur in both closed and open configurations.

Taken together, these results show that continuous linear construction is predominant within the corpus, while multiple, parallel, open and closed configurations are also represented.

8.1.2 Internal graphic features and filling

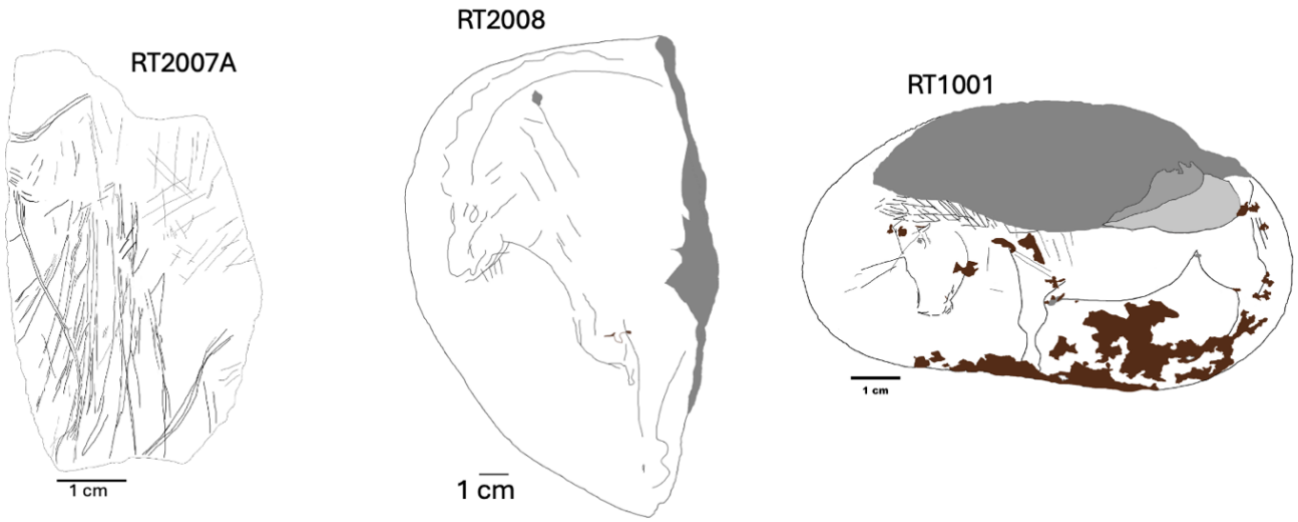


Figure 8.3 Examples of filling in the Riparo Tagliente corpus. Tracings by the author.

Internal graphic filling is recorded in 12 graphic units. The filling is not produced through a single graphic solution, but through different configurations of repeated engraved strokes.

Among the 12 graphic units with filling, 6 are characterised by parallel lines, whereas 3 involve multiple-line constructions without parallel organisation and 3 single line constructions. These distinctions show that filling represents a functional graphic treatment rather than a homogeneous formal category.

The function of the filling also varies according to its location within the representation. In some cases, repeated strokes are used to fill a defined anatomical area, while in others they contribute to the modelling or internal articulation of a specific anatomical feature. In RT2007A, for example, converging lines form an internal filling associated with the representation of a limb. In RT2008 or RT2005A, by contrast, parallel lines are concentrated in the muzzle and contribute to the rendering of anatomical details.

8.1.3 Anatomical features and details

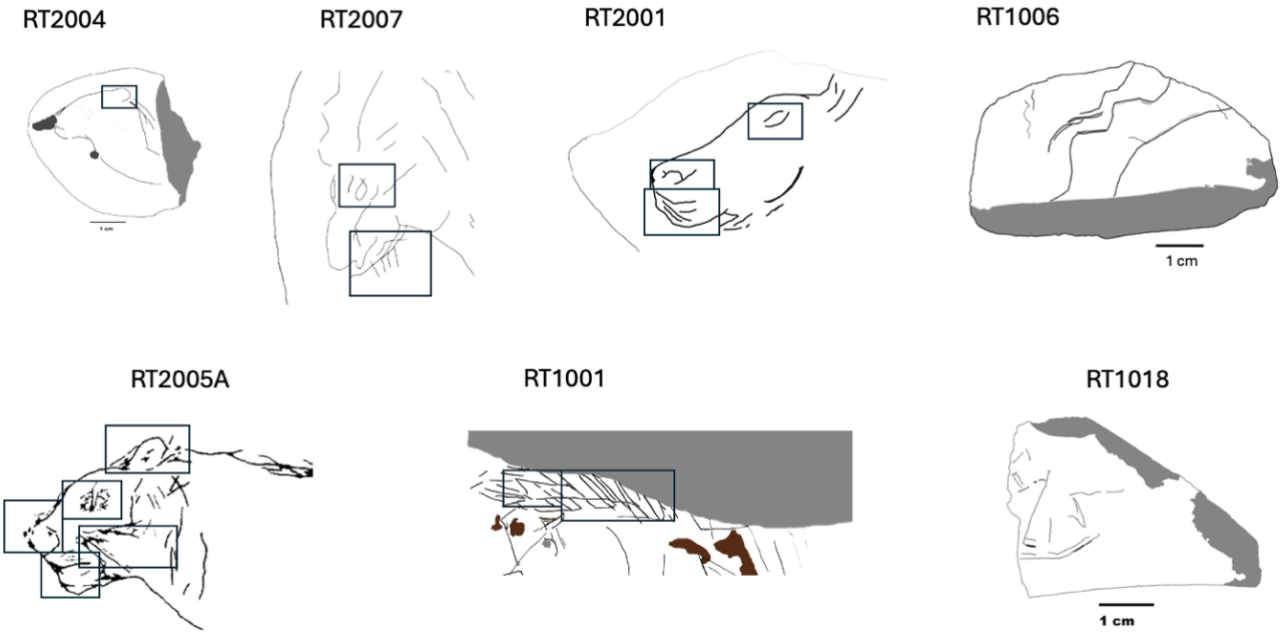


Figure 8.4 Anatomical details identified on the figurative representations: ear on RT2004; ear, eye, mouth, vibrissae and nostril on RT2005A; vibrissae, nostril and eye on RT2001; ear and mane on RT1001; ear on RT1018; horn on RT1006.

The anatomical variables display low frequencies: 10 for the facial hair, 9 for the horns/antler, 8 for the ear, 5 for the eyes, the mouth and the nostrils. Facial hair provides one the clearest examples of the interaction between anatomical representation and graphic execution: all eleven graphic units combine the presence of facial hair with parallel lines.

In the other hand, the forms adopted by the other details are not uniform. Eyes can be almon-shaped (RT2002), circular (RT2005A) or made by two semi-circular strokes (RT1002, RT2001).

Mouths are represented through both single-line (RT2001, RT2002 and RT2005A) and open configurations (RT2008).

The horn are rendered by two elongated, curved continuous incisions, called double line (RT2002, RT1002, RT1003), while the two strokes contributed to a single anatomical features combines a smooth continuous line on the inner side of the horn with a discontinuous zigzag line representing the annulations, a characteristic feature of the species (RT2008, RT1006). Hence the presence of a facial feature does not imply a standardised graphic solution.

Nostrils are recorded in 5 graphic units, although the feature is present in only 2 cases. In RT2001, the nostril is represented by two semicircular strokes, whereas in RT2002 it is rendered as a single stroke.

8.1.4 Posture, Orientation, Perspective and Movement

The representation of the limbs can be assessed in 14 graphic units. Among these, 13 preserve sufficient information to characterise the form of the limbs: 7 are classified as essential, 5 as realistic, and 1 as linear. In one additional graphic unit, the form of the limbs cannot be assessed reliably. The number of preserved limbs can be determined in 13 graphic units, with one limb represented in 9 cases, two limbs in 3 cases, and four limbs in 1 case. In two further graphic units, the number of limbs cannot be assessed reliably.

Among the graphic units for which orientation can be assessed, 19 are observable: 14 are oriented towards the left, 4 towards the right, and 1 is represented frontally.

Perspective is recorded in 12 graphic units. Of these, 3 are classified as absolute profile, 3 as straight biangular perspective, 2 as oblique biangular perspective, 2 as frontal, and 1 as uniangular perspective. In one additional graphic unit, perspective cannot be assessed reliably.

Movement is recorded only in RT2008, where it is inferred from the bent position of the right forelimb.

These results should nevertheless be interpreted cautiously in relation to preservation, as the observability of the limbs, orientation and perspective varies considerably across the corpus. The figures reported above therefore describe only the observable subset of the 45 graphic units.

8.2 Stylistic Patterns

The preceding section described the principal variables independently. The second analytical level considers their co-occurrence within individual graphic units. This is important because stylistic characteristics are not necessarily expressed through isolated features. Rather, they may emerge through the repeated combination of particular graphic procedures, anatomical details and compositional choices.

8.2.1 From individual graphic devices to recurrent combinations

Taken together, these associations indicate that the graphic units are commonly organised through combinations of linear procedures rather than through the exclusive use of a single type of stroke. Continuous construction frequently provides the main framework of the representation, while additional strokes are incorporated according to the specific requirements of the figure.

8.2.2 Parallel lines as a recurrent graphic device

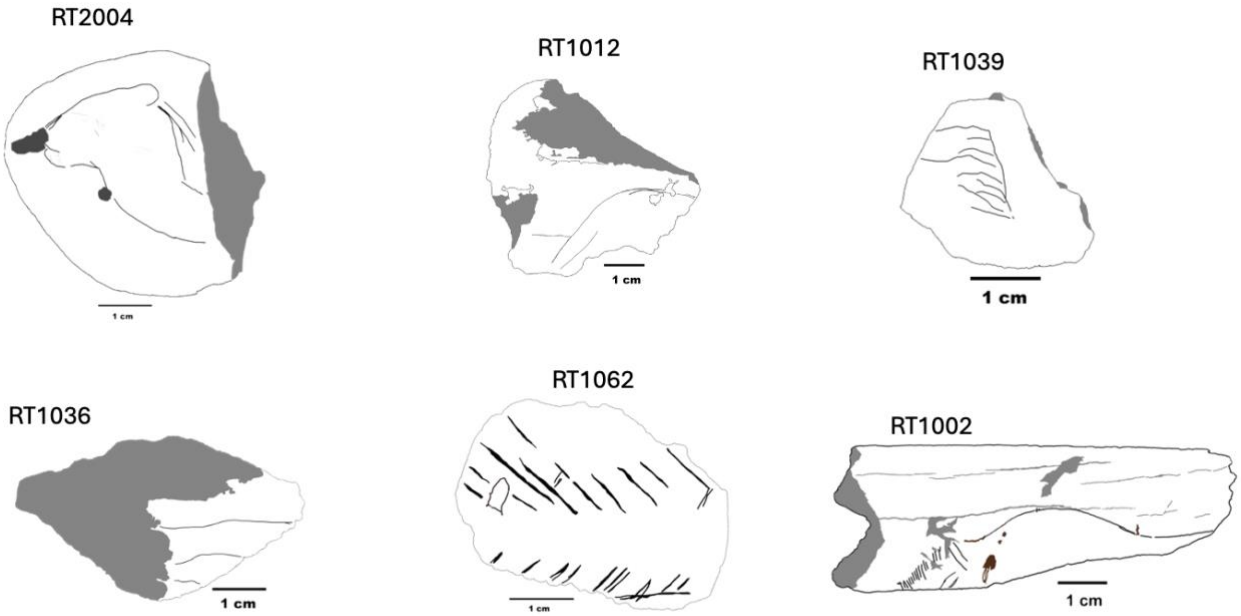


Figure 8.5 Examples of parallel lines identified on the figurative artefacts from Riparo Tagliente

Parallel lines constitute one of the most recurrent graphic devices in the corpus, occurring in 27 of the 45 graphic units. Their significance, however, lies not simply in their frequency but in the variety of contexts in which they occur. They may contribute to the external contour, internal graphic elements (RT2004), filling or the representation of anatomical features (such as tail, in RT2007A and RT1012, or limb as in RT1036).

The clearest recurrence concerns facial hair. 11 graphic units combine facial hair with parallel lines: 5 beards (RT1039, RT1053, RT1062, RT2002, RT2008), 3 forelocks (RT1002, RT1003, RT2005B), 2 whiskers (RT2001, RT2005A) and 1 mane (RT1001). In each of these cases, parallel strokes are used to render a hair-related anatomical feature. The same graphic procedure is therefore repeated across different anatomical contexts and taxonomic groups.

Parallel lines are also frequently associated with other anatomical details. All 5 graphic units in which an eye is recorded contain parallel lines, as do all 5 graphic units with a mouth. 7 of the 8 ear-bearing graphic units contain parallel lines, while 6 of the 9 graphic units with horns or antlers do so. The association is weaker for nostrils, for which parallel lines occur in 2 of the 5 observable cases. Another element that is consistently rendered using parallel lines is the tail, in all four cases (RT1001, RT1012, RT2007A, RT2007B).

Taken together, these associations indicate that parallel lines form a recurrent component of the graphic repertoire and occur in a range of anatomical and non-anatomical contexts. Their

significance therefore emerges from their repeated association with other graphic and anatomical variables rather than from their presence alone.

8.2.3 Anatomical combinations

The co-occurrence of anatomical features provides a further level of stylistic information. Eye and mouth occur together in four graphic units depicting different taxa and showing variations in the formal execution of both features.

Eye formed by two semi-circular strokes with a single-line mouth (RT2001); an almond-shaped eye with a single-line mouth (RT2002); a circular eye and a single-line mouth (RT2005A); an elongated almond-shaped eye with an open mouth (RT2008).

The combination of ear and horn/antler is only attested once (RT2002). In this case, the triangular ear and the two elongated curved horn elements.

These observations show that anatomical details may recur in combination without producing a single standardised formula. The recurrence of particular associations is therefore accompanied by variation in the formal treatment of the individual features.

8.2.4 Combinations of contour, internal detail and anatomical representation

When contour construction, internal graphic elements and anatomical details are considered together, the organisation of individual graphic units becomes more differentiated. Several representations combine a continuous external contour with repeated or parallel strokes used for internal or anatomical details.

In RT2002 a continuous outline establishes the main contour, while parallel lines are concentrated in the facial-hair area and the horns are articulated through separate curved continuous strokes. RT2008 similarly combines a continuous external contour with parallel lines used in the muzzle and other anatomical areas. RT2005A displays a more complex organisation, in which multiple continuous lines contribute to the dorsal contour while single and parallel lines are used in the muzzle and whiskers. The recurrence of continuous external construction alongside multiple or parallel internal and anatomical elements therefore constitutes a more complex pattern than any of these variables considered individually.

The stylistic organisation of the corpus is consequently better described as a combination of differentiated graphic procedures, in which particular line configurations are associated with particular parts or functions of the representation.

8.2.5 Orientation and perspective as components of the graphic configuration

Among the 10 graphic units for which both variables can be assessed, 8 are oriented towards the left and 2 towards the right. The eight left-facing examples encompass several perspective categories: absolute profile (3), straight biangular perspective (2), oblique biangular perspective (2) and uniangular perspective (1).

Leftward orientation therefore occurs across different approaches to the representation of spatial configuration rather than being restricted to strict profile depictions. Orientation and perspective should consequently be treated as related but distinct components of the graphic configuration.

8.3 Diachronic Variability

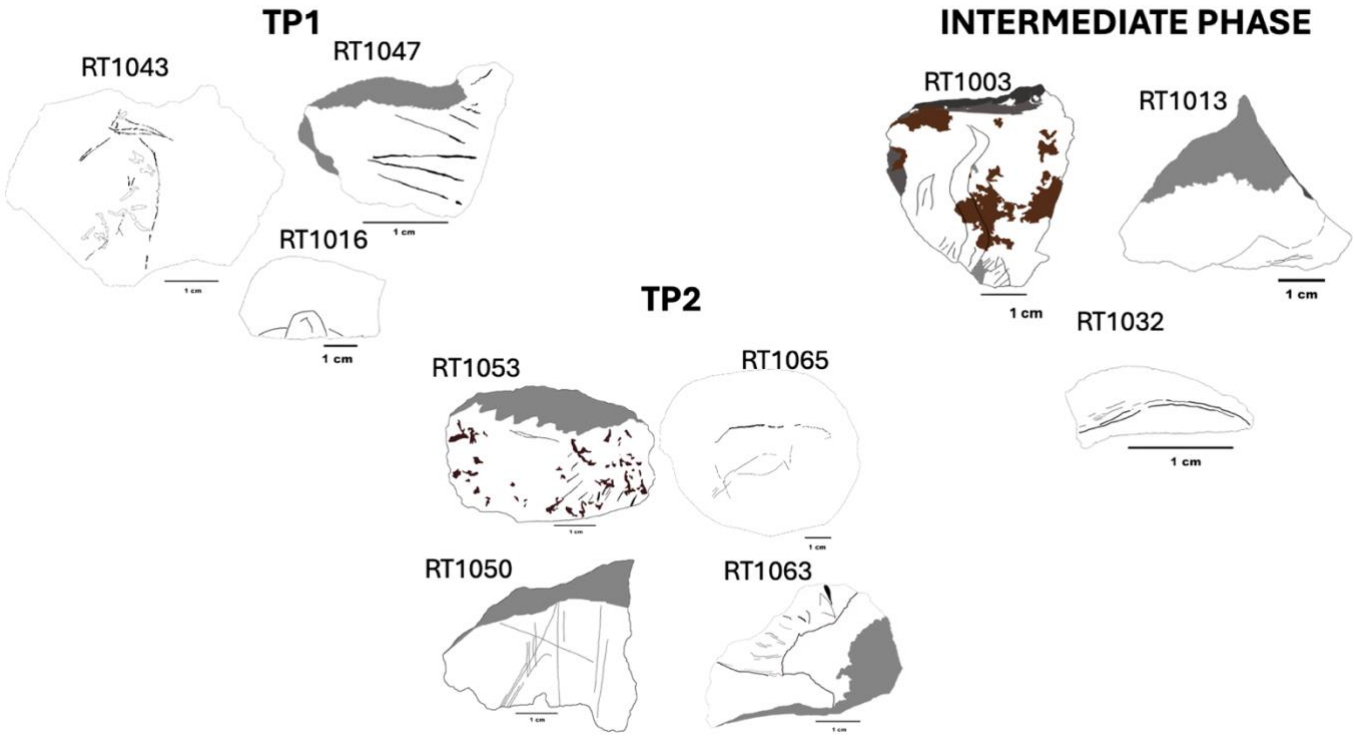


Figure 8.6 Examples of the different types of figurative artefacts identified across the chronological phases at Riparo Tagliente: TP1, TP2 and Intermediate Phase.

The three chronological phases adopted in this study follow the stratigraphic, faunal and paleoenvironmental framework established for the Late Epigravettian sequence of Riparo Tagliente. TP1 (first phase) comprises US 17–14 and corresponds to the coldest part of the sequence, associated with the Dryas I and characterised by a faunal association adapted to cold environmental conditions. The intermediate-phase corresponds to US 13, which represents a transitional stage between the two environmental conditions, with cold- and temperate-adapted taxa occurring in more balanced proportions. TP2 (second phase) comprises US 12–5 and corresponds to the later part of the sequence, associated with the climatic improvement of the Bølling and characterised by a greater representation of taxa adapted to more temperate conditions. These phases were therefore established independently of the present stylistic analysis and provide the chronological framework used to assess the distribution of graphic variables through time.

The chronological analysis was conducted on the subset of 27 graphic units for which chronological information was assessed during the construction of the study corpus: TP1 (n = 7), intermediate-phase (n = 7), and TP2 (n = 13).

The analysis was conducted at two complementary levels. First, the individual variables were compared between TP1, the intermediate-phase and TP2 to identify differences in the frequency of specific graphic or anatomical features. Second, selected combinations of variables were examined in order to determine whether individual characteristics tended to co-occur in recurring configurations within particular chronological phases.

8.3.1 Distribution of individual graphic variables

The variables relating to graphic construction provide the most suitable basis for diachronic comparison because they are relatively widely observable within the corpus and are less directly affected by the preservation of individual anatomical features.

Single line is highly recurrent throughout the sequence: in all 7 graphic units assigned to TP1, in 5 of the 7 units assigned to the intermediate-phase, and in 12 of the 13 units assigned to TP2. A similar pattern is observed for the use of continuous line (6 of the 7 TP1 units, all 7 intermediate-phase units, and 10 of the 13 TP2) and for closed line contour (5 TP1 units, 5 intermediate-phase units and 8 TP2 units). These features are therefore consistently represented throughout the sequence and do not show a marked chronological concentration: they represent a widespread component of the graphic repertoire throughout the sequence.

The same observation can be made for some less frequent variables: the discontinuous line (1 in TP1, 2 in the intermediate-phase, 3 in TP2), the open line contour (2 in TP1, 2 intermediate-phase, 5 in TP2). The multiple lines (2 in TP1, 1 in intermediate-phase units, 5 in TP2). Their distribution does not indicate a clear chronological pattern.

The most differentiated distribution concerns in the use of parallel lines: 2 of the 7 TP1 units, 6 of the 7 intermediate-phase units, and 9 of the 13 TP2 units. They are therefore comparatively uncommon in TP1, whereas they are frequent in both the intermediate-phase and TP2.

This pattern does not, however, indicate a simple replacement of one graphic construction by another. Rather, it suggests that particular graphic conventions may have been differently represented or combined at different points in the sequence. The significance of this variation can be assessed more fully by examining the co-occurrence of individual variables below.

8.3.2 Filling and internal graphic elaboration

Filling requires separate consideration because its observability is considerably more restricted than that of the basic line-construction variables. It is observable in only 8 units overall: 2 in TP1, 2 in the intermediate-phase, and 4 in TP2. The limited number of observable cases,

particularly in TP1 and the intermediate-phase, prevents the distribution of filling from providing robust evidence for a chronological trend.

Therefore, the data are insufficient to support a progressive increase or decrease in the use of filling through the sequence, nor do they indicate a clear concentration of the feature in any one phase. Filling should instead be regarded as a relatively restricted graphic characteristic, whose chronological significance can be assessed more effectively by considering its co-occurrence with other graphic variables.

8.3.3 Co-occurrence of graphic variables

The second level of the chronological analysis examined combinations of graphic variables in order to assess whether particular characteristics tend to recur within the same graphic unit and whether their co-occurrence varies between the three chronological phases.

The combination “continuous + closed lines” occurs in 4 TP1 units, 5 intermediate-phase units and 5 TP2 units, indicating a recurrent mode of graphic construction throughout the sequence rather than a feature restricted to a particular phase.

By contrast, “parallel + continuous lines” shows a more differentiated distribution, occurring in 1 TP1 unit, 6 intermediate-phase units and 7 TP2 units. Their marked recurrence from the intermediate phase onwards indicates that parallel lines are frequently incorporated into an otherwise continuous graphic construction. This does not, however, imply a uniform graphic function: This does not, however, imply a uniform graphic function: in RT2007A, for example, the parallel lines are associated with the execution of the engraving rather than with an anatomical feature, as is also the case in RT1025A.

“Parallel + single lines” likewise frequently co-occur (2 TP1, 4 intermediate-phase units, 8 TP2). Their coexistence shows that the increased occurrence of parallel lines does not correspond to a replacement of single-line construction, but rather to their incorporation within broader graphic configurations. “Parallel x closed lines” occur in 1 TP1 unit, 4 intermediate-phase units and 5 TP2 units, showing a similar increase from TP1 onwards.

The combinations involving filling are more restricted. “Parallel lines + filling” occur in 1 TP1 unit, 2 intermediate-phase units and 1 TP2 unit, while “multiple lines + filling” occur in 2 TP1 units and 2 TP2 units, with 0 occurrences in the intermediate-phase. The latter 4 cases display different filling configurations: RT1016 uses single-line filling, RT2005A and RT1063 multiple-line filling, and RT2007A parallel-line filling. Filling is therefore not consistently associated with a single mode of internal graphic construction.

Taken together, the co-occurrence analysis indicates the persistence of continuous and closed construction, which remains recurrent throughout the sequence. The principal chronological difference in the graphic-construction variables lies in the greater representation of parallel lines from the intermediate phase onwards and in their frequent co-occurrence with

continuous, single-line and closed configurations. At the same time, the different contexts and combinations associated with parallel lines and filling indicate that these variables do not correspond to uniform graphic procedures. The observed pattern therefore points to a differential distribution of particular graphic conventions, rather than to a straightforward replacement of one graphic system by another.

8.3.4 Anatomical variables and preservation

The anatomical variables were also examined across the three chronological phases. Their chronological interpretation is, however, more limited than that of the graphic-construction variables because their observability is strongly affected by the preservation of the representations.

Head is observable in three chronologically attributed graphic units (1 in TP1, 2 in TP2) and is present in all three cases. Eye is likewise observable in three units (1 in TP1, 1 in the intermediate-phase and 1 in TP2) and is present in all observable cases. Mouth is observable in two units (1 in TP1 and 1 in TP2) and is present in both. The nostril is observable in only one TP2 unit and is present in this case. Facial hair is observable in seven units (2 in TP1, 2 in the intermediate-phase and 3 in TP2) and is present in all observable cases. The ear is observable in six units (3 in TP1, 2 in the intermediate-phase and 1 in TP2); it is present in two TP1 units, one intermediate-phase unit and one TP2 unit, and absent in one TP1 unit and one intermediate-phase unit.

Facial hair is observable in 2 TP1 units, 2 intermediate-phase units and 3 TP2 units, and is present in all observable cases. Horn/Antler is observable in 1 TP1 unit, 2 intermediate-phase units and 3 TP2 units, again with the feature present in all observable cases.

Ear is observable in 3 TP1 units, 2 intermediate-phase units and 1 TP2 unit. It is present in 2 TP1 units, 1 intermediate-phase unit and 1 TP2 unit. Tail is observable in 2 TP1 units and 2 TP2 units.

These data indicate the recurrent representation of these anatomical features across the sequence, but do not demonstrate a chronological increase or decrease. Indeed, the distributions are too limited to support a diachronic interpretation.

8.3.5 Synthesis of chronological variability

The chronological analysis indicates continuity combined with selective variation rather than a straightforward linear stylistic evolution through the sequence. Single, continuous and closed constructions are recurrent across TP1, the intermediate-phase and TP2, indicating the persistence of shared elements of graphic construction throughout the sequence. By contrast, parallel lines show a more differentiated distribution, occurring in 2 TP1 units, 6 intermediate-phase units and 9 TP2 units. Their co-occurrence of parallel lines with continuous

and closed construction is likewise more frequent in the intermediate-phase and TP2 than in TP1.

At the same time, this pattern should not be interpreted as evidence for a progressive increase in graphic complexity. Multiple lines and filling remain comparatively restricted, and the combinations involving these features do not display a consistent chronological distribution. The anatomical variables likewise provide limited evidence for diachronic differentiation because of their restricted observability.

Overall, the results therefore point to changes in the distribution and combination of particular graphic conventions within a largely recurrent graphic repertoire, rather than to the emergence of clearly distinct chronological styles.

9. Discussion: Riparo Tagliente asqsemblage in the bigger picture

9.1. Results in relation to the Late Epigravettian stylistic sequence

The results obtained at Riparo Tagliente can be considered in relation to the stylistic models previously proposed for the Late Epigravettian in Italy. In particular, Montoya (2008) identified a chronological development from a more naturalistic graphic repertoire, in which Riparo Tagliente was considered an important expression, towards increasing simplification and schematisation in later contexts. The present analysis does not reproduce such a straightforward stylistic progression. Single, continuous and closed constructions occur throughout the three chronological phases, while parallel lines display a more differentiated distribution, becoming more frequent from the intermediate phase onwards. The anatomical variables provide more limited evidence because of their restricted observability.

These results therefore suggest continuity combined with selective variation rather than the emergence of clearly distinct chronological styles. The present analysis does not invalidate the broader Late Epigravettian sequence, but indicates that stylistic variability within Riparo Tagliente is more appropriately described through the distribution and combination of individual graphic conventions than through a general transition from naturalistic to schematic representation. This provides a more fine-grained basis for positioning the Riparo Tagliente assemblage within the stylistic variability documented for the Late Epigravettian in Italy.

9.2. Comparison with Magdalenian graphic conventions

The Middle Magdalenian and the Upper Magdalenian were selected as the principal comparative contexts for the Riparo Tagliente corpus not only because previous studies have highlighted stylistic similarities between the Italian assemblage and French portable art traditions, but primarily because these contemporary western European graphic traditions provide a framework for investigating the relationship between the figurative production of the

Late Epigravettian in Italy and that of the western European Upper Palaeolithic. The comparative analysis therefore focuses on chronologically defined assemblages for which a reliable chronological attribution is available.

9.2.1 Continuous outline

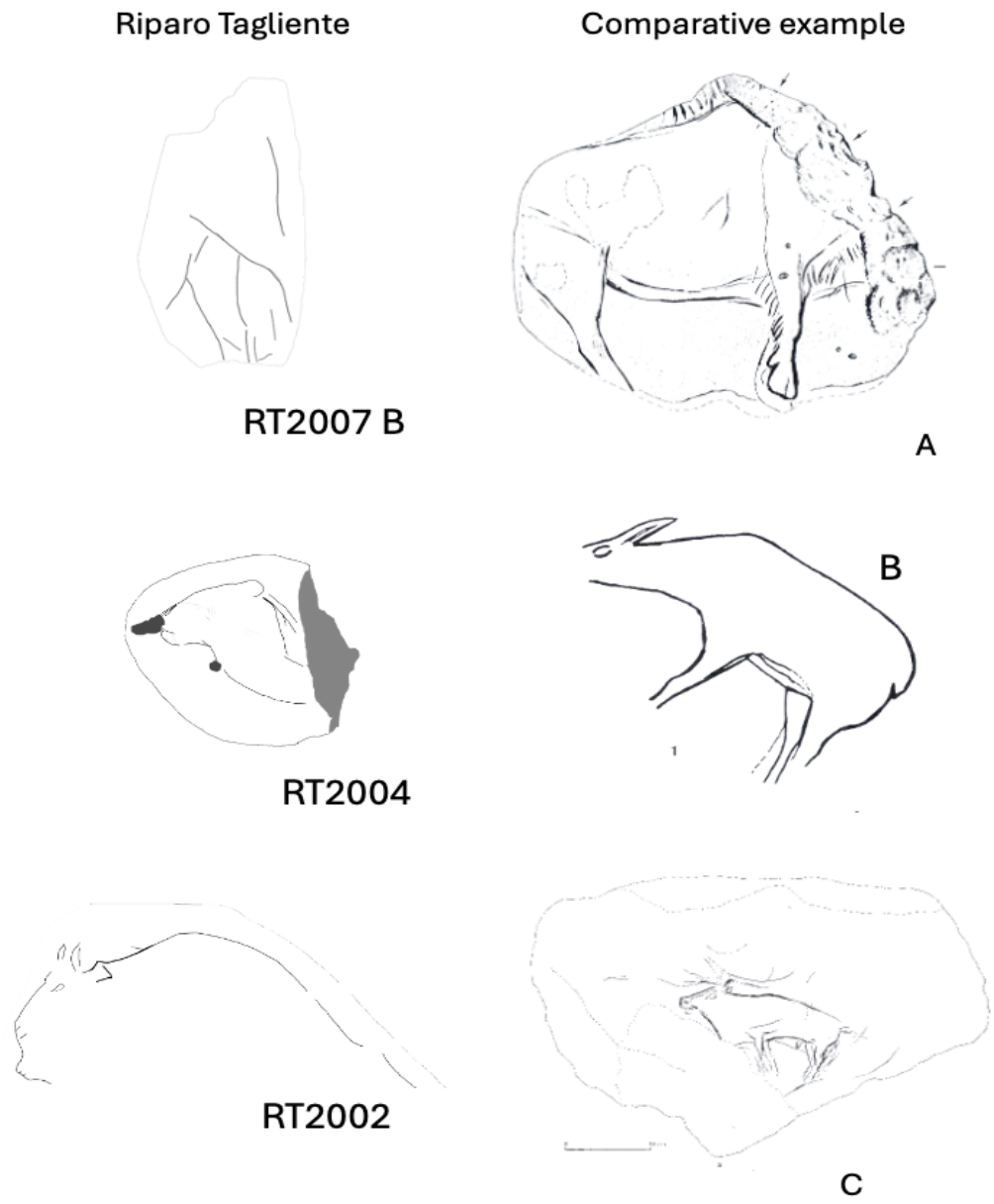


Figure 9.1 Comparison of continuous graphic construction between selected Riparo Tagliente and Magdalenian engravings. Riparo Tagliente examples: RT2007B (US 5, Final Bølling), RT2004 (unknown) and RT2002 (US 10e, 16.426–15.371 cal BP for the associated stratigraphic contex (Fontana *et al.* 2018)) (tracings by the author). Magdalenian comparative examples: (A) La Madeleine, pebble 290, Magdalenian IV or Late Middle Magdalenian (13.555–12.034 cal. BP; Tosello 2003); (B) Grotte de Rochereil, laminite plaquette no. 350, Final Magdalenian (Tosello 2003); (C) La Madeleine, plaque no. 329, Magdalenian IV or Late Middle Magdalenian (13.555–12.034 cal. BP; Tosello 2003).

One of the most recurrent graphic conventions identified within the Riparo Tagliente assemblage is the use of a continuous external outline to construct the animal figure. Rather than defining the body through a succession of discontinuous engraved segments, the contour

is generally executed as a single uninterrupted engraved line. This continuous line establishes the overall silhouette of the animal and provides the principal structural framework upon which the representation is organised. Secondary anatomical features, such as the limbs and facial details, are subsequently integrated into this primary graphic structure.

Comparable uses of continuous linear construction can be identified in selected Later Middle and Upper Magdalenian portable-art contexts, although the Franco-Cantabrian record displays a plurality of graphic solutions. The comparison is made at the level of specific graphic units and focuses on the organisation of the external contour, regardless of the taxa depicted. Several engravings included in the present comparative corpus display dorsal contours executed as long, continuous engraved lines extending from the rump to the neck, creating a coherent linear framework before the addition of anatomical details. The significance of this comparison therefore lies in the recurrence of a comparable graphic convention rather than in a correspondence between the overall graphic structures of the figures.

9.1.2. Facial details

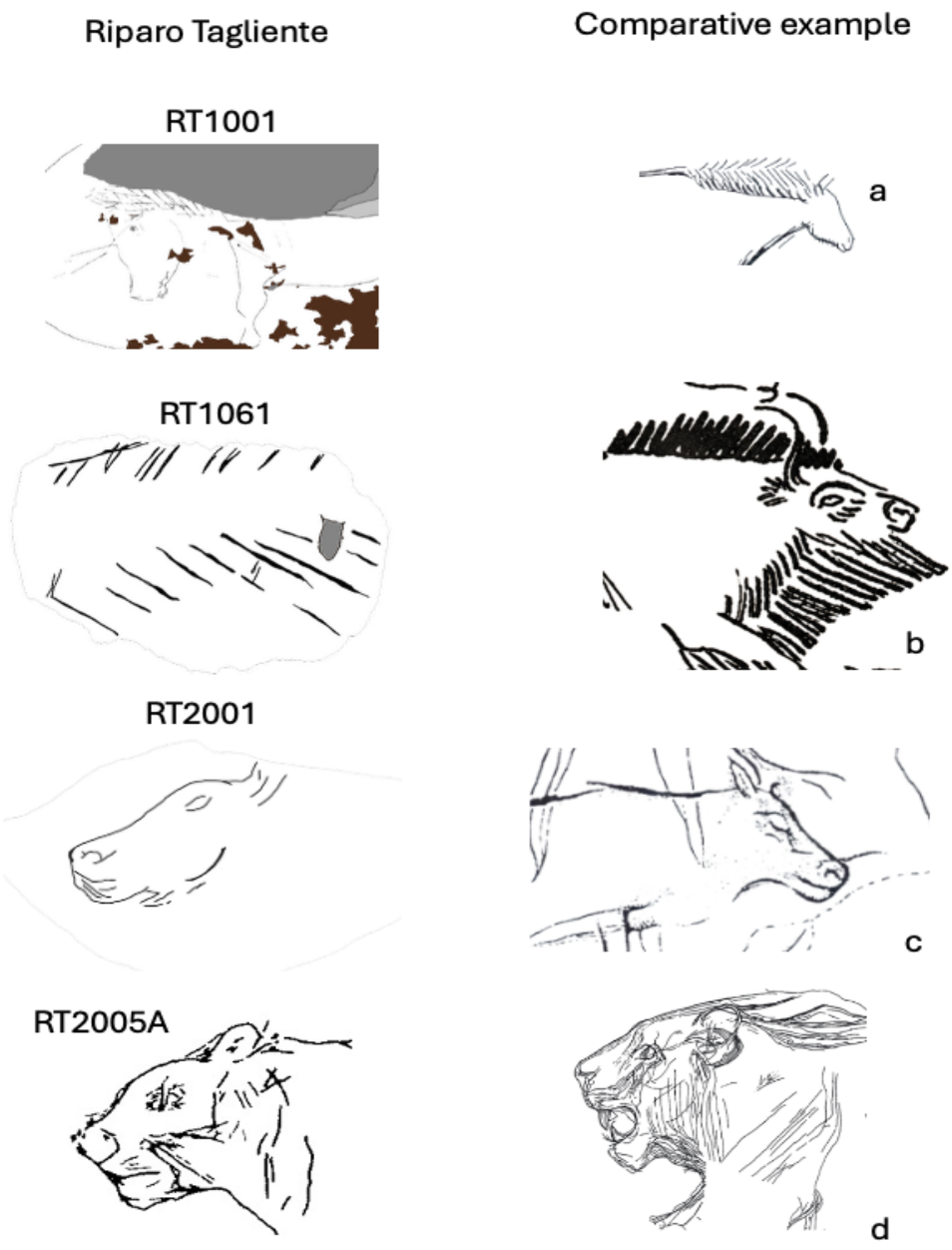


Figure 9.2. Comparison of facial details between selected Riparo Tagliente and Magdalenian engravings. Riparo Tagliente examples: RT1001 (context unknown), RT1062 (US 613; date unknown), RT2001 (context unknown) and RT2005A (burial context; 16.149–15.532 cal BP; Fontana *et al.* 2018) (tracings by the author, except RT2005A after Guerreschi 1984). Magdalenian comparative examples: (A) La Madeleine, limestone pebble no. 286, Magdalenian IV or Later Middle Magdalenian (13.555–12.034 cal BP; Tosello 2003); (B) Grotte de Niaux, Middle Magdalenian; (C) Limeuil, plaquette no. 17, Upper/Final Magdalenian (11,846–11,400 cal BP); (D) La Marche, MH 50-7-300, Later Middle Magdalenian (adapted from Mélard 2008).

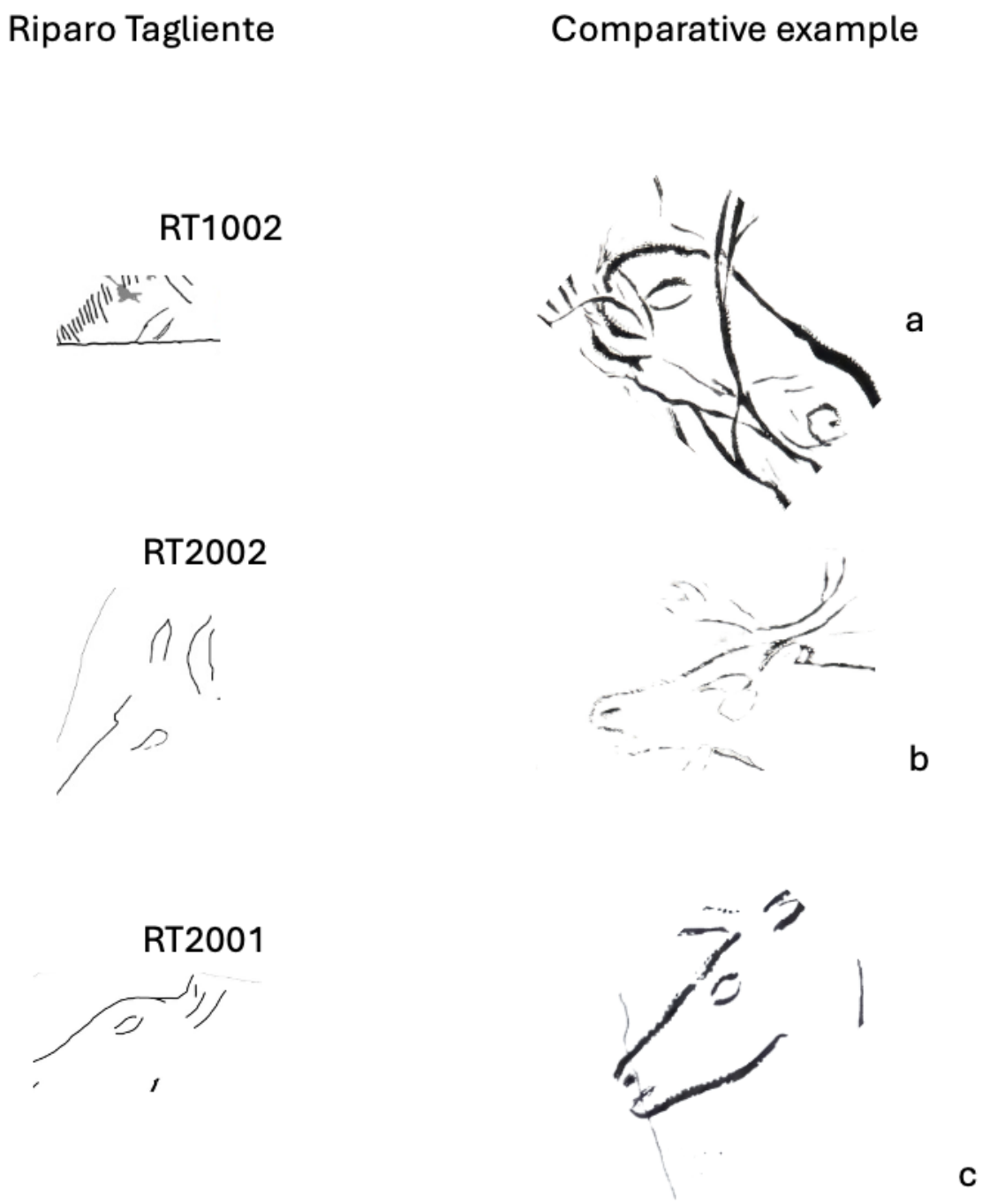


Figure **9.3**. Comparison of eye treatment between selected Riparo Tagliente and Magdalenian engravings. Riparo Tagliente examples: RT1002 (US 13a; 16,438–15,941 cal BP; Fontana et al. 2018), RT2002 (US 10e; 16.426–15.371 cal BP; Fontana *et al.* 2018) and RT2001 (context unknown) (tracings by the author). Magdalenian comparative examples: (A) Laugerie-Basse, reverse of engraved limestone pebble no. 4, depicting horses and unidentified animals, Middle Magdalenian (Tosello 2003); (B) Limeuil, plaquette no. 16, depicting a reindeer on a ground line, Final Magdalenian (site dated to 11.846–11.400 cal BP; Tosello 2003); (C) Laugerie-Basse, recto of engraved limestone pebble no. 4, depicting a reindeer, Middle Magdalenian (Tosello 2003). The comparison focuses on the formal treatment and graphic construction of the eye within the animal head.

The comparison of facial details reveals some similarities between the Riparo Tagliente engravings and selected Magdalenian representations, particularly in the treatment of facial hair and in the graphic rendering of the eye. Facial hair provides one of the more recurrent points of comparison, with beards, forelocks and manes in some cases rendered through groups of short, parallel engraved strokes. Comparable uses of parallel linear elements can be observed in selected Later Middle and Upper Magdalenian examples, although these conventions occur within a wider range of graphic solutions in the Franco-Cantabrian record.

The treatment of the eye also provides a more specific basis for comparison. Within the Riparo Tagliente corpus, elongated eyes may be rendered as a single continuous element, as observed in RT2001, RT2002 and RT2007, or through two separate semicircular strokes, as in RT1002. Some Magdalenian examples display comparable elongated or internally defined linear treatments of the eye, although the specific form and execution vary between representations. The comparison therefore concerns particular modes of graphic construction rather than a general correspondence in facial anatomy. Other facial features, such as the nostril and ear, do not display sufficiently consistent similarities in the selected comparative material to support the same level of stylistic comparison and are therefore not considered further here.

9.1.3. Horns and antlers

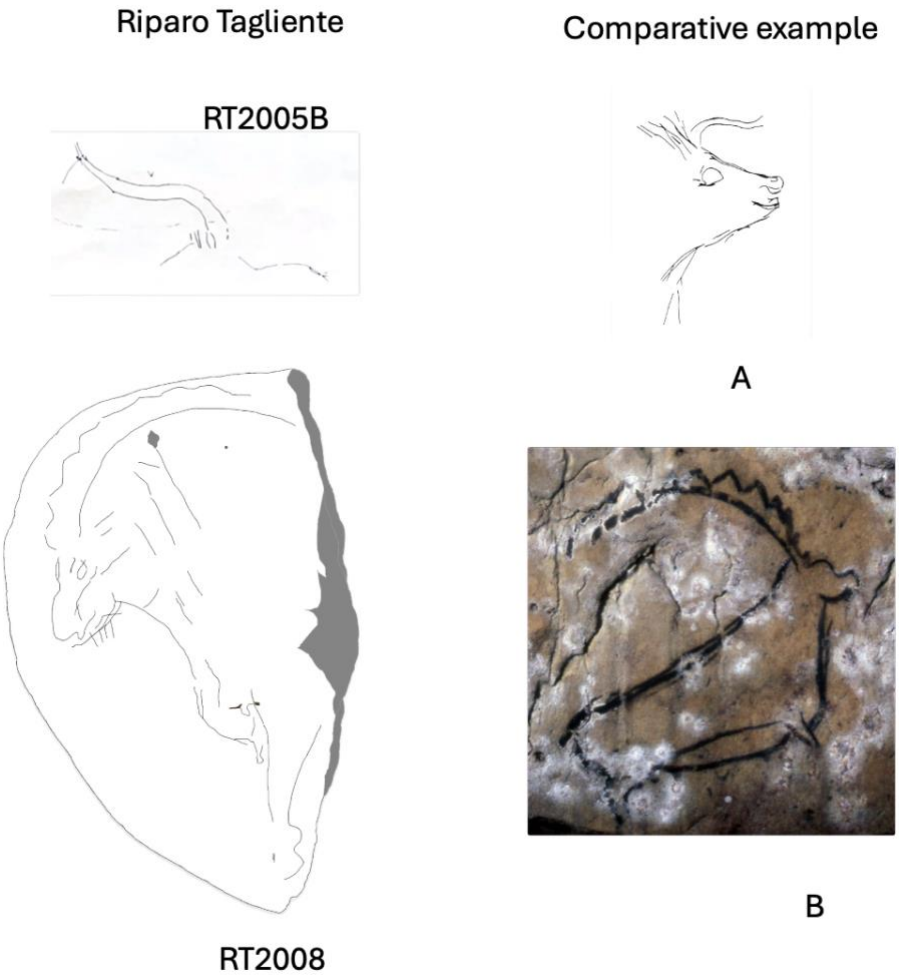


Figure 9.4 Examples of horns and antlers from Riparo Tagliente: RT2005B (burial context; 16.149–15.532 cal BP; Fontana *et al.* 2018) (tracing by Guerreschi 1984) and RT2008 (context unknown) (tracing by the author). Magdalenian comparative examples: (A) La Marche (adapted from Mélard 2008); (B) Grotte de Niaux, Middle Magdalenian.

The representation of horns and antlers provides a further basis for comparison between the Riparo Tagliente corpus and selected Magdalenian portable-art representations. The comparison does not point to a single standardised mode of rendering these appendages. Rather, selected representations share specific graphic solutions, including linear constructions and, in some cases, the integration of the appendage into the broader organisation of the head. The use of ring-like elements in the depiction of horns or antlers is, however, particularly unusual outside Magdalenian graphic traditions in Western Europe. At the same time, the Magdalenian comparative material includes more elaborate and internally detailed treatments, illustrating a wider range of graphic solutions. These correspondences are

therefore considered at the level of specific formal treatments rather than as evidence for a generalised similarity in the representation of horns or antlers.

9.1.4 Proportions and overall graphic organisation

A further level of comparison concerns the proportions and overall composition of the animal figures. In the best-preserved Riparo Tagliente representations (RT1001, RT2002, RT2005A and RT2008), the principal anatomical parts are organised according to broadly coherent bodily proportions, while maintaining a recognisable reference to the morphology of the living animal. This aspect provides a useful point of comparison with Middle and Upper Magdalenian representations, in which the relative proportions of the body, head and limbs are likewise maintained. The comparison, however, concerns the overall organisation of the figure rather than the anatomical accuracy of individual details alone. Body proportions, the relative positioning of the head and limbs, the distribution of the figure within the available support and the relationship between the principal anatomical elements contribute to the construction of the representation as a whole. These compositional aspects can therefore be considered alongside the specific graphic conventions discussed above, allowing stylistic comparison to move from individual features to the composition of the complete figure.

Taken together, these results suggest that Graziosi's model is not supported by the evidence from Riparo Tagliente. The similarities identified with western Magdalenian graphic traditions indicate that some figurative schemes and specific graphic conventions are comparable across the two cultural contexts, while their different combinations within the respective assemblages point to distinct graphic repertoires. Riparo Tagliente therefore provides a useful case study for examining Late Epigravettian figurative graphic production within the broader European graphic context. At the same time, the differences identified between the compared assemblages show that these shared conventions did not result in a uniform graphic system: the compared assemblages retained a degree of specificity in the selection and combination of graphic solutions.

Conclusions

This study has provided a systematic stylistic reappraisal of the figurative engraved portable art from Riparo Tagliente, integrating published and unpublished material within a standardised analytical framework. The results indicate continuity combined with selective variation rather than a straightforward linear stylistic evolution through the Late Epigravettian sequence. Recurrent graphic conventions persist across the three chronological phases, while their distribution and combination vary through time. The evidence therefore does not support the emergence of clearly differentiated chronological styles or a progressive increase in graphic complexity. In relation to the stylistic sequence proposed for the Late Epigravettian in Italy, the

results broadly support the persistence of a recurrent graphic repertoire while providing a more detailed characterisation of its internal variability. The comparison with contemporary western European traditions also identifies specific formal correspondences with Later Middle and Upper Magdalenian portable art and, where relevant, Early Azilian contexts. These correspondences concern particular graphic solutions rather than a uniform set of conventions shared across the compared assemblages.

Taken together, the results suggest that Graziosi's model is not supported by the evidence from Riparo Tagliente. The similarities identified document affinities between geographically distinct graphic traditions, but do not in themselves demonstrate direct stylistic continuity or cultural transmission. Likewise, the differences observed are insufficient to establish a separation between the compared traditions, as they may reflect individual variability, modes of execution, or the selective combination of particular graphic conventions. The present evidence therefore supports a relationship between the compared traditions at the level of selected formal correspondences, while remaining insufficient to determine the historical processes underlying them. Riparo Tagliente thus provides a case study for situating Late Epigravettian figurative graphic production in northern Italy within a broader European context, while preserving the specificity of individual assemblages.

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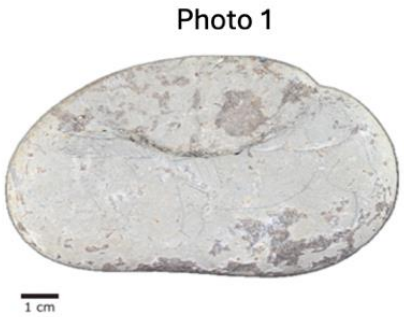
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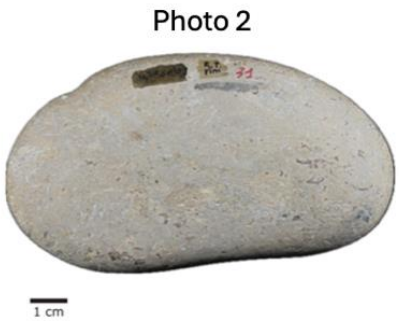
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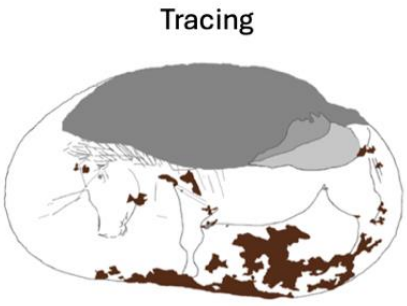
APPENDIX A: Catalogue of the Analysed Artefacts

RT1001

Collection: University of Ferrara
Year of discovery: 1986
Stratigraphic Unit: Reworked
Square: -
Support: Chert Cortex
Stone alteration: Concretion, detachment
Worked surface: 1
Broken artifact: Yes
Dimension: 99mm x 56mm x 17mm
Technique: Engravings
Description: Figure of an equid facing left, with head lowered. Possible filling of the dorsal area missing due to the fracture. Mane detailed with small, parallel strokes. The tail may consist of two parallel lines oriented vertically
Bibliographic reference: Leonardi, 1992.







RT1002

Collection: University of Ferrara

Year of discovery: post 1967

Stratigraphic Unit: 13 a

Square: 40/2

Support: Bone

Stone alteration: weathering or trampling

Worked surface: 1

Broken artifact: Yes

Dimension: 84mm x 29mm x 10mm

Technique: Engravings

Description: Figure of a bovid oriented along the lower left margin. There are lines on the head of varying lengths, which could represent the horns. The animal's muzzle is characterized at the apical area by small, parallel lines that depict the animal's forelock.

Bibliographic reference: -



RT1003

Collection: University of Ferrara

Year of discovery: 1989

Stratigraphic Unit: 13a alfa

Square: 70/7

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

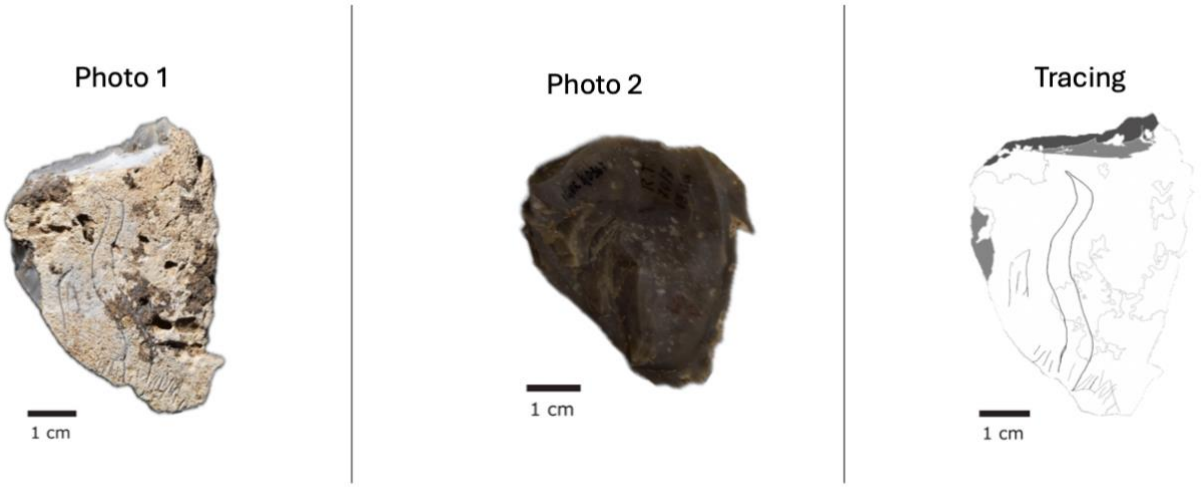
Broken artifact: Yes

Dimension: 42mm x 57mm x 14mm

Technique: Engravings

Description: Flint fragment showing a horn rising in a wavy line from a series of dashed, parallel lines that indicate the animal's head. A second, more recessed ear can also be seen. Since the ear is positioned in front of the horn, this suggests that the figure is oriented toward the left.

Bibliographic reference: -



RT1004

Collection: University of Ferrara

Year of discovery: 1998

Stratigraphic Unit: 406

Square: 20/6

Support: Bone

Stone alteration: weathering or trampling

Worked surface: 1

Broken artifact: Yes

Dimension: 79mm x 32mm

Technique: Engravings

Description: Bone fragment depicting on the left margin a paw (?), which does not appear to be that of a bovid due to its slender shape, but it is impossible to say more. Inside the paw and in a lower area corresponding to the knee, there is a circular mark that could be a rough sketch of the patellar joint, although this excludes it from matching with the corresponding circular mark on the outside. The stroke is simple in the rendering of the figure but becomes multiple in the area behind the knee joint (perhaps due to the complexity involved in depicting the bending of the limb).

Bibliographic reference: -

Photo 1



Photo 2

Tracing



RT1005

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: Re-excavated context

Square: 44/9

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

Broken artifact: Yes

Dimension: 42mm x 34mm x 8mm

Technique: Engravings

Description: Engraving on a flint cortex characterised by a single discontinuous outline line.

Bibliographic reference: -

Photo 1



Photo 2



Tracing



RT1006

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 10c

Square: 53/69

Support: Chert Cortex

Stone alteration: -

Worked surface: 1

Broken artifact: Yes

Dimension: 61mm x 35mm x 8mm

Technique: Engravings

Description: A flint fragment bearing engravings in the shape of ibex horns, group of single, discontinuous engravings. In addition to the horn, there is also a second group of incision - that seems distinguished from the first by lighter, parallel and multiple strokes - follow the shape of the horn. It could represent two hooves: the first hoof can be identified within the horn engravings only by rotating the piece, while the second hoof is visible between the zigzag line of the horn and the other, lighter engravings that follow its contour.

Bibliographic reference: -



RT1008

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 13 a lafa

Square: 72/3

Support: Chert Cortex

Stone alteration: Detachment

Worked surface: 1

Broken artifact: Yes

Dimension: 23mm x 12mm x 6mm

Technique: Engravings

Description: A piece of flint cortex engraved with a series of parallel, multiple incisions.

Bibliographic reference: -

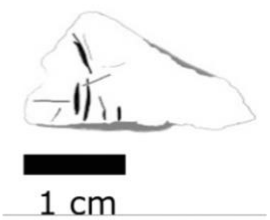
Photo 1



Photo 2



Tracing



RT1010

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 14

Square: 44/9

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

Broken artifact: Yes

Dimension: 44mm x 39mm x 8mm

Technique: Engravings

Description: A flint fragment bearing incisions that seem to depict a profile or a part of the muzzle of a herbivore

Bibliographic reference: -

Photo 1



Photo 2



Tracing



RT1011

Collection: University of Ferrara

Year of discovery: 1999

Stratigraphic Unit: 6 – 7

Square: 510/7

Support: Bone

Stone alteration: Concretion

Worked surface: 1

Broken artifact: Yes

Dimension: 76mm x 31mm x 19mm

Technique: Engravings

Description: A bone fragment that seems to have an engraved profile

Bibliographic reference: -



RT1012

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 17

Square: 22

Support: Chert Cortex

Stone alteration: Concretion, detachment

Worked surface: 1

Broken artifact: Yes

Dimension: 53mm x 43mm x 12mm

Technique: Engravings

Description: Incised flint cortex fragment, characterized by two single lines running parallel to each other. It could represent a tail.

Bibliographic reference: -

Photo 1

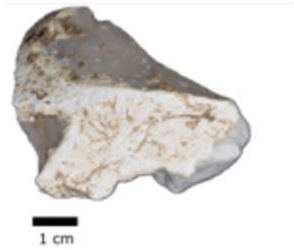
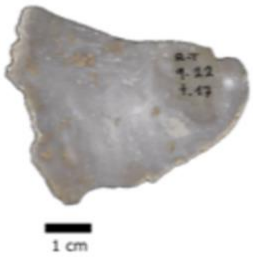


Photo 2



Tracing



RT1013

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 13

Square: 63/3

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

Broken artifact: Yes

Dimension: 50mm x 39mm x 7mm

Technique: Engravings

Description: Flint cortex fragment bearing two incised lines forming the hoof of an ungulate or a knee joint, comparable to the feature observed on RT2002. The first group consists of a discontinuous line forming the dewclaw, while the second is linear and continuous, forming the other component of the hoof.

Bibliographic reference: -



RT1016

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 15

Square: 22

Support: Chert Cortex

Stone alteration: -

Worked surface: 1

Broken artifact: Yes

Dimension: 44mm x 39mm x 8mm

Technique: Engravings

Description: A flint fragment likely representing a lion’s ear, with the muzzle facing left.

Bibliographic reference: Leonardi, 1978.

Photo 1



Photo 2



Tracing



RT1017

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 358

Square: 69/1

Support: Chert Cortex

Stone alteration: Detachment

Worked surface: 1

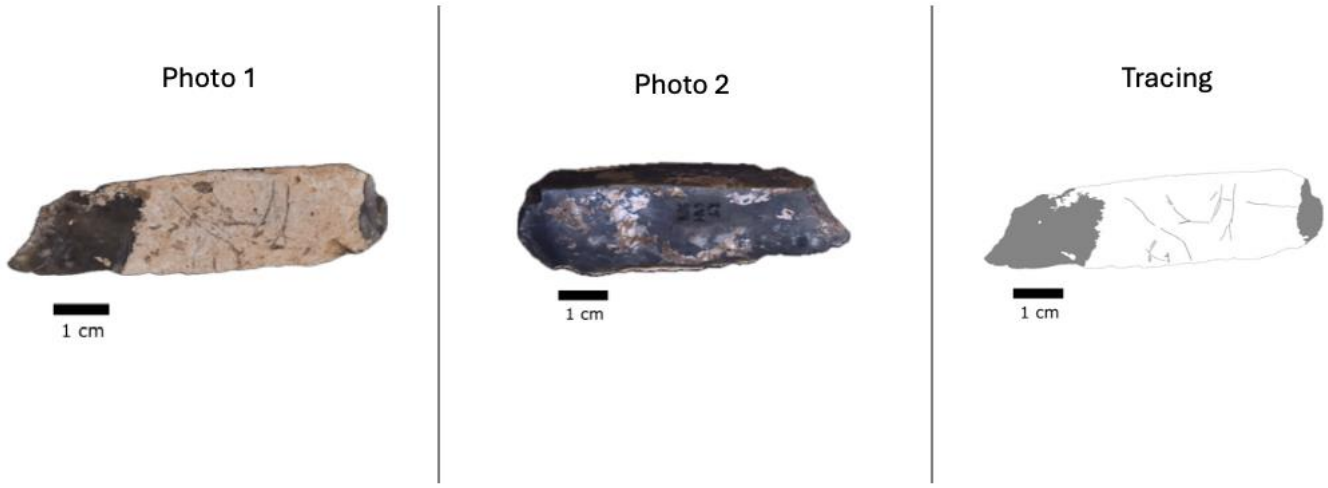
Broken artifact: Yes

Dimension: 68mm x 20mm x 12mm

Technique: Engravings

Description: A flint fragment with engravings probably representing an ungulate antler.

Bibliographic reference: unpublished.



RT1018

Collection: University of Ferrara
Year of discovery: 10/2/1963
Stratigraphic Unit: Cleaning of the interior
Square: -
Support: Chert Cortex
Stone alteration: Concretion
Worked surface: 1
Broken artifact: Yes
Dimension: 48mm x 40mm x 12mm
Technique: Engravings
Description: Incised flint fragment depicting the ear of a bovid. A discontinuous line represents the outline of the ear, which is enriched by parallel lines depicting the hair. A continuous line perpendicular to the base of the ear may represent an anatomical detail of the ear.
Bibliographic reference: -



RT1019

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 13 a alfa

Square: 26/2

Support: Chert Cortex

Stone alteration: -

Worked surface: 1

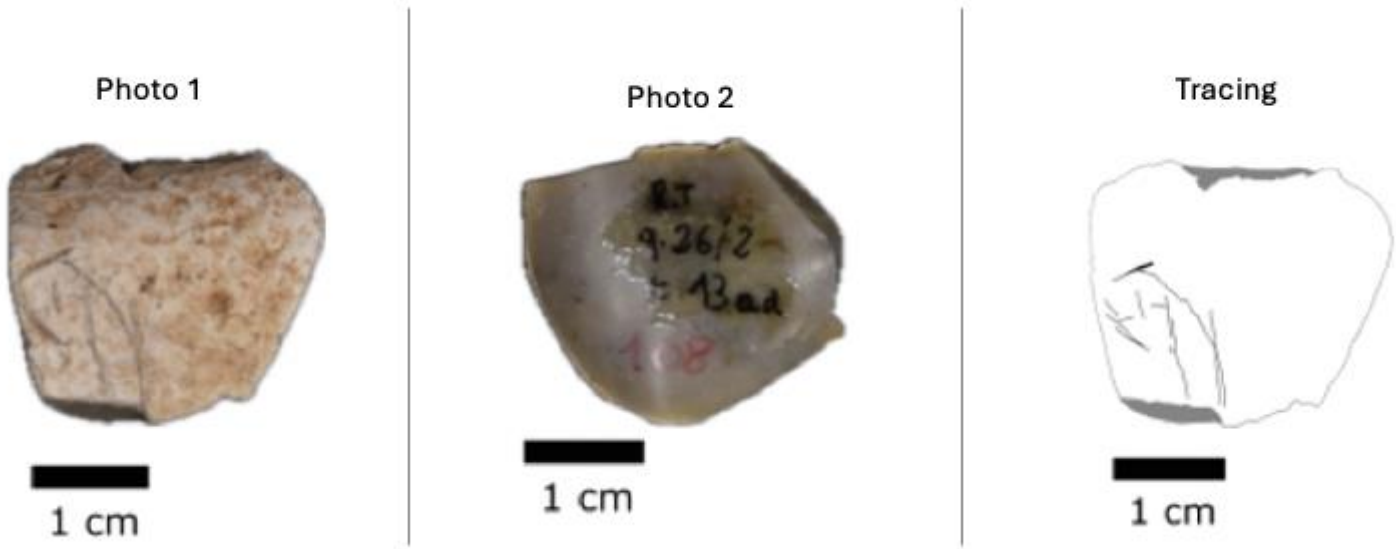
Broken artifact: Yes

Dimension: 27mm x 24mm x 9mm

Technique: Engravings

Description: Incised flint fragment. The engraving could represent an ear, based on the characteristics of its contour, which is discontinuous and linear, and the parallel lines inside it, comparable to those observed in RT1018. Alternatively, the motif could represent an eye, although this interpretation remains uncertain

Bibliographic reference: -



RT1021

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 5

Square: 50/8+9

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

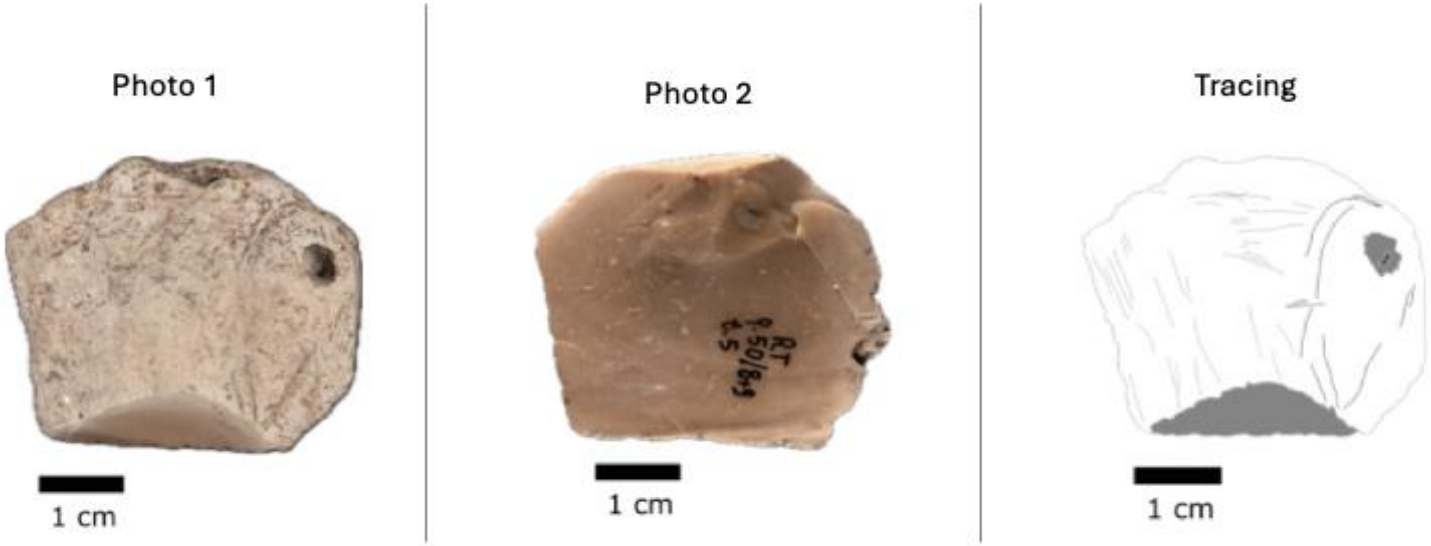
Broken artifact: Yes

Dimension: 42mm x 35mm x 10mm

Technique: Scraping

Description: Incised flint cortex fragment depicting the eye of a bison. The eye is constructed around a natural hole located in a slightly raised area of the surface. The subsequent action consisted of accentuating the difference in relief through scraping, thereby defining an elongated, almond-shaped eye.

Bibliographic reference: -



RT1023

Collection: University of Ferrara

Year of discovery: 2004

Stratigraphic Unit: 365

Square: 49/9

Support: Bone

Stone alteration: -

Worked surface: 1

Broken artifact: Yes

Dimension: 86,5mm x 31mm x 17mm

Technique: Engravings

Description: bone fragment with a bovine profile, recognizable by its hump, engraved with multiple incisions (cfr. RT1011)

Bibliographic reference: -



RT1025

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: -

Square: -

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 2

Broken artifact: Yes

Dimension: 65mm x 47mm x 17mm

Technique: Engravings

Description:

A) Engraved pebble bearing three continuous parallel lines, produced by a tool that left a double line. These may represent trials of profiles or gestures.

B) Incised pebble with a series of multiple lines that appear to delineate an appendage, possibly an ear of a bovid or an equid. The pattern is comparable to that observed on RT1018 and RT1019, consisting of multiple and single contour lines, discontinuous in three sections and terminating in a pointed shape

Bibliographic reference: -



RT1026

Collection: University of Ferrara

Year of discovery: 2005

Stratigraphic Unit: 5

Square: 590/9

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

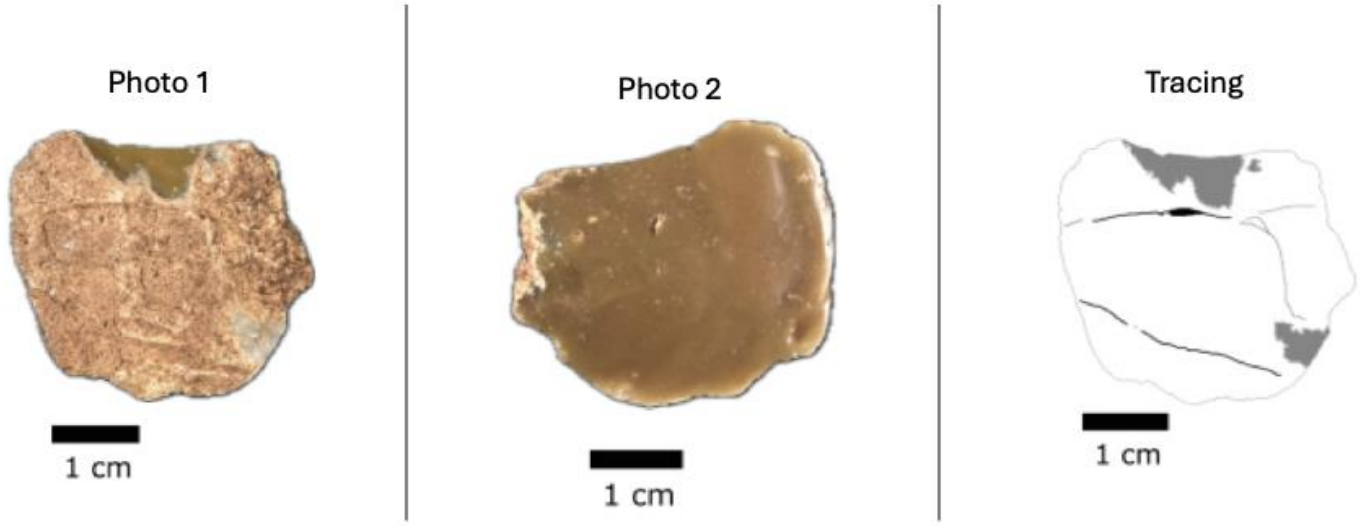
Broken artifact: Yes

Dimension: 35mm x 31mm x 6mm

Technique: Engravings

Description: Incised flint cortex fragment with two parallel lines. The first line continues straight before curving inward, while the other continues in a straight line.

Bibliographic reference: -



RT1030

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 13

Square: 7

Support: Chert nodule

Stone alteration: Concretion, corrosion

Worked surface: All

Broken artifact: Yes

Dimension: 45mm x 29mm x 14mm

Technique: Engravings, scraping

Description: Trapezoidal limestone nodule, shaped through scraping to define the internal details, with two incisions highlighting anatomical features. According to the current interpretation: * the artefact represents a hare, with the two incisions emphasizing the animal's characteristic ear and mouth. ** From a comparative perspective with the Magdalenian, this artefact strongly resembles the profile of Magdalenian horse heads, and the anatomical feature highlighted by the incision may instead be interpreted as the animal's forelock

Bibliographic reference: -



RT1031

Collection: University of Ferrara
Year of discovery: -
Stratigraphic Unit: Reworked
Square: -
Support: Chert Cortex
Stone alteration: -
Worked surface: All
Broken artifact: Yes
Dimension: 61mm x 45mm x 33mm
Technique: Engravings
Description: Chert fragment bearing a series of parallel, continuous-line engravings, alongside a second group composed of multiple lines. The three-dimensional form of the artefact itself represents a penis.
Bibliographic reference: Leonardi, 1972.



RT1032

Collection: University of Ferrara

Year of discovery: **-**

Stratigraphic Unit: 13 a alfa

Square: 57/4

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

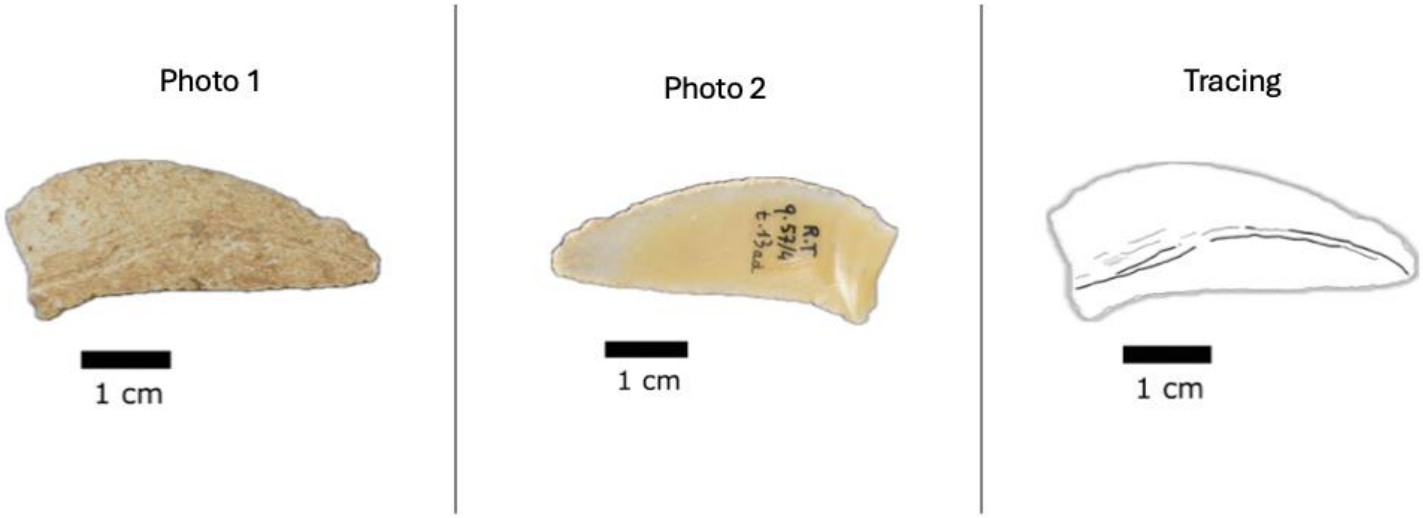
Broken artifact: Yes

Dimension: 42mm x 18mm x 3mm

Technique: Engravings

Description: Incised flint fragment bearing continuous lines that delineate a parallel profile of a bovide.

Bibliographic reference: -



RT1033

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: -

Square: -

Support: Chert Cortex

Stone alteration: -

Worked surface: 1

Broken artifact: Yes

Dimension: 48mm x 34mm x 9mm

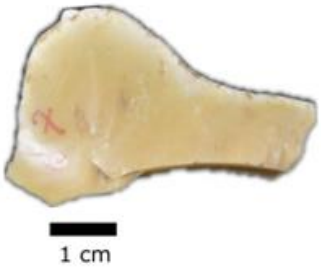
Description: A flint fragment bearing three single, continuous incised lines: two are parallel, while the third intersects one of the parallel lines perpendicularly.

Bibliographic reference: -

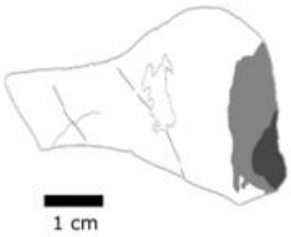
Photo 1



Photo 2



Tracing



RT1036

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 25ck

Square: 10/5

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

Broken artifact: Yes

Dimension: 53mm x 30mm x 10mm

Technique: Engravings

Description: A flint fragment with two parallel lines, which seem to form the terminal part of a leg with the beginning of a hoof.

Bibliographic reference: -



RT1039

Collection: University of Ferrara

Year of discovery: **-**

Stratigraphic Unit: 12

Square: 57

Support: Chert Cortex

Stone alteration: Concretion, detachment

Worked surface: 1

Broken artifact: Yes

Dimension: 26mm x 24mm x 3mm

Technique: Engravings

Description: Small cortex fragment depicting a bison's beard (based on comparison with the RT2002 and other French sites)

Bibliographic reference: Leonardi, 1980.

Photo 1



Photo 2



Tracing



RT1040

Collection: University of Ferrara

Year of discovery: 2001

Stratigraphic Unit: 409

Square: 23/2

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: All

Broken artifact: Yes

Dimension: 35mm x 17mm x 8mm

Technique: Engravings, perforation

Description: The silex nodule presents two kinds of engravings. The first is a clean, single line that appears to represent a mouth, wrapping around the object and suggesting a change in perspective. The second is a well-defined circular perforation that appears to represent an eye, with the animal's face oriented to the left.

Bibliographic reference: -

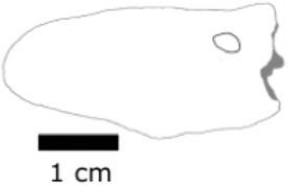
Photo 1



Photo 2



Tracing



RT1043

Collection: University of Ferrara

Year of discovery: 2001

Stratigraphic Unit: 15

Square: 22

Support: Chert Cortex

Stone alteration: -

Worked surface: 1

Broken artifact: Yes

Dimension: 52mm x 36mm x4mm

Technique: Engravings

Description: Flint cortex fragment bearing two single, continuous incised lines. The motif consists of an outer, straight and continuous line, while an inner line curves inward to form the posterior portion of the hoof or a knee joint. (Cfr RT1013)

Bibliographic reference: -

Photo 1

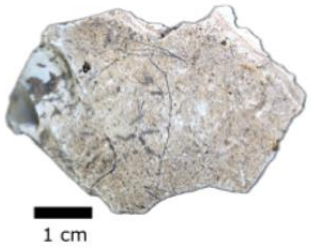
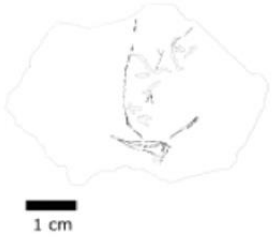


Photo 2



Tracing



RT1044

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: -

Square: -

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

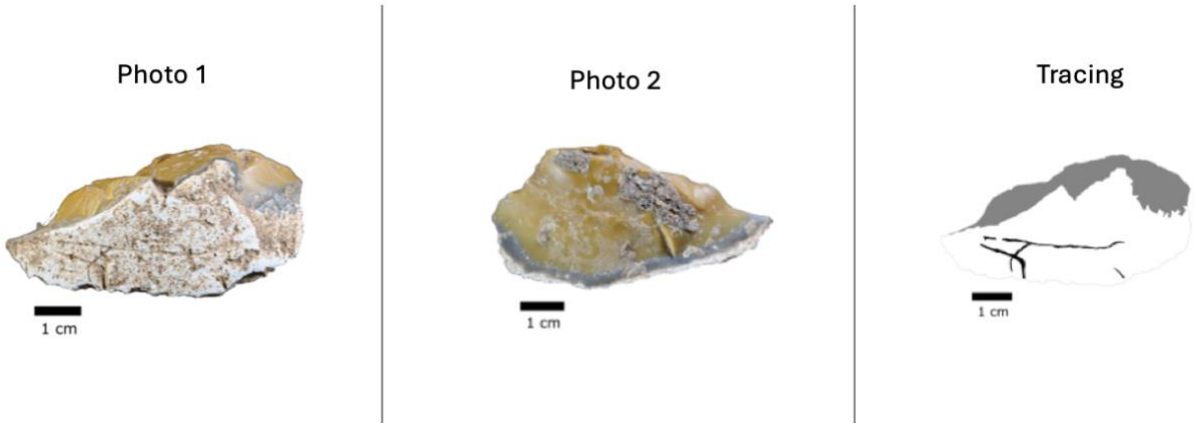
Broken artifact: Yes

Dimension: 64mm x 33mm x 18mm

Technique: Engravings

Description: A flint cortex fragment bearing two incised lines: a longer line running along the length of the artefact and a shorter horizontal line that curves outward approximately one-third of the way along the longer line.

Bibliographic reference: -



RT1046

Collection: University of Ferrara

Year of discovery: 2001

Stratigraphic Unit: Cleaning

Square: 82/6

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

Broken artifact: Yes

Dimension: 55mm x 31mm x 12mm

Technique: Engravings

Description: A flint scraper displaying, on its cortex, two groups of marks that appear to indicate the presence of an herbivore, possibly an equid. The first group consists of two parallel lines which, based on their position relative to the limb, may represent the muzzle. The second group appears to depict a forelimb. Both groups are characterized by a single outline contour. Additionally, a third group is present within the composition, consisting of two lines located at the level of the animal's leg.

Bibliographic reference: -

Photo 1

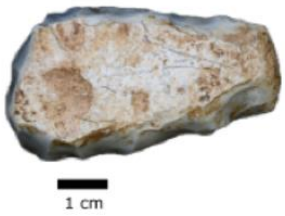
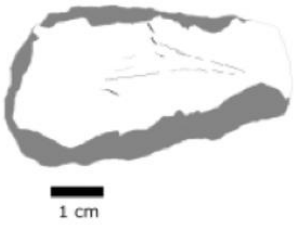


Photo 2



Tracing



RT1047

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 15

Square: 22

Support: Chert Cortex

Stone alteration: Concretion

Worked surface: 1

Broken artifact: Yes

Dimension: 26mm x 23mm x 3mm

Technique: Engravings

Description: A silex cortex displaying five rectilinear incisions arranged as follows: one line perpendicular to the main rectilinear plane, two lines converging in a V-shape relative to the same plane, and two lines parallel to it. In addition, another comma-shaped mark is visible in the lower left area. It has been interpreted as figurative, possibly representing a group of horns, although with considerable uncertainty.

Bibliographic reference: Leonardi, 1972.

Photo 1



Photo 2



Tracing



RT1050

Collection: University of Ferrara

Year of discovery: 19/09/1985

Stratigraphic Unit: 10a

Square: 82

Support: Chert Cortex

Stone alteration: -

Worked surface: 1

Broken artifact: Yes

Dimension: 46mm x 40mm x 12mm

Technique: Engravings

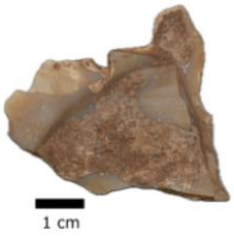
Description: flint cortex with a set of parallel and single strokes closed to form a V, which could represent the antlers of a cervid (or caprid) with the muzzle seen from the front (?)

Bibliographic reference: unpublished

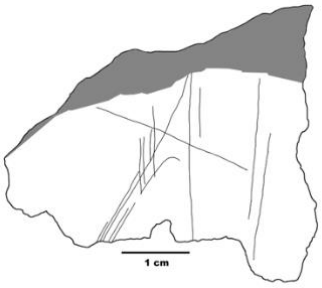
Photo 1



Photo 2



Tracing



RT1051

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: Re-excavated context

Square: 29/7

Support: Chert Cortex

Stone alteration: Concretion, detachment

Worked surface: 1

Broken artifact: Yes

Dimension: 48mm x 16mm x 8mm

Technique: Engravings

Description: Two straight, single-stroke parallel lines on a silex cortex. In addition, at the lower end (as oriented in the photo), another mark is visible midway between the two parallel lines. This assemblage could represent a limb.

Bibliographic reference: -

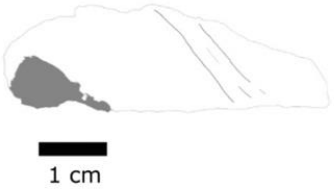
Photo 1



Photo 2



Tracing



RT1053

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 10e

Square: 23

Support: Chert Cortex

Stone alteration: bioperturbation

Worked surface: 1

Broken artifact: Yes

Dimension: 49mm x 32mm x 4mm

Technique: Engravings

Description: Silex cortex with traces of ochre and black pigment. The object was found in layers rich in ochre; the engravings made in this manner could resemble a bison's beard or a horse's mane (cfr La Madeleine engraved stone 301/Metamorphic rock pebble 302).

Bibliographic reference: unpublished

Photo 1

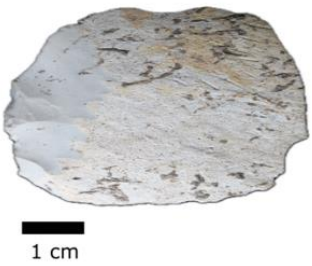
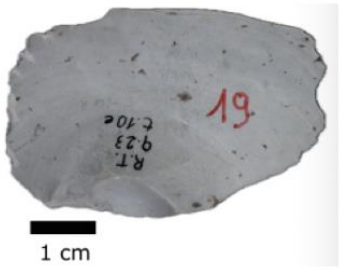
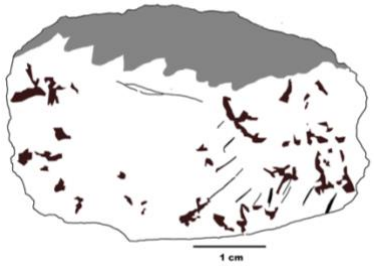


Photo 2



Tracing



RT1055

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 12

Square: 72

Support: Chert Cortex

Stone alteration: -

Worked surface: 1

Broken artifact: Yes

Dimension: 47mm x 21mm x 7mm

Technique: Engravings

Description: A flint fragment marked centrally by a single straight line. In the lower right corner, six well-defined parallel incisions can be observed. Between the first three lines, a patch of red ochre is also present.

Bibliographic reference: -



RT1056

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: -

Square: -

Support: Chert Cortex

Stone alteration: Detachment

Worked surface: 1

Broken artifact: Yes

Dimension: 72mm x 42mm x 45mm

Technique: Engravings

Description: A flint fragment depicting two single lines that terminate in a structure appearing tripartite and pointed.

Bibliographic reference: -

Photo 1

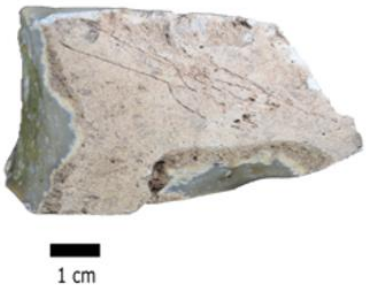
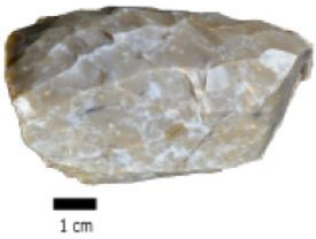
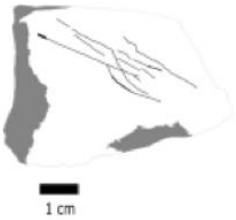


Photo 2



Tracing



RT1058

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: -

Square: -

Support: Chert Cortex

Stone alteration: -

Worked surface: 1

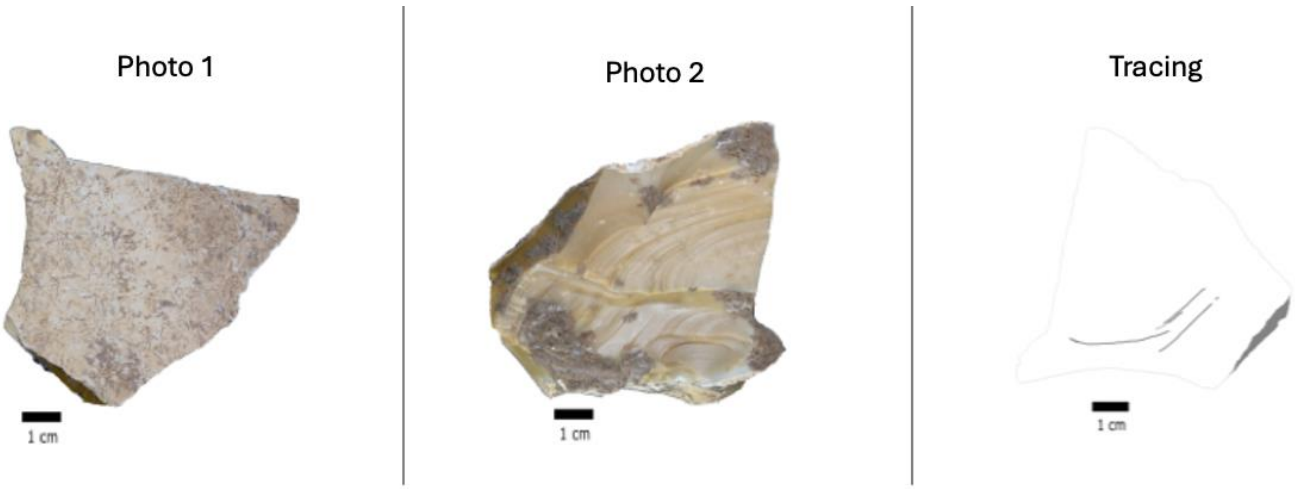
Broken artifact: Yes

Dimension: 72mm x 76mm x 37mm

Technique: Engravings

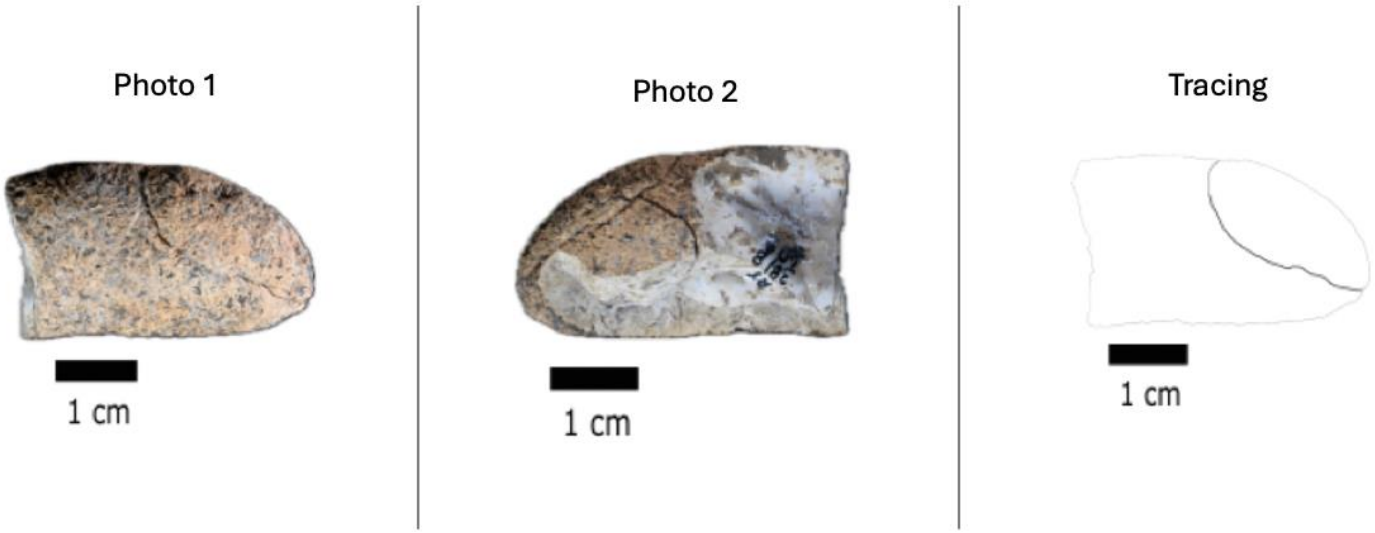
Description: A flint fragment with incisions on the cortex. These are very shallow and are divided into two groups: two parallel lines and a line shaped like a parenthesis. Overall, the composition could be interpreted as a hind leg (or possibly a foreleg in motion?), in which the legs would be rendered in a variant of open parallel lines.

Bibliographic reference: -



RT1059

Collection: University of Ferrara
Year of discovery: 2001
Stratigraphic Unit: 408
Square: 38/8
Support: Chert Cortex
Stone alteration: detachment
Worked surface: all
Broken artifact: Yes
Dimension: 38mm x 22mm x 8mm
Technique: Engravings
Description: A cylindrical flint nodule with an incision delineating an ellipsoidal area. This three-dimensional artifact falls within the sphere of anthropomorphic figurative expression
Bibliographic reference: -



RT1060

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 13

Square: 54/7

Support: Chert Cortex

Stone alteration: -

Worked surface: 1

Broken artifact: Yes

Dimension: 44mm x 26mm x 9mm

Technique: Engravings

Description: A flint nodule with an incised cortex. The incisions consist of a group of fairly well-defined parallel lines. Within these, striations can be observed that may serve a filling function. The motif could represent a limb and its infilling.

Bibliographic reference: unoublished



RT1062

Collection: University of Ferrara

Year of discovery: 2005

Stratigraphic Unit: 613

Square: 551/6

Support: Chert Cortex

Stone alteration: Concretion,

Worked surface: 1

Broken artifact: Yes

Dimension: 42mm x 31mm x 4mm

Technique: Engravings

Description: A flint plaque with an incised cortex marked by a series of converging parallel incised lines, in a herringbone-like pattern. A perforation is also present, though it is probably of animal origin. This figurative scheme is frequently found in the French Magdalenian context to represent the hair under the muzzle and along the neck of bison.

Bibliographic reference: unpublished



RT1063

Collection: University of Ferrara

Year of discovery: -

Stratigraphic Unit: 12

Square: 10

Support: Chert Cortex

Stone alteration: Detachment

Worked surface: 1

Broken artifact: Yes

Dimension: 45mm x 29mm x 10mm

Technique: Engravings

Description: A flint fragment with an incised cortex. The two incisions are pronounced and appear to converge into a U-shape. Within the lines, additional marks can be observed, possibly serving as a filling.

Bibliographic reference: Leonard, 1978.

Photo 1



Photo 2



Tracings



RT1065

Collection: University of Ferrara

Year of discovery: 1967

Stratigraphic Unit: 12

Square: 12

Support: Stone

Stone alteration: Concretion

Worked surface: 1

Broken artifact: Yes

Dimension: 74mm x 60mm

Technique: Engravings

Description: pebbles with very superficial engravings, representing either a ventral profile of a bovid or standing birds (identified through comparison).

Bibliographic reference: unpublished

Photo 1

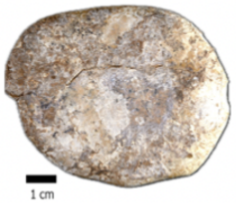


Photo 2

Tracings



RT2001

Collection: Museo di Archeologia Nazionale

Year of discovery: 1964

Stratigraphic Unit: out of context

Square:

Support: oolithic limestone

Stone alteration: Concretion, detachment

Worked surface: 1

Broken artifact: Yes

Dimension: 86mm x 53mm x 39,5mm

Technique: Engravings

Description: Small oolitic limestone plaque depicting the muzzle of a herbivore (probably a moose).

Bibliographic reference: Mezzena, 1964.

Photo 1



Photo 2

Tracings



RT2002

Collection: Museo di archeologia nazionale
Year of discovery: post-1967
Stratigraphic Unit: 10e
Square: 22
Support: stone
Stone alteration: Concretion
Worked surface: 1
Broken artifact: Yes
Dimension: 320mm x 215mm x 103mm
Technique: Engravings
Description: Engraving on a roughly semicircular stone depicting a bison with a particularly pronounced dorsal hump. The ear follows the same pattern as RT1018, while the depiction of the knee joint recalls that observed on RT1013 and RT1043
Bibliographic reference: Leonardi, 1972.

Photo 1



Photo 2

Tracings



RT2003

Collection: Museo di archeologia nazionale
Year of discovery: 1964
Stratigraphic Unit: out of context
Square: -
Support: Stone
Stone alteration: -
Worked surface: 1
Broken artifact: Yes
Dimension: -
Technique: Engravings
Description: a pebble on which a series of engravings had been interpreted as depicting a horse or bovine. Following microscopic examination, this interpretation was refuted
Bibliographic reference: Mezzena, 1964.



RT2004

Collection: Museo di archeologia nazionale

Year of discovery: 1964

Stratigraphic Unit: Out of context

Square:

Support: Chert Cortex

Stone alteration: etachment

Worked surface: 1

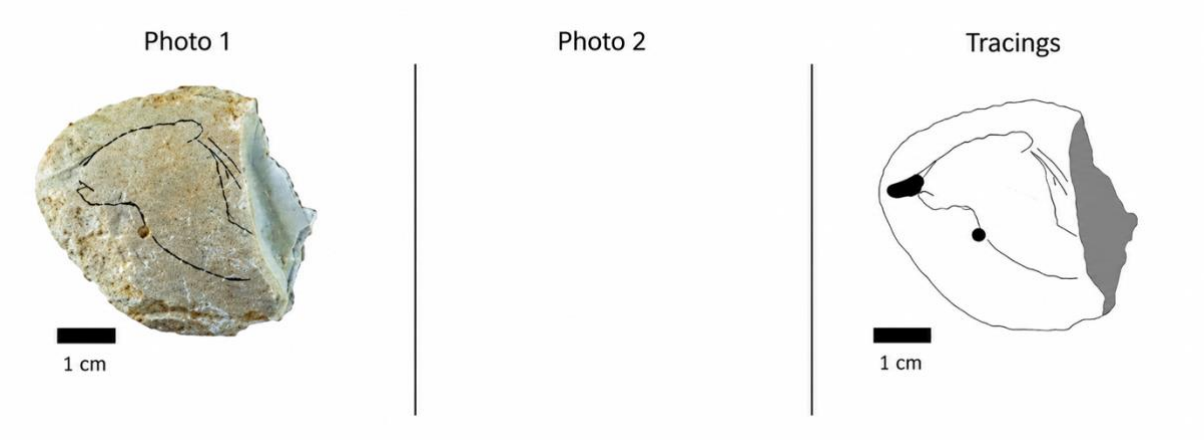
Broken artifact: Yes

Dimension: 49mm x 43mm x 24mm

Technique: Engravings

Description: Small flint nodule with engravings on the cortex depicting a felid (lion) with an unusually long neck. The shape of the ear is comparable to that observed on RT1019

Bibliographic reference: Mezzena, 1964.



RT2005

Collection: Museo di archeologia nazionale

Year of discovery: 1973

Stratigraphic Unit: Burial

Square:

Support: Stone

Stone alteration: Concretion, detachment

Worked surface: 1 - Graphic Unit: 2

Broken artifact: Yes

Dimension: -

Technique: Engravings

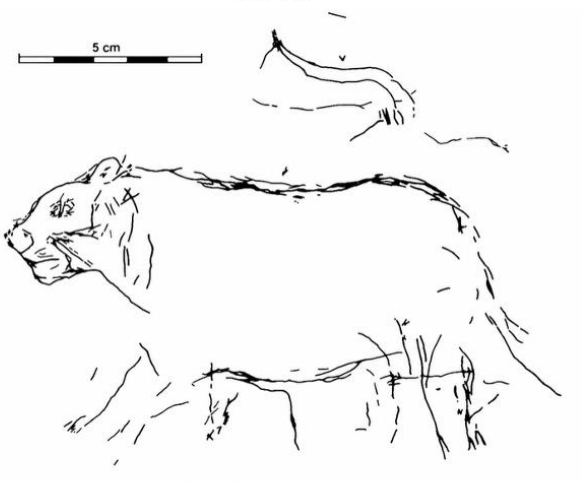
Description: Engraved lion depicted through a series of multiple continuous lines defining the dorsal contour. The muzzle is characterized by single, continuous lines and parallel lines, particularly in the representation of the whiskers. The ear and nostrils are rendered as circular elements. In the lower part of the figure, the engraving becomes more confused and difficult to follow. The number of single lines may indicate the presence of the legs, while their arrangement in groups of parallel lines with different orientations could be consistent with a straight biangular perspective.

Bibliographic reference: Bartolomei et al, 1974.

Photo 1



Tracing



Tracing adapted from Leonardi1988

RT2007

Collection: Museo di archeologia nazionale

Year of discovery: 1964

Stratigraphic Unit: US 5 (excavation 1963)

Square: -

Support: Limestone plaque

Stone alteration: Concretion, detachment

Worked surface: 1

Broken artifact: Yes

Dimension: 4,9mm x 3.1 mm

Technique: Engravings

Description:

A) Double continuous engraving delineating the profile of a hind leg of the animal, probably an ungulate, possibly a bovid or equid. Also noteworthy are the converging lines forming the filling.

B) Single continuous linear engraving delineating the two hind limbs of a bovid

Bibliographic reference: Mezzena, 1964.

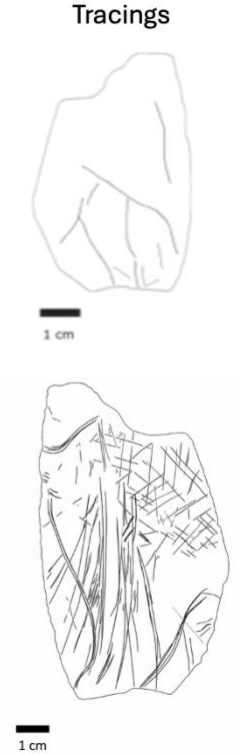
Photo 1



Photo 2



Tracings



RT2008

Collection: Museo di archeologia nazionale

Year of discovery: 1964

Stratigraphic Unit: By-products (waste materials) from medieval excavation pits (Guerreschi)

Square: -

Support: Pebble

Stone alteration: Detachment

Worked surface: 1

Broken artifact: Yes

Dimension: 90mm x114 x 85mm

Technique: Engravings

Description: Pebble bearing an engraving of an ibex. The figure is delineated by a single, continuous outline. One of the horns is characterized by one smooth side and the other rendered in a zigzag pattern. Parallel lines can also be observed in the details of the muzzle. The position of the retracted right hoof may indicate a particular movement or posture. The shape of the hoof is also comparable to those of other specimens from the site, RT1013, RT1043, and RT2002.

Bibliographic reference: Mezzena, 1964.

Photo 1



Photo 2

Tracings



APPENDIX B. Analytical Variables

Anatomical feature	Formal type	RT examples
Eye	almond-shaped	RT2002 RT2008
	Semicircular strokes	RT1002 RT2001
	Circular	RT2005A
Mouth	Single line (closed)	RT2001 RT2002 RT2004 RT2005A
	Open	RT2008
Ear	triangular	RT1001 RT2002
	Rounded/circular	RT1019 RT2004 RT2005A
	Trapezoidal	RT1016 RT1018
	Elongated	RT1025B
Nostril	Semicircular strokes	RT2001
	Single stroke	RT2002
Horn/antler	Double strokes	RT1002 RT1003 RT1006 RT1019 RT2008
	V Shape	RT1050
Facial hair	beard	RT1039 RT1053 RT1062 RT2002 RT2008

	Forelock/Mane	RT1001 RT1002 RT1003 RT2005B
	whiskers	RT2005A

Figure 8.1. Formal typology of anatomical features identified in the Riparo Tagliente corpus.

CRITERIA	VARIABLES
INFORMATIVE DATA	
Id	
Progressive number	
Taxonomic group	
STATE OF PRESERVATION	
Complete	
Incomplete	
GRAPHIC CONSTRUCTION	
Groove depth	Very superficial, superficial, medium
Lines	Single, multiple, parallel
	Continuous, discontinuous
	Closed, open
	Regular, irregular
Outline technique	Single, multiple, parallel
	Continuous, discontinuous
	Closed, open
INTERNAL GRAPHIC FEATURES and ANATOMICAL FEATURES	
Filling + location +shape	Parallel, single, multiple
Head + head shape	S-shape, U-shape, Linear U-shape, quadrangular
Eye + eye shape	Semicircular, almond shape,
Mouth + mouth configuration	closed, open, linear
Facial hair + lines + location	Parallel, multiple, single
Nostril + nostril shape	Semicircular, circular
Horn/antler + horn/antler shape	Double, V-Shape
Tail + tail shape	Parallel lines
Orientation	Left, right
Limbs shape	Realistic, essential
Perspective	Straight biangular perspective, uniangular perspective, frontal, absolute profile, oblique biangular perspective
Movement	