

Аглядны артыкул

Арганізацыя майстэрні ў капліцы Хатшэпут: археалагічныя перспектывы вывучэння старажытнаегіпецкіх рэльефаў

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Анотацыя. Старажытныя мастацкія помнікі звычайна інтэрпрэтуюцца пераважна праз іх стылістычныя асаблівасці або гістарычнае значэнне. У гэтым даследаванні прапануецца іншы падыход праз аналіз старажытнаегіпецкіх насценных рэльефаў з выкарыстаннем рамкі chaîne opératoire. Даследавання рэльефы ўпрыгожваюць сцены капліцы Хатшэпут у Дэйр эль-Бахры ў Фівах. Дзякуючы гэтаму аналітычнаму падыходу даследаванне рэканструюе паслядоўнасць вытворчых дзеянняў, звязаных са стварэннем рэльефаў, пачынаючы з падрыхтоўкі паверхні сцяны і заканчваючы фінальнымі дапрацоўкамі, выкананымі майстрам-скульптарам. Вынікі дазваляюць зразумець эрганамічную арганізацыю працы падчас працэсу разьблення, вызначыць ролі розных рамеснікаў і адрозніць працу асобных майстроў. Акрамя таго, даследаванне раскрывае менш бачныя аспекты майстэрскай практыкі, уключаючы ўзаемадзеянне паміж майстрамі і вучнямі на розных этапах вытворчасці. Праз рэканструкцыю гэтых тэхнічных і сацыяльных працэсаў даследаванне спрыяе больш глыбокаму разуменню мастацкай вытворчасці ў Старажытным Егіпце і арганізацыі спецыялізаванай працы ў манументальным дэкоры. Прадэманстраваны тут метадалагічны падыход таксама можа быць ужыты для вывучэння традыцый разьбяных рэльефаў у іншых рэгіёнах свету, дзе існавалі падобныя працэсы мастацкай вытворчасці.

Ключавыя словы: старажытнаегіпецкія рэльефы; Хатшэпут; Дэйр эль-Бахры; chaîne opératoire; арганізацыя майстэрні; навучанне майстра і вучня.

Review Article

Workshop Organization at Hatshepsut's Chapel: Archaeological Perspectives on Ancient Egyptian Reliefs

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Abstract. Ancient artistic remains are commonly interpreted primarily through their stylistic qualities or historical significance. This study proposes a different perspective by analysing ancient Egyptian wall reliefs using the chaîne opératoire framework. The reliefs examined decorate the walls of the Chapel of Hatshepsut at Deir el-Bahari in Thebes. Through this analytical approach, the research reconstructs the sequence of production activities involved in creating the reliefs, beginning with the preparation of the wall surface and continuing to the final refinements executed by the master sculptor. The results make it possible to understand the ergonomic organisation of labour during the carving process, identify the roles of different craftsmen, and distinguish the work of individual hands. Moreover, the study reveals less visible aspects of workshop practice, including interactions between masters and apprentices during the production stages. By reconstructing these technical and social processes, the research contributes to a deeper understanding of artistic production in ancient Egypt and the organisation of specialised labour in monumental decoration. The methodological approach demonstrated here may also be applied to the examination of carved relief traditions in other regions of the world where similar artistic production processes existed.

Keywords: ancient Egyptian reliefs; Hatshepsut; Deir el-Bahari; chaîne opératoire; workshop organization; master apprentice training

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Introduction

Ancient Egyptian sculpture, relief carving, and painting are widely recognised for their monumentality and longevity, and within a Western perspective they are often categorised as forms of “art.” Despite this prominence, the individuals responsible for producing these works remain largely unidentified. This obscurity is closely related to the social structure of ancient Egyptian society, where unlike in cultures such as ancient Greece artists were not typically celebrated as individual creators. As a consequence, explicit claims of authorship are extremely rare. In addition, artistic production in ancient Egypt was strongly shaped by the workshop system, where collaborative work processes limited the emergence of distinct personal styles (for an overview, see Oppenheim 2006: 216–19; Laboury 2012: 199–200). If the identity of the ancient Egyptian artist can therefore be considered “one of the great unknowns of Egyptology” (Laboury 2013), the participation and role of apprentices remain even more difficult to identify.

Scholarly attempts to recognise the work of individual Egyptian artists have often relied on analysing the material characteristics of the objects they produced. Such studies were initially developed through investigations of painted

tombs in Thebes from the New Kingdom period (sixteenth to eleventh century BC) (e.g. Bryan 2001; Keller 2001; Tavier 2012; Hartwig & Leterme 2013; Laboury & Tavier 2016). Building on this line of research, Laboury (2012: 203–206) proposed the concept of an “archaeology of art.” According to this perspective, the physical surface of an artefact preserves numerous traces that can be examined in a manner comparable to stratigraphy, allowing researchers to reconstruct the stages of its creation and the circumstances in which it was produced (Laboury 2012: 203). This approach complements traditional art-historical studies of Egyptian monuments and objects (see Hartwig 2011; Müller 2013 for overviews) by shifting attention away from aesthetic interpretation and symbolic meaning toward the practical processes involved in production.

Research on carved reliefs in ancient Egypt (Woods 2015) has often concentrated on unfinished monuments, as these provide direct evidence of carving techniques and the organisation of labour (e.g. Teichmann 1971; Baines 1989). In recent years, however, scholars have increasingly begun to examine completed reliefs in order to address similar questions (Freed 2000; Silverman 2000; Oppenheim 2006; Pieke 2011; Davies 2017). These studies provide the comparative framework for the present analysis.

Within archaeology, the investigation of production techniques and the sequential actions required to create an artefact is commonly described through the concept of the *chaîne opératoire*, or operational sequence. Originating in anthropological research (Gosselain 1992; Lemonnier 1992), this concept has been applied extensively to the study of stone-tool industries (e.g. Sellet 1993; Bar-Yosef & Van Peer 2009; Soressi & Geneste 2011; Delage 2017). Nevertheless, the same perspective can also be applied to artistic production. By examining the technological stages of manufacture, the *chaîne opératoire* approach not only clarifies how a finished object was produced but also reveals aspects of the technological and social environment in which it was created, including systems of training and apprenticeship (Gosselain 1992: 563–64, 572 & 582). Although this method can be used to study many forms of artefacts, it is particularly well suited to carved reliefs, since similar to stone tools their creation involves a reductive process in which material is gradually removed. In this study, the *chaîne opératoire* framework is applied to the wall reliefs located in the Chapel of Hatshepsut, the largest chamber within the mortuary temple constructed for the female pharaoh Hatshepsut (1473–1458 BC). The temple stands at Deir el-Bahari in Thebes on the western bank of the Nile.

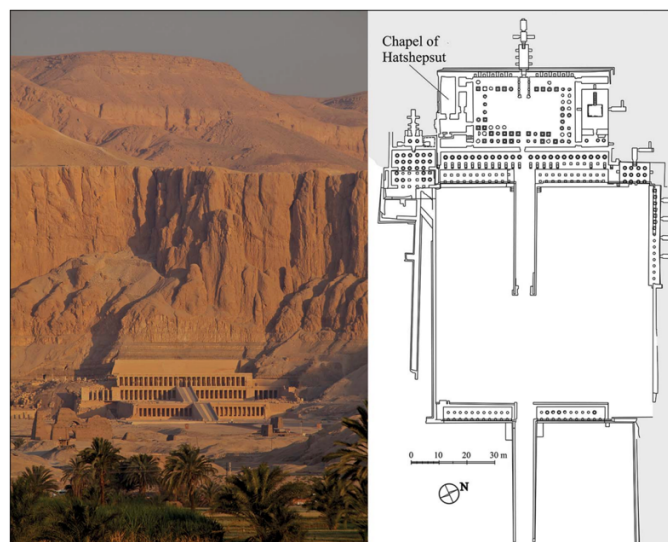


Figure 1. The Temple of Hatshepsut at Deir el-Bahari (photograph by M. Jawornicki; plan by T. Dziedzic).

The chapel, intended to serve as the cult space for Hatshepsut's mortuary rituals, was built from limestone blocks and decorated with raised relief carvings. Its north and south walls, each approximately 13.26m long and 3.78m high, display offering scenes that are typical of this type of cult environment. However, earlier examples of such scenes survive only in fragmentary form (Stupko-Lubczynska 2016). In accordance with standard iconographic conventions, roughly two-thirds of each wall is occupied by a procession of male offering-bearers carrying various items toward the deceased ruler, who is depicted seated at the western end of the wall, furthest from the entrance.

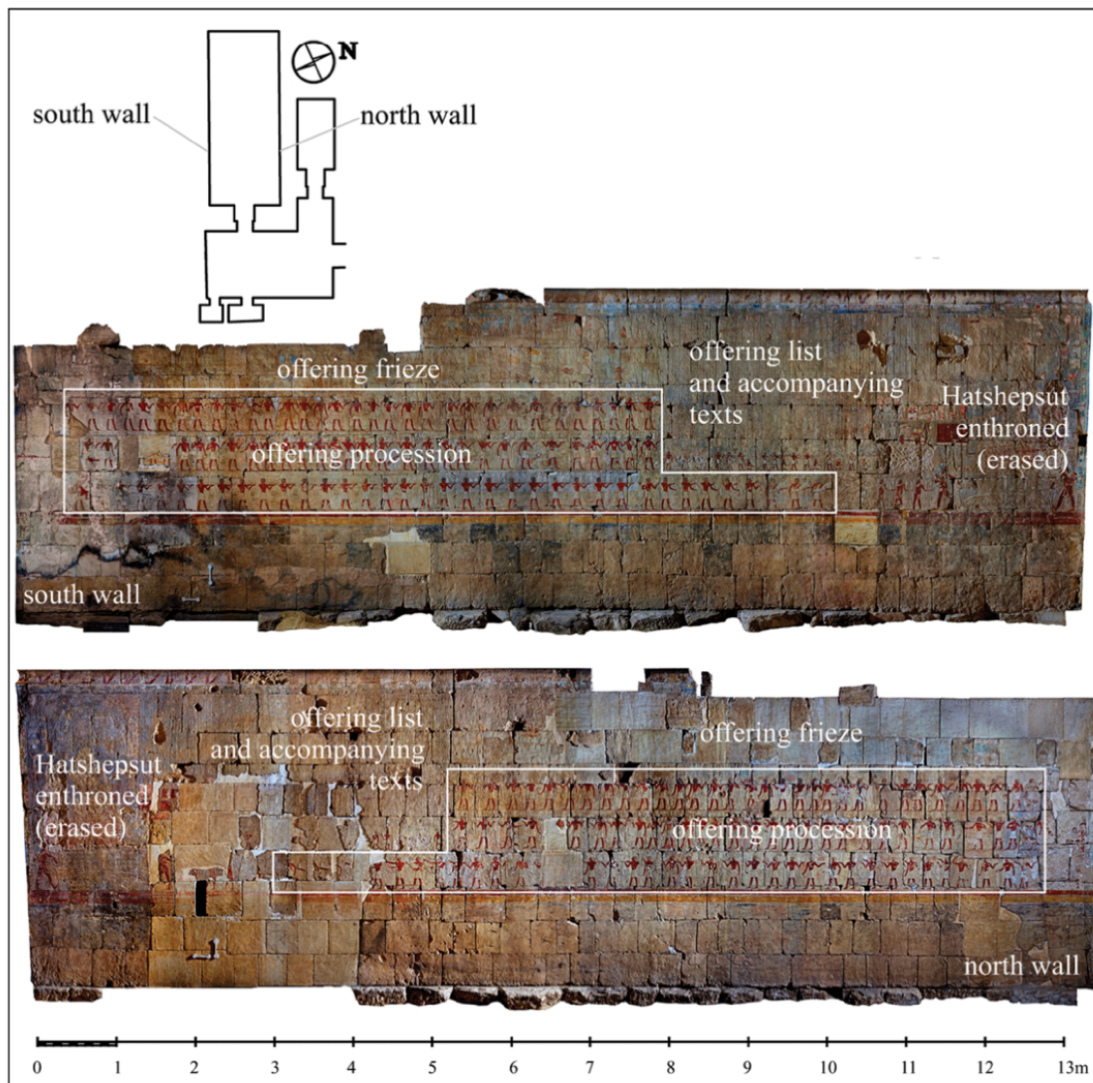


Figure 2. The Chapel of Hatshepsut, with offering scenes on the south and north walls (photographs by J. Kosciuk and M. Jawornicki; plan by T. Dziedzic).

In the chapel, the procession is arranged in three horizontal registers and includes a total of 200 figures, divided equally between the two lateral walls. Their distribution, however, differs slightly between rows: the south wall contains 32, 32, and 36 figures from top to bottom, while the north wall includes 32, 30, and 38 figures respectively. The repetition of similar visual elements across these numerous figures, combined with their remarkable state of preservation, provides an exceptional opportunity to analyse the technological aspects of a completed relief programme. The purpose of this study is therefore not only to reconstruct the technical procedures involved in producing the reliefs of the Chapel of Hatshepsut but also to explore the internal organisation of the workshop responsible for their creation, identify individual contributions, and examine the interactions between masters and apprentices. This integrated approach may also offer a methodological framework applicable to the study of decorated monuments in other regions. In addition to analytical observation, the research incorporates an experimental more precisely experiential dimension. During a long-term project conducted between 2006 and 2013, a team of draughtspersons led by the present author documented the reliefs of the chapel. The project was organised by the Mission of the Polish Centre of Mediterranean Archaeology at the University of Warsaw. As part of the documentation process, the team produced full-scale drawings of the wall surfaces by attaching transparent plastic sheets directly to the reliefs and tracing them at a 1:1 scale. These drawings were subsequently digitised and converted into vector graphics. Although this procedure was originally intended solely for documentation, it inadvertently reproduced certain physical actions performed by the ancient sculptors. As a result, the process has also made it possible to reflect on the ergonomic aspects of relief carving and to gain insights into the working practices of the artists who created these monuments.

Materials and Methods

The study adopts an archaeological and technological approach to investigate the production process of carved reliefs in the Chapel of Hatshepsut at Deir el-Bahari in Thebes. The analytical framework follows the concept of *chaîne opératoire*, which examines the sequence of technical actions involved in the creation of artefacts and artistic objects (Gosselain 1992; Lemonnier 1992; Sellet 1993). This approach enables the reconstruction of both technological procedures and the social organisation of artistic production.

Previous studies indicate that Egyptian relief decoration followed a systematic sequence of operations. The process began with the preparation of the wall surface, which involved smoothing the limestone blocks and filling imperfections or joints with plaster (Teichmann 1971; Aldred 1975: 801–804; Bogoslovsky 1980: 92–93; Laboury 2020: 91). After this preparation stage, the surface was divided into sections and marked with a square grid drawn in red pigment to establish correct proportions for the figures (Robins 1994: 23–30, 87–118).

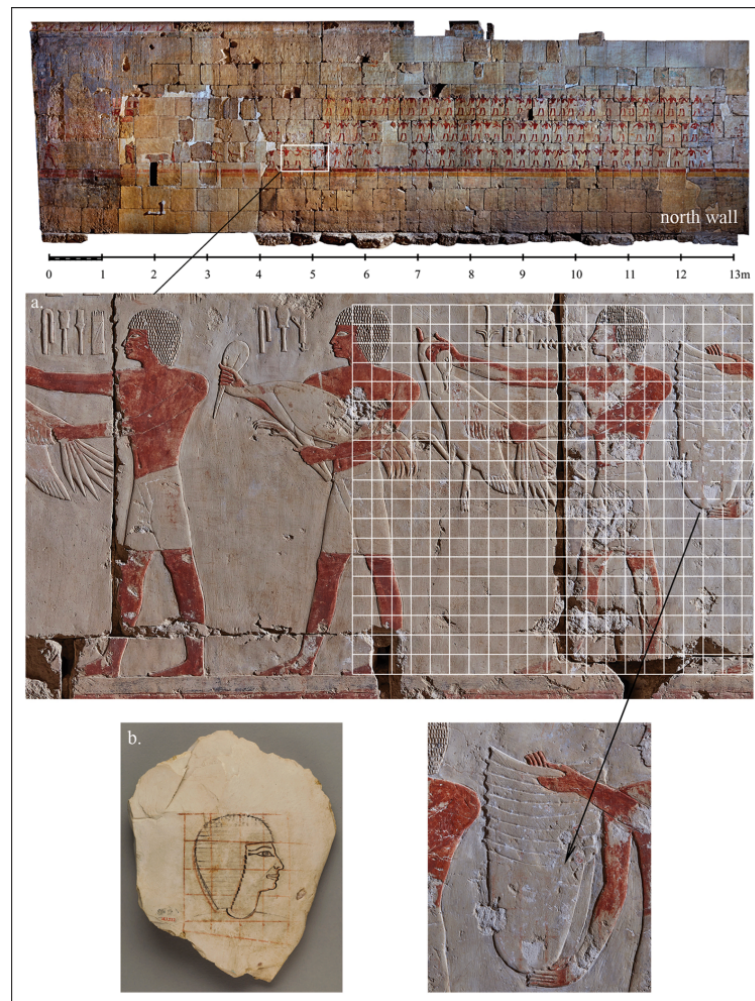


Figure 3. a) Remains of a square grid in the Chapel of Hatshepsut and its reconstruction for the entire figure of an offering-bearer (photographs by J. Kosciuk and M. Jawornicki; grid reconstruction by the author); b) limestone flake, with preparatory drawing on a grid presumably a portrait of Senenmut, overseer of construction at Hatshepsut's Temple at Deir el-Bahari. The sketch gives a sense of the completion of stages two to four in the Chapel of Hatshepsut (courtesy of The Metropolitan Museum of Art, New York, Rogers Fund, 1936, acc. no. 36.3.252).

Following the grid application, draughtspersons transferred the planned composition onto the wall using red sketches derived from preparatory designs on portable media such as papyrus or wooden boards (Iversen 1960; Galán 2007). A senior draughtsperson subsequently revised the drawing, correcting proportions and refining details in black paint so that the final two-dimensional design could guide the sculptors' work. Textual inscriptions accompanying the images were added as a separate operation after the figurative composition had been established.

Once the outlines were completed, sculptors began carving the relief by following the corrected drawings. This stage involved several operations, including removing the background surface, smoothing the carved areas, and shaping the raised figures to produce their three-dimensional appearance. The finished relief was then covered with a

layer of whitewash and painted. The procedures described above represent only part of a broader production sequence that originally began with quarrying and preparing limestone blocks and ended with later modifications or damage to the relief surfaces (Sellet 1993; Wieczorek 2018).

The working environment in the chapel was also considered in this analysis. While the lowest decorative register could be carved directly from ground level, the higher registers required scaffolding structures that allowed artisans to access different areas of the wall simultaneously (Arnold 1991: 231–33).

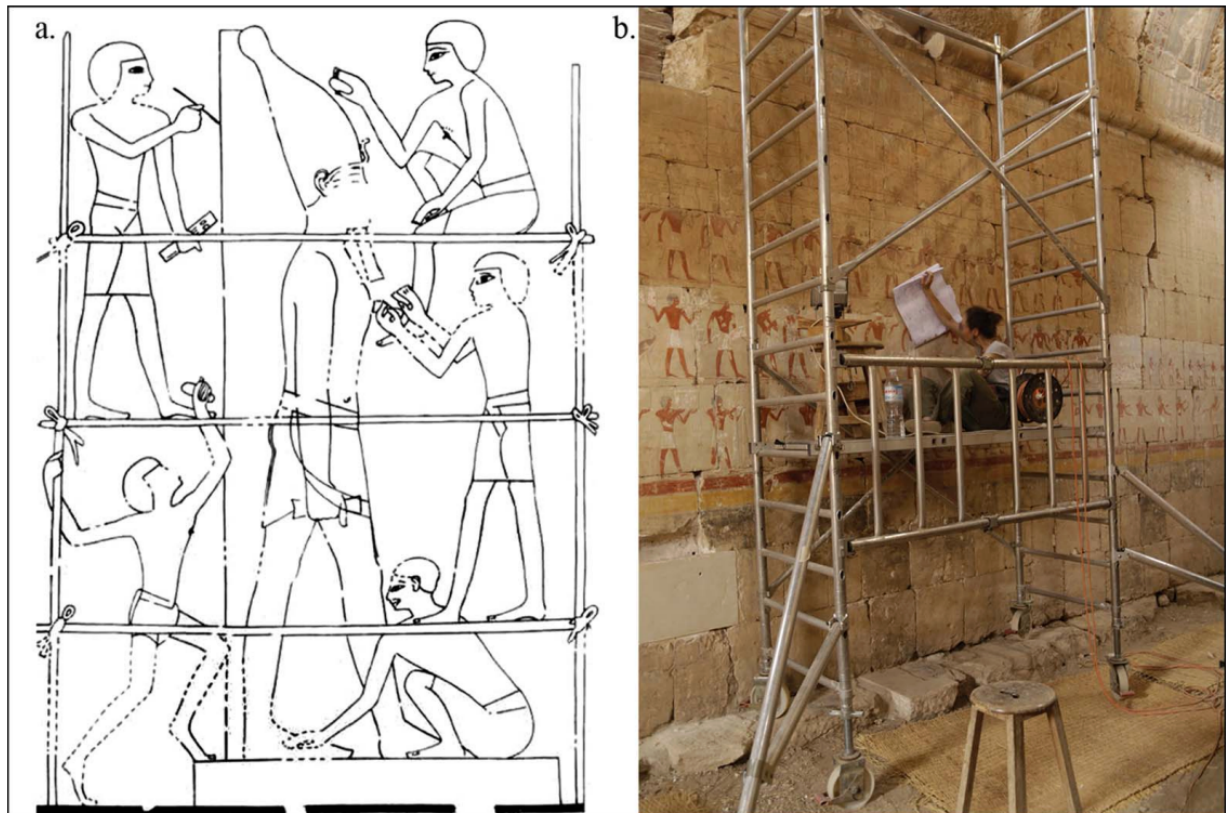


Figure 4. a) Work on light-pole scaffolding, as depicted in Theban tomb 100, immediately following Hatshepsut's reign (after Davies 1943: pl. 60); b) scaffolding erected during documentation in the Chapel of Hatshepsut (photograph by A. Hallmann).

Observations from modern documentation of the reliefs, carried out between 2006 and 2013 by the Polish Centre of Mediterranean Archaeology, also provide methodological insight. During the recording process, wall surfaces were traced at a 1:1 scale on transparent film sheets attached directly to the walls, later digitised as vector drawings. This documentation work unintentionally reproduced some of the physical conditions experienced by ancient craftsmen, thereby allowing an experiential assessment of ergonomic factors involved in the carving process.

Results

Close examination of the reliefs reveals noticeable differences in carving quality across various elements of the decoration. These variations suggest the participation of artisans with differing levels of experience working within the same project. In many areas of the chapel, corrections and irregularities can be observed in less detailed parts of the reliefs, indicating that these sections were likely executed by less experienced sculptors.



Figure 5. Examples of work by less experienced sculptors (corrections indicated with arrows) (photographs by M. Jawornicki; arrows by the author).

More complex elements, particularly human faces, exhibit a higher degree of precision and refinement. These sections were probably carved by highly skilled sculptors responsible for the most delicate features of the decoration. The contrast between simpler and more elaborate workmanship indicates a hierarchical organisation within the workshop, in which master sculptors focused on intricate details while assistants worked on larger and less complex surfaces.

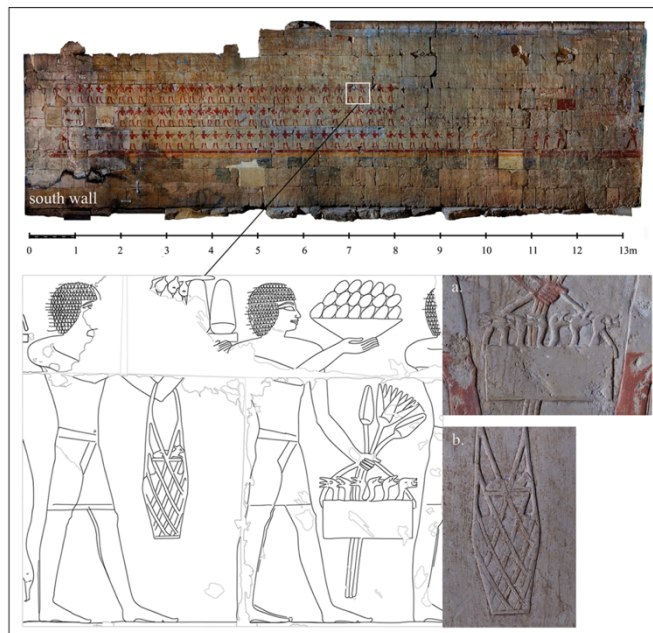


Figure 6. Two levels of relief carving: a) artist B; b) artist A (photographs by J. Kosciuk and M. Jawornicki; illustration by the author).

Differences in carving techniques are especially visible in the depiction of wigs worn by the offering-bearers. Some wigs were carved using horizontal rows with carefully shaped triangular recesses, whereas others display simpler vertical incisions. The variation in technique likely reflects the participation of sculptors with different skill levels or training stages. These observations collectively demonstrate that the production of the reliefs involved multiple artisans performing distinct roles according to their technical abilities.



Figure 7. Wigs of adjacent offering-bearers sculpted by artists B (left) and A (right) (photograph by M. Jawornicki)

Discussion

The distribution of carving styles within the chapel suggests that the workshop functioned not only as a production unit but also as a place of artistic training. In certain areas, the carving of wigs appears to have been divided between two individuals, with a master sculptor initiating the design and a trainee completing the remaining details. Such collaborative work provides material evidence of apprenticeship practices occurring directly during the creation of the monument.



Figure 8. Work zones of artists A, B, and B1 sculpting offering-bearers' wigs (photographs by M. Jawornicki; figure by the author).

Additional evidence for organisational structure may be observed in the differences between the chapel's two lateral walls. Certain objects carried by offering-bearers are represented differently on each wall, both in terms of carving technique and iconographic detail. For instance, sheaves of grain on one wall are depicted only with outlines, whereas the same motif on the opposite wall is rendered with fully carved details. Similar variation occurs in the depiction of containers interpreted as water or milk jugs.



Figure 9. Motifs treated differently on two walls: sheaves of corn on (a) the south wall and (b) the north wall; water/milk jugs on (c) the south wall and (d–e) the north wall (photographs by M. Jawornicki).

These contrasts may reflect the work of two separate groups of artisans operating simultaneously on different sections of the monument. Textual evidence from Deir el-Medina indicates that construction projects were often organised into ‘left’ and ‘right’ crews, each supervised independently (Černý 1973; Eyre 1987). The archaeological evidence from the Chapel of Hatshepsut is consistent with such a system.

Further differences appear in the execution of inscriptions accompanying the offering-bearers. On the south wall, these titles were carved in the same raised relief technique as the surrounding figures. On the north wall, however, many inscriptions were incised directly into the smoothed background, suggesting that they were added at a later stage of the production process.

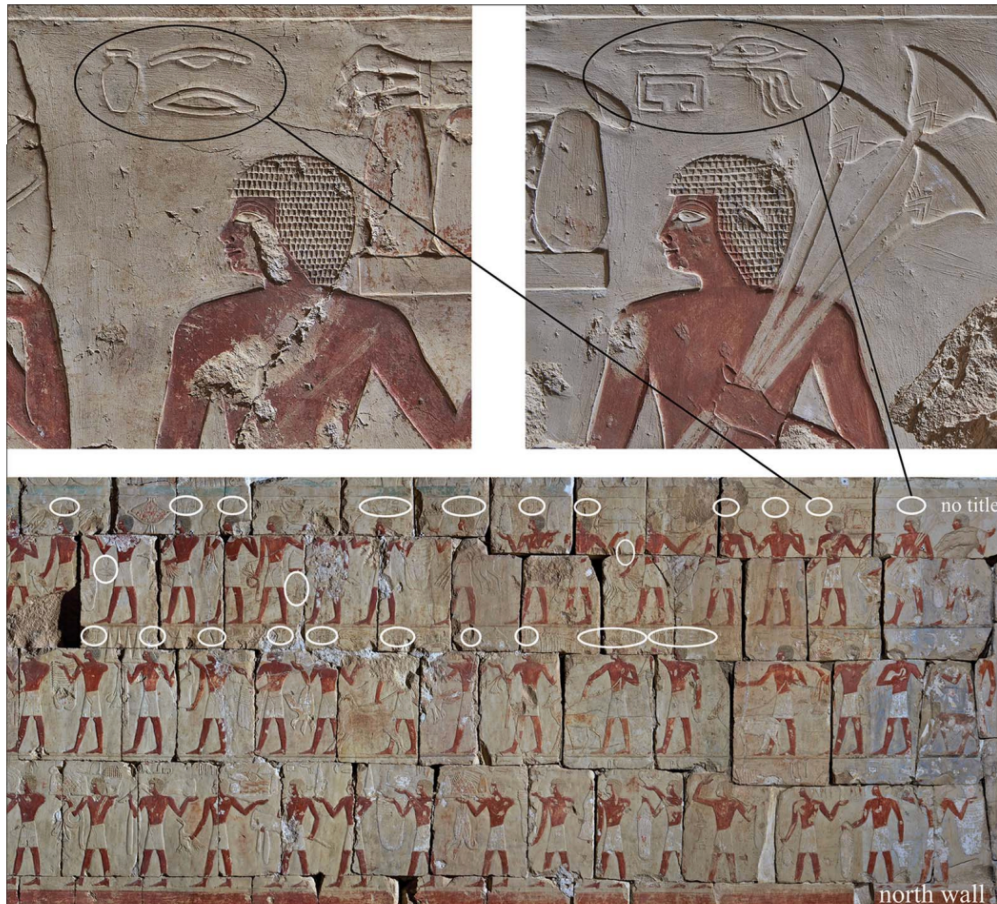


Figure 10. Distribution of offering-bearers' titles and accompanying inscriptions, executed on a smoothed background (encircled) on the north wall (photographs by M. Jawornicki; figure by the author).

The concentration of these later inscriptions in areas where training activities appear to have occurred may indicate practical constraints during the carving process. If apprentices occupied certain zones while learning complex techniques, other artisans responsible for inscriptions might have had to postpone their work until those areas became accessible. Consequently, the spatial organisation of labour within the chapel likely influenced the sequence and timing of decorative operations. Overall, the technological and stylistic evidence preserved in the reliefs provides valuable insight into the organisation of artistic workshops in ancient Egypt. The Chapel of Hatshepsut demonstrates how large-scale decorative programmes could simultaneously serve both as monumental artistic projects and as environments for the transmission of craft knowledge between masters and apprentices.

Conclusions

This research aimed to illuminate the role of the craftsmen responsible for producing the raised reliefs in the Chapel of Hatshepsut at Deir el-Bahari. Through a detailed examination of two mirrored decorative scenes located on the chapel's lateral walls, the study reconstructed the sequence of technical actions involved in the production of the reliefs,

following a chaîne opératoire perspective. This reconstruction contributes to a clearer understanding of the working conditions and technical processes employed by the artisans who executed the monument's decoration.

Additional insight was gained through the documentation process undertaken by the research team. The method used to record the reliefs partially replicated the physical conditions under which the ancient craftsmen operated. Observations derived from this experience were subsequently interpreted alongside archaeological evidence from other Egyptian sites, as well as textual and iconographic sources that describe construction and decoration practices.

Large construction projects in ancient Egypt, including the Chapel of Hatshepsut, were typically organised within workshop-based systems. Relief decoration followed a structured sequence beginning with preparatory drawings created using proportional grids and continuing through several stages of carving executed by specialists of varying skill levels. Evidence from the chapel suggests that less experienced sculptors were responsible for simpler areas of carving, as indicated by numerous corrections visible in sections of lower complexity. One area of the north wall appears to have functioned as a location where apprentices were trained to carve more sophisticated elements. This indicates that instruction occurred directly at the work site through close interaction between masters and trainees, including the correction of errors and the demonstration of carving techniques. The outcomes of such training exercises ultimately became integrated into the finished monument.

Variations in iconography and carving techniques across the chapel walls also point to a division of labour between two separate working crews, a practice mentioned in Egyptian textual sources. Attempts to identify individual sculptors through stylistic analysis using the Morellian method proved inconclusive. Because carving followed preliminary drawings, differences in relief style cannot necessarily be attributed to individual artisans and may instead reflect variations introduced during earlier stages of the design process.

Some of the patterns observed in the Chapel of Hatshepsut correspond with practices documented at other Egyptian monuments and reflect broader principles of workshop organisation. Other features, however, appear unique and demonstrate the flexible nature of labour organisation in response to specific environmental or logistical circumstances. In this context, the chaîne opératoire approach proves particularly useful. Understanding the sequence of working stages helps explain phenomena such as the secondary carving of inscriptions incised into finished backgrounds in areas where apprenticeship activities were identified. This suggests that the operational sequence was not strictly linear but could involve overlapping tasks, occasionally producing ergonomic constraints and deviations from the original decorative plan. When the reliefs on the north wall were completed, approximately one third of the figures lacked accompanying inscriptions. The subsequent addition of these texts likely reflects a stage of inspection or review, a procedure known from textual records but rarely visible archaeologically.

Although the study of ancient Egyptian and broader Near Eastern art benefits from an abundance of written and visual sources, the importance of material evidence preserved in monuments and artefacts should not be overlooked (Nicholson 2020). By combining experiential documentation with archaeological, textual, and iconographic evidence, this research demonstrates the value of a holistic analytical approach. Applied to workshop products such as the reliefs of the Chapel of Hatshepsut, this method enables the reconstruction of production techniques, labour organisation, and even aspects of the working environment. It also provides insight into less tangible dimensions of artistic practice, including the interaction between masters and apprentices within ancient craft traditions.

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