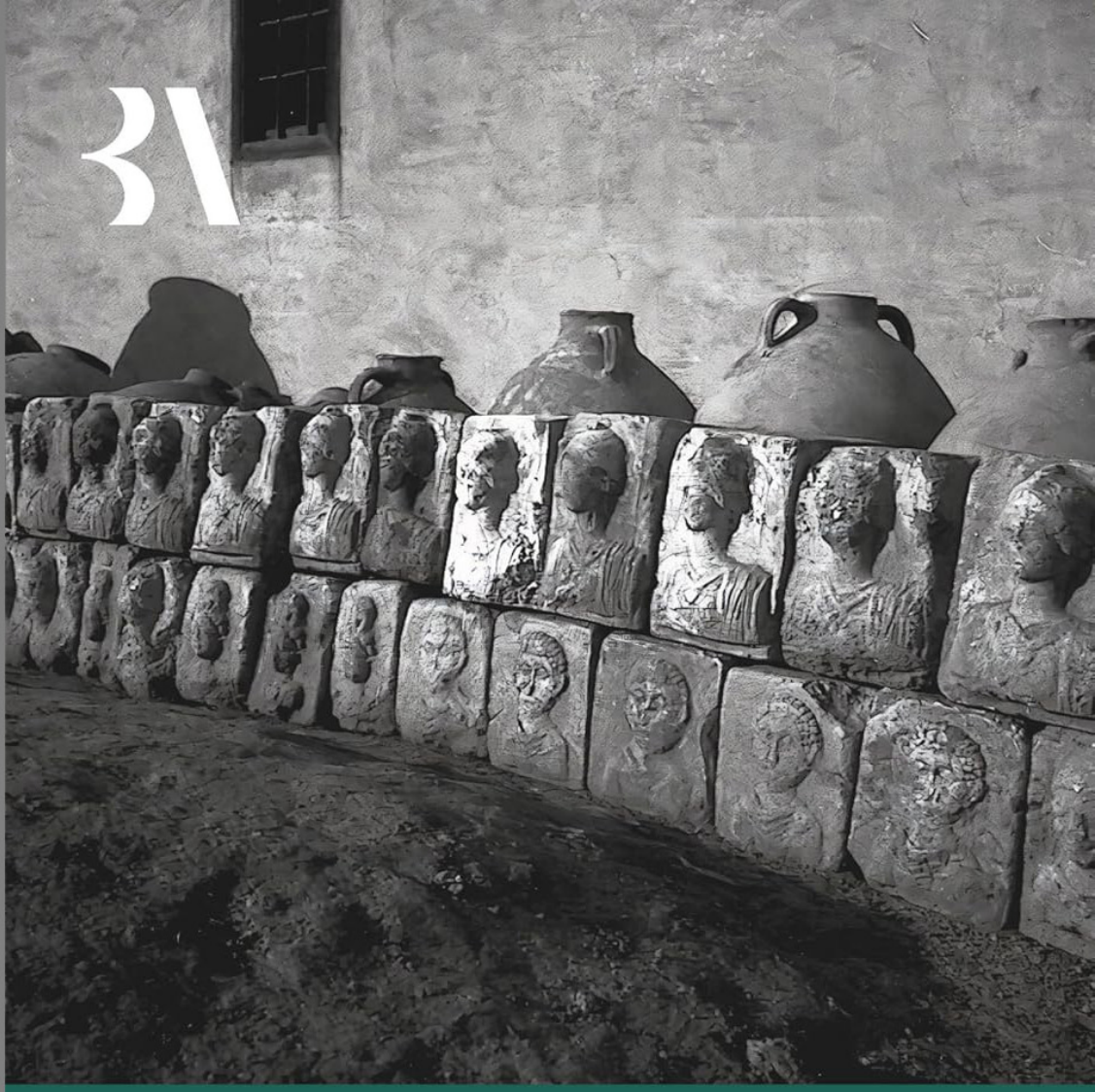

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Ancient Plaster

Casting Light on a Forgotten Sculptural Material

Editors
Abbey L. R. Ellis and Emma M. Payne

8

In the Workshop of an Ancient Egyptian Sculptor: The Estate of the Chief Royal Sculptor Thutmose at Akhet-Aten – Amarna

DIMITRI LABOURY[1]

Introduction

In 1954, the German archaeological mission working on the ancient Greek site of Olympia discovered the workshop of the renowned Athenian sculptor, architect, goldsmith and painter Pheidias, together with many of his tools and implements, which allowed a much better understanding of the creation of a world-famous masterpiece of antiquity, one of the 'Seven Wonders of the Ancient World': the (now lost) chryselephantine colossal cult statue of Zeus at Olympia (Mallwitz and Schiering 1964; Schiering 1991).[2] When, four decades earlier, in 1912, the excavation team of the Deutsch-Orient-Gesellschaft under the direction of Ludwig Borchardt unearthed the remains of the estate and workshop of the royal sculptor Thutmose on the archaeological site of Amarna, ancient Akhet-Aten, in Middle Egypt, they made a no-less-significant discovery for art history as a discipline.[3] They revealed another masterpiece of the art of antiquity, one of the most iconic works of ancient Egyptian art history: the bust of Nefertiti.[4] Although omitting what was to become a famous bust, their findings were immediately celebrated in an

[1] My heartfelt gratitude goes to Alessio Delli Castelli for proofreading this article and helping me to improve its language. Of course, any remaining mistakes would be mine.

[2] See also Kenneth Lapatin's contribution to this volume.

[3] On this archaeological discovery, see Krauss (1983), Phillips (1991), Arnold (1996: 41–83) and the most recent account of it in Seyfried (2012b).

[4] Berlin Ägyptisches Museum (henceforth referred to as ÄM) 21.300.

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acclaimed exhibition organised in the Prussian capital the following year, an event which significantly contributed to popularise the art of the time of Akhenaten in Europe (Wildung 2012: 39–46). More importantly, from an art historical perspective, this discovery provided us with an exceptional opportunity to delve into the creative process of a named ancient Egyptian artist and to investigate his relations with his clients. All this was made possible thanks to the gypsum plaster pieces found during these excavations.

Gypsum plaster was intensely employed in ancient Egypt, such that it represents a world in itself in the Egyptological documentation. Although it is not a complete *terra incognita*, the subject is surprisingly rather understudied when compared to its scientific potential.[5] It is often assumed that gypsum plaster was mainly acquired from the Fayum depression, but other sources have been identified. James A. Harrell (2017) recently discovered huge ancient open-air gypsite quarries – on nearly 3 square kilometers – just north and east of Amarna.[6] Amarna 'gypsum plaster', whether for architectural use or for the objects discussed in this chapter, is always composed of gypsum, anhydrite and limestone aggregate, in variable proportions, and therefore, technically, it is a mixture of gypsum and lime plaster.

Gypsum plaster had been used by the ancient Egyptians from the end of Predynastic times (end of the 4th millennium BC), at the dawn of Pharaonic society and culture, as mortar or plaster. Although architectural gypsum plaster was sometimes under- or overcooked (Traunecker 1977), variation in hardness according to the desired use shows that ancient Egyptians developed a real expertise in its production. Plaster is also well attested in artistic practices, notably for reproducing older works of art and copying images (Borchardt 1910: 104–6, pl. 73),[7] but also – and more frequently – as a completion of or an addition to a sculpted piece, with plaster modelled onto the stone and then painted.[8] Furthermore, ancient Egyptian

[5] It is quite telling that there is no entry for gypsum plaster in the reference book of Nicholson and Shaw (2000) on materials and technologies in ancient Egypt. It is only mentioned and commented on page 22 in an entry about alabaster, its main mineral origin. Otherwise, short but very informative syntheses are found in Traunecker (1977) and Harrell (2017).

[6] As Harrell (2017: 544), underlined, 'the gypsum cones excavated at Amarna, the "*ḳḏ* of *Akhetaten*", have compositions consistent with a derivation from the nearby gypsite deposits'. Harrell (2017: 536) also mentions that the lexeme *ḳḏ*, attested since the 18th dynasty, is a Semitic loanword in the ancient Egyptian language, derived from the Akkadian *gaṣṣu*, which is also at the origin of *gypsos* in Greek and hence of the English word gypsum. The very existence of these numerous cones as small (± 4.5–5 x 6.5–7.5 cm), moulded, labelled and dated gypsum samples (Pendlebury 1951: 180–1, 243–5; Harrell 2017: 538, 544), in addition to a specific word in Egyptian vocabulary to designate professional gypsum plaster makers (*ḳḏy*), suggests some sort of an industrial production of gypsum plaster in ancient Egypt. On the Fayum gypsum quarries, see Heldal et al. (2009).

[7] If proportion grids (probably invented in the Middle Kingdom, i.e., at the beginning of the 2nd millennium BC, to copy earlier works of art) were utilised to accurately transpose compositions and iconography, the development of plaster casting techniques for copying ancient wall reliefs (Borchardt 1910: 104–6, pl. 73) reveals an interest for sculptural style proper (Laboury 2020: 90).

[8] For a similar – slightly later – case analysed with CT scans, see Wildung (1998). For a recent synthesis on the artistic uses of plaster in ancient Egypt, see Tomoum (2005: 173–7). For reliefs in insufficiently

artists also produced full plaster pieces, that is, works entirely made in gypsum plaster, such as those discussed in the present chapter.

The archaeological setting

Amarna is the modern name given to the archaeological site where pharaoh Amenhotep IV – Akhenaten founded Akhet-Aten ('the Horizon [or place of manifestation] of [the solar god] Aten'). Established in the fifth year of his reign (c.1342 BC), the new royal residence was only occupied for 15 years.[9] The new royal city, a sort of Versailles of its time, was established along the River Nile in a semicircular plain 10 kilometres long and structured around impressive royal buildings. It also comprised quite large residential areas for the people living there (up to 40,000), who would become a necessary audience for royal ceremonial displays. Within the wider Egyptian archaeological landscape, the site is exceptional in many respects (Kemp 2012; Stevens 2015), and, from an art-historical vantage point, for the fact that it is the only place which has revealed significant remains of sculptor workshops, it is unique.[10]

Sculpture production is archaeologically attested in different spots, near the main temple and palace (where many royal statues were to be erected), in the central part of the city (Petrie 1894: 30), as well as further south, in the so-called south suburb (or main city), a residential zone where several sculptors were also active and clearly lived (Phillips 1991; Tietze 2008: 145–58; Bednarski 2009; Kemp 2012: 292–6). Among the houses and dwelling places in which sculptural activities were recorded, the estate of Thutmose (Figure 8.1) is the largest one, hinting at his social importance. He lived in a rather fashionable part of the town, being, for instance, the neighbour of the *generalissimo* Ramose, commander in chief of the royal armies (Tietze 2008: 145–50, 166–74; 2015). The typology of houses on the site of Amarna has been very well studied, notably by Christian Tietze (1985; 2008: esp. 86–109) and Kate Spence (2010; 2012), and this allows us to situate

homogeneous stones or for statuary pieces, e.g., the famous bust of the 4th-dynasty prince Ankhkaef, see Boston Museum of Fine Arts 27.442.

[9] On the site, see the excellent synthesis of Kemp (2012). For Akhenaten and his reign, see Laboury (2010).

[10] See the excellent synthesis in Phillips (1991). Archaeological evidence of sculpture workshops was also identified for the 4th dynasty, in Giza, south of the pyramid of Khafra (Conard and Lehner 2001; next to miniature statue models, one should note the discovery of fragments of plaster referred to on pages 44 and 56) and for the Ptolemaic Period, in Tell Atrib (Myśliwiec 1997). However, just like the one mentioned by Petrie in the central city of Amarna, next to the great Aten temple (Petrie 1894: 30 and here below), they do not allow any functional or in-depth analysis. For a synthesis, see Tomoum (2005: 133–6, 140). From textual sources, one may assume that the most important sculpture workshops in ancient Egypt were connected to temple or royal institutions, also on a topographical level. In this respect, the workshops in the residential area of Amarna represent a unique or, to be more precise, a uniquely attested case.

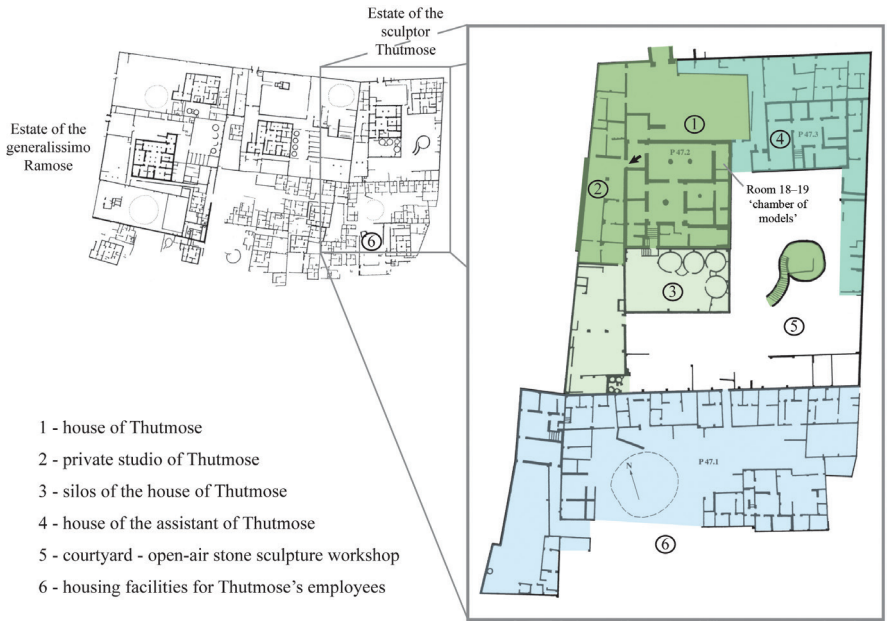

Figure 8.1 Ground plan of the estate of the royal sculptor Thutmose in its direct neighbourhood on the site of Amarna. The little black arrow points to the sole entrance door to the plaster studio, from the private house of Thutmose. Drawing: Dimitri Laboury.

our sculptor in the lower fringe of the leading elite, in the top 10 per cent of the societal pyramid of his time. But when compared to similar houses (i.e., of the same type and size), his residence features some typological oddities, which may be summarised as follows, according to the analysis undertaken by Spence. For a house of that size, 'the front hall is absolutely huge. … The central hall is then surprisingly small …' and the private apartments, at the rear part of the house, rather 'squashed … All these peculiarities probably derived from the oversized scale of the front room', suggesting 'that activities in the house were unusually focused on the front hall and were intended to impress wealthy/high-status visitors'.[11]

The attribution of the house could be secured thanks to the unearthing of a fragmentary ivory horse blinker inscribed with the name of 'the favourite of the king, the chief of works and sculptor Thutmose' (Figure 8.2).[12]

[11] Personal communication: 12 September 2017. I wish to express here my profound gratitude to my friend and colleague Kate Spence for kindly sharing her analysis with me and allowing me to reproduce her message here.

[12] Berlin ÄM 21.193. This reminds us of the cup inscribed with *Pheidiou eimi* in the workshop of Olympia referred to in this chapter. Like the latter, the attribution of the estate discussed to Thutmose

Figure 8.2 Line drawing of a horse blinker fragment. 18th dynasty. Ivory. Berlin Ägyptisches Museum (21193). 11.2 x 4.8 x 0.6 cm. Drawing: S. Connor.

The archaeological investigation of the site and its structural analysis allowed reconstruction of the chronology of its making as well as of the distribution of functions within the estate. The estate was organised as a small to medium-sized enterprise of the time, around the master's villa (see no. 1 in Figure 8.1, House P.47.2), which was built first, with a well to provide water, and – slightly later – some annexes, consisting of enclosed granaries (see no. 3 in Figure 8.1) and stables. On the eastern and southern sides were then added a smaller house (see no. 4 in Figure 8.1, House P.47.3), presumably for the assistant of Thutmose (maybe his son), some storage facilities, notably for raw material, and an open-air zone (see no. 5 in Figure 8.1) with a light roof from place to place along the external wall for the sculpture workshop proper. It would have been mostly in the shade but outdoors and with good, diffuse, indirect light. Against the southern enclosure wall of the workshop area and around one of its entrance doors, a small 'village of workers' (see no. 6 in Figure 8.1, House P.47.1), as was described by the excavators, was then constructed, obviously to accommodate Thutmose's employees.[13] A plaster studio was also identified, thanks to the presence of many large fragments[14] and

has sometimes been questioned, but the fact that the site was undoubtedly the dwelling place and the workshop of an important sculptor and the presence of stables for his horses and chariot in the annexes of this house lead to a more-than-plausible conclusion (Krauss 1983). On royal chiefs of works in ancient Egypt, see Krauss (1988: 40–2).

[13] Though it seems impossible to evaluate the time between each construction phase, Arnold (1996: 42) suggested the gradual development of the estate should be interpreted as the materialisation of 'a true success story' for Thutmose and his workshop.

[14] See, for example, Seyfried (2012a: 382–3).

splashes of gypsum plaster, in the private part of the estate, just along the western external wall of Thutmose's personal house and only accessible from this building (see no. 2 in Figure 8.1).[15] So one may reasonably conclude that this was the chief royal sculptor's private studio, where gypsum plaster was worked.

When the site was abandoned, sometime after Akhenaten's death (and in all likelihood at the beginning of the reign of Tutankhamun, around the end of 1327 BC), the inhabitants moved with most of their belongings, though not without leaving behind some objects, either forgotten or – more likely – deemed obsolete, such as unfinished sculpture pieces, especially those depicting the Amarna royals, who had by then passed away,[16] and few tools, mainly those of little value, such as flint-stone blades or drill-tips.[17] There nevertheless seems to be an exception in the room labelled 18–19 by the excavators, that is, the annex of the (en)large(d) visitors' front hall of the house, where in early December 1912, a series of more than two dozen gypsum plaster studies was discovered among over 60 objects relating to sculpture.

The finds (and their material characteristics)

Room 18–19 (± 5.7 x 2.25 m),[18] described by Borchardt as the 'chamber of models' (*Modellkammer*), was discovered still containing small shaped samples of stones,[19] model statuettes depicting royals,[20] unfinished pieces of royal statues, some with painted indications showing the work in progress or still to be carried out[21] and 28 gypsum plaster pieces: 24 heads or faces (9 of royals and 15 of unidentifiable

[15] For a more detailed description of this part of the site based on excavators' accounts, see Phillips (1991: 33–4). The studio was integral to the original plan of the house, built at the same time, in a position where one usually finds a private courtyard in comparable houses (see, e.g., Tietze 2008: 101, figures 22–3).

[16] E.g., Seyfried (2012a: 386–91, cat. 174–8).

[17] E.g., in Seyfried (2012a: 382–3). For a general list of the types of tools discovered in Thutmose's estate and their use as illustrated in contemporary iconography, see Phillips (1991: 38). As Arnold (1996: 142, n. 22) notes, 'Remarkably, few metal tools are listed among the finds.' For some examples, see Seyfried (2012a: 123–4, figures 5–6).

[18] The room has a double number (18 and 19) because a low partitioning wall creating a cubicle (numbered 18) in the rear part of the chamber was initially interpreted by the excavators as a separation between two different rooms (Arnold 1996: 142, n. 24).

[19] Two clear examples are Berlin ÄM 21.248 (in calcite; 10.8 x 1 cm) and 21.252 (a small pink granite rectangular block of 10 cm long). See Seyfried (2012a: 364–5, cat. 144; 366–7, cat. 148).

[20] E.g., Berlin ÄM 21.263 (Seyfried 2012a: 191, 340–1, cat. 124). Many of the model statuettes found on the estate are about 40 cm high; see Cairo Egyptian Museum JE 43580, 44866 and 44867.

[21] Most of them in a fragmentary state: Berlin ÄM 21.202, 21.204, 21.211, 21.220, 21.224, 21.225, 21.231, 21.237, 21.243, 21.244, 21.245, 21.254, 21.272, 21.336, 21.252 (limestone head of Nefertiti with painted marks to monitor its sculptural completion); see respectively Seyfried (2012a: 356–7, cat. 134); 358–9 (cat. 137); 344–5 (cat. 126); 356–7 (cat. 134); 358–9 (cat. 137); 356–7 (cat. 134); 346–7 (cat. 127); 342–3 (cat. 125); 356–7 (cat. 133–4); 188, 338–9 (cat. 123).

individuals),[22] one right ear,[23] one mouth,[24] and two feet,[25] in addition to two limestone busts completed with plaster and paintings, one depicting Nefertiti,[26] the other Akhenaten.[27] These heads and faces may conveniently be categorised according to the individual they represent – that is, on a physiognomic axis – and the portion of the face or head they depict – that is, on a typological axis – with simple masks, faces with ears and neck, full heads with a flat top where a headdress would be placed and complete sculpted busts overlaid with plaster (at least in some areas) (Figure 8.3).[28]

From a technical point of view, these plaster heads and faces present clear material evidence of casting as well as of modelling (Figures 8.4–8.5), an indication that they resulted from an initial model made of malleable material – most probably clay – from which a mould was created to make a plaster reproduction.[29] Clay was often used in the workshop, notably for the making of small molten

[22] Royal depictions can be identified thanks to their plain physiognomic resemblance with inscribed statues as well as the presence of the lower part of their crown on the forehead and temples. Royal heads are Berlin ÄM 21.2999, 21.349, 21.351 and 21.353 (Seyfried 2012a: 179 [figure 6–7], 322–3 [cat. 111]; 199, 324–5 [cat. 112]; 17, 332–3 [cat. 120]; 326–7 [cat. 113]); royal faces or masks are Berlin ÄM 21.340, 21.343, 21.348, 21.354 and 21.355 (Seyfried 2012a: 13, 328–9 [cat. 117]; 328–9 [cat. 115]; 198, 330–1 [cat. 119]; 328–9 [cat. 116 and 114]). Non-royal faces are Berlin ÄM 21.228, 21.239, 21.261, 21.262, 21.280, 21.281, 21.341, 21.342, 21.346, 21.347, 21.350, 21.356, 21.357, 21.359 and 21.366 (Seyfried 2012a: 12, 320–1 [cat. 108]; 20, 314–15 [cat. 97]; 21, 179 [figure 5], 320–1 [cat. 107]; 316–17 [cat. 101, 99, 102]; 314–15 [cat. 98]; 318–19 [cat. 105, 106, 104]; 312–13 [cat. 96]; 320–1 [cat. 110]; 316–17 [cat. 100]; 320–1 [cat. 109]; 318–19 [cat. 103]). Some clearly portray the same individual and only those have been integrated in Figure 8.3 of the present chapter, for the sake of readability.

[23] Berlin ÄM 21.235. See also Seyfried (2012a: 356–7 [cat. 133]).

[24] Berlin ÄM 21.234. See also Seyfried (2012a: 330–1 [cat. 118]). This mouth presents the typical expression which characterises the official face of the direct successor of Akhenaten, Neferneferuaten; see Laboury (2002).

[25] For the first foot: Berlin ÄM 21.282. See also Seyfried (2012a: 358–9 [cat. 137]). For the second: Berlin ÄM 21.236. This was lost during World War II. For an old picture, see Thompson et al. (2018: 4, 7, figure 5). A similar life-sized foot (study) in plaster was found in 1932–3 in the sculptor workplace and house O.47.20, further east, now kept in the Metropolitan Museum of Art, New York, 33.6.1 (gift of Mrs J. Hubbard and the Egypt Exploration Society).

[26] Berlin ÄM 21.300.

[27] Berlin ÄM 21.360.

[28] See Laboury (2005). Note that Berlin ÄM 21.341 does not perfectly conform to this typology because it already presents an ear and a neck but it has been integrated into the mask category because it seems less elaborated than Berlin ÄM 21.239, which obviously depicts the same individual. Both could also belong to the same category, corresponding to a first attempt and its corrected version. Note that Berlin ÄM 21.341 is slightly bigger than Berlin ÄM 21.239. As explained in footnote 22 in this chapter, Figure 8.3 does not include all 15 non-royal plaster masks and faces, but only the 6 which clearly depict the same individual twice, in order to allow a better and easier readability of the table.

[29] For the first analysis of this process, see Roeder (1941: esp. 154–60). There was also a long tradition of 'faces in clay', as Dorman (2002) reminds us. Fingerprints are still visible on some of the plaster pieces excavated in Thutmose's house. During a research stay in Berlin in 2002, Dietrich Wildung, then director of the Ägyptisches Museum, told me about his project to analyse them with the help of Berlin police specialists – notably in order to assess whether they could all come from the same pair of hands – but, as far as I know, such a project could not be implemented yet.

Figure 8.3 Table of typological and physiognomic distribution of plaster and plastered studies of faces found in the annex of the reception hall of the house of the royal sculptor Thutmose (P.47.2/18–19) and other parallel Amarna objects (in shades of grey), at the same scale. Photos and table: Dimitri Laboury.

Figure 8.4 Front and three-quarter left back views of a head of Akhenaten showing traces of modelling (especially at the junction of the neck and the jaw and around the ears) as well as of casting (notably the top surface). 18th dynasty. Plaster. Berlin Ägyptisches Museum (21351). 26 x 15 x 20 cm. Photos: Dimitri Laboury.

objects such as rings or amulets (Phillips 1991: 39; Seyfried 2012a: 292–6). Capart (1957: 207) has pointed out the discovery of a fragmentary model in clay during the excavation of Thutmose's estate. Its use is also attested for a head which unfortunately has no known provenance (Tefnin 1986) and a face of the same period.[30]

The texture and wavy shape of the surface on the back of the faces and on the top of the heads (Figures 8.4–8.5) reveals that plaster was poured in a liquid state, in various successive layers. Rather clear traces of seams (seen especially on the side of the neck in Figure 8.5 and perhaps also on the central axis of the face) indicate that the heads, the true three-dimensional pieces, were produced with casts in at least two separate parts; the one-sided (or 2.5D) pieces, that is, the faces or masks, were most probably created with an open one-piece mould.[31] This is how Petrie reproduced the

[30] Brooklyn Museum 16.61. This face is dated slightly later.

[31] Nevertheless, among the numerous fragments of gypsum plaster discovered in Thutmose's plaster studio, no element of a mould could be clearly identified or recorded, it seems. So, as suggested in Nigel Konstam's contribution to this volume, it is likely that crucibles, just like the original models in malleable material, were destroyed, as waste moulds, in the process of creating the casts

Figure 8.5 Front and three-quarter left back views of a head of Nefertiti showing traces of modelling (especially at the junction of the neck and the jaw or at the back of the ears) as well as of casting (notably the top surface or the seam on the side of the neck, below the ear). 18th dynasty. Plaster. Berlin Ägyptisches Museum (21.349). 25.5 x 14 x 17.3 cm. Photos: Dimitri Laboury.

gypsum plaster face he found during his excavations of the remains of a sculpture workshop in the central part of the city of Akhet-Aten: the first plaster model – officially – discovered at Amarna, in the winter of 1891–2 (Figure 8.6).[32]

Back in London, Petrie discussed the object with the English sculptor Alfred Gilbert and together they came to the conclusion that it was a death mask, 'produced from an actual cast taken from the body' of Akhenaten himself (Petrie 1894: 40). If the ancient Egyptians had a long tradition of funerary masks, sometimes – especially in the Old Kingdom – modelled in gypsum plaster on top of the already wrapped mummy (Tacke 1996), the practice of casting a death mask is less than poorly attested. Only one cast of this kind was discovered (Figure 8.7)[33] and the

that came down to us and were obviously more valued. For Egyptian parallel pieces of the Late Period, see Tomoum (2005: 174), with references.

[32] Petrie (1894: frontispiece). The mould created and used by Petrie is kept at the Petrie Museum (UCL 24321), the original cast being in the Cairo Egyptian Museum (CG 753).

[33] Now kept in the Cairo Egyptian Museum (RT/SR 10-12-14-6), this cast was discovered during the excavations of the temple of the pyramid of king Teti (6th dynasty; end of 24th century BC)

Figure 8.6 Left: left-side view of a partial face of Akhenaten. 18th dynasty. Plaster. Cairo Egyptian Museum (CG 753). Right: frontal view of its duplicate, made by Petrie and exhibited at the Penn Museum, Philadelphia (E647). 15 x 16 x 2.5 cm. Photos: Dimitri Laboury.

appearance of the face it recorded is strikingly different from those conveyed by the Amarna pieces. The latter systematically depict facial features, mouth, eyes, shaped eyebrows (either in relief or hollowed out), in perfect accordance with the sculptural standards of the time, and not as a naturalistic print of a closed-eyed dead body.[34] Their formal vocabulary thus compels us to conclude that they are indisputably sculpture products, fashioned by human hands.

The mask unearthed by Petrie is also particularly relevant for determining the original function of the Amarna plaster faces and heads. The piece was undoubtedly found complete. See, for example, the rim on the right edge of the face when seen from the front. The head presents slightly more than the left profile, with a sort of abbreviated three-quarter view (Figure 8.6). The very shape of the piece plainly shows that it was meant to be a study, produced to help visualise the king's profile in three dimensions.[35] The archaeological context of all of the Amarna plaster heads and faces, that is, in sculptors' workshops, inevitably leads to the same conclusion,

by Quibell (1909: 20, 112–13, pl. 55), but not in situ. As explained by the excavator, 'from the mould a cast was made at the Museum' and is now still exhibited next to the authentic crucible.

[34] Compare with Tacke (1996: 313–14), for a similar material.

[35] For parallel objects, see Tomoum (2005: pl. 20, 30c, 54b–c).

Figure 8.7 Left: mould of the face of a deceased individual found by J. E. Quibell in Saqqara, Egypt. Plaster. Cairo Egyptian Museum (RT/SR 10-12-14-6). Right: cast made from the mould by Mr Fanghaenel at the Cairo Museum between 1907 and 1909. Photos: Dimitri Laboury.

as well as the isolated anatomical parts reproduced in plaster: an ear, a mouth, and two feet, also found in the 'chamber of models' of Thutmose.[36] Besides, some of these plaster pieces bear clear traces of reworking or painted annotations, such as the head of Akhenaten (Figure 8.4),[37] whose main facial features – the contour of the made-up eyes, the finely shaped and rounded eyebrows, the palpebral furrows and the nasolabial folds – have been underlined with black paint, as if to convey a more sculptural impression of the face.

In contrast with the evidence presented in this volume by Nigel Konstam regarding the feet of ancient Greek bronzes, the plaster studies of feet from Amarna do not present any sign of life casting; quite the contrary, the medial longitudinal arch of the foot is barely depicted. Considering the time needed to produce a plaster cast from life, on the one hand, and a clay model to eventually cast in plaster, on the other hand, as demonstrated by W. Alexander Lumsden in this volume, it seems unthinkable that royals or even members of the elite of Akhet-Aten would pose for life casting at Thutmose's estate. Therefore, all technical and material elements point to studies

[36] See footnotes 23–5 in this chapter and the remarks about the mouth and the feet. As for the ear, in ancient Egyptian art history, ear shape is often characteristic of the style of a period, as Connor reminds us (2019: esp. 89–90). For parallel study pieces, in stone, see Tomoum (2005: 74–84, pl. 50b–c–58, 96a).
[37] Berlin ÄM 21.351.

Figure 8.8 Low-angle back view of the basis of a royal head showing the imprint of a long, flat and striated object evoking a small wooden plank. 18th dynasty. Plaster. Berlin Ägyptisches Museum (21299). 22.5 x 19.5 x 22 cm. Photo: Dimitri Laboury.

(at least partly from life) made in a malleable material and later converted into plaster.[38]

The basis of one of the plaster heads presents what appears to be the imprint of a flat piece of wood, on which the original clay sculpture was apparently modelled (Figure 8.8).[39] The bases of the plaster heads also allow us to reconstruct the position of the sculptor when modelling his clay prototype. Whereas the faces and masks have a rather plane casting surface on the back, suggesting that the original clay model was made to rest flat on a support of some sort, the heads systematically end in a bevelled edge at the base of the neck. The angle corresponds to that of

[38] On the interest of the art which developed under Akhenaten for a naturalistic or more perceptual rendering of feet, see Russmann (1980). Regarding the role of life casting: during the conference, W. Alexander Lumsden made a very important point about the sources artists could utilise to develop a more naturalistic rendering of anatomy. It seems that ancient Egyptian sculptors, even in the more perceptual orientation of the arts in the time of Akhenaten (on this, see Laboury 2010: 208–23), never felt the need to rely on life cast models, probably because they made statues with rather simple and compact poses in comparison to their Greek fellows of the 5th century BC.

[39] See Laboury (2005). A very good side view revealing the section of this imprint on a CT scan can be seen in Seyfried (2012b: 179, figure 7).

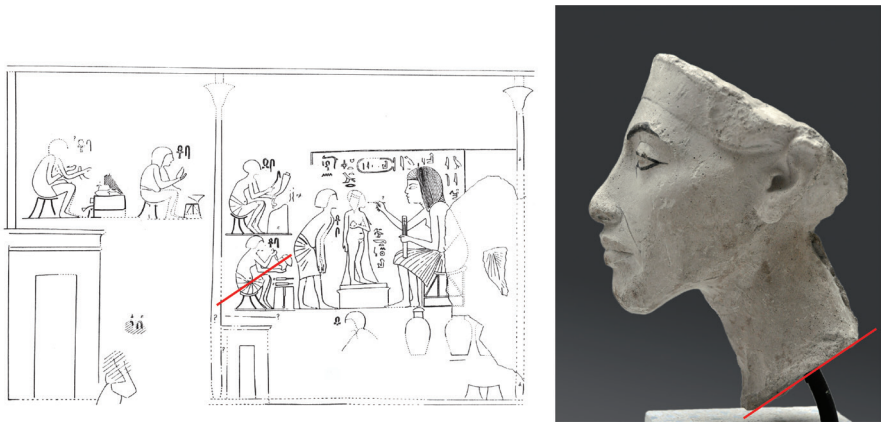

Figure 8.9 Left: line drawing of a relief depicting the workshop of the chief sculptor of queen mother Tiy, Iuty, in the tomb of the steward of Akhenaten's mother, Huya, at Amarna (Tomb of Amarna 1). Right: profile view of the head of Akhenaten. 18th dynasty. Plaster. Berlin Ägyptisches Museum (21351). Photo and drawing: Dimitri Laboury.

the thighs of a person sitting on a low stool such as those ancient Egyptians used in their houses and workplaces.[40] Since there was no workbench in ancient Egypt, it seems that Thutmose created his clay models of heads using a small plank or wooden support and sat on such a low stool. This conforms with the representation of his fellow sculptors as they are depicted in a workshop scene in the private tomb of the royal courtier Huya, steward of the queen mother Tiy, in the nearby elite cemetery of Amarna (Figure 8.9).[41]

Reconstructing the creative process and the relation to commissioners

Taking into account these material observations, the plaster studies discovered in Thutmose's dwelling may be used to reconstruct the *chaîne opératoire*, the technical procedure followed by the sculptor, as well as his creative process to design

[40] For examples discovered in Thutmose's estate, see Seyfried (2012a: 278–9, cat. 56).

[41] Handling copies of these pieces enabled me to experiment that in such a sitting position, with the bevelled edge of one of those heads on my knees, I was exactly face to face with the plaster model. Considering the importance of this step in the process of creating the official physiognomic type of a member of the royal family or the model for the statue of a private customer, it is more than likely that the task was undertaken by the chief sculptor, director of the workshop, in whose private studio plaster was worked, i.e., Thutmose himself.

a physiognomic model. They indeed appear to materialise the successive stages through which the official image of a royal – but also a private – individual was established (Figure 8.3).

It is important to note that, although they are more or less of the same scale, that is, roughly life-sized, the various versions of one and the same face do not have compatible dimensions. This can be seen in Figure 8.3, which displays the plaster studies on the same scale. This means that the sequence of modelling the clay piece, casting it and creating a plaster reproduction out of it, was started again at every single step of the procedure. It is, of course, very common in the history and practices of art to create a clay or plaster model in order to prepare the work for a sculpture to be made in stone,[42] but, in this case, why multiply the conversion of clay (or malleable substance) models into a more durable material such as plaster? Why apply this rather complex process for the same individual face, if not to request the agreement of the commissioner of the work, who was obviously not present in the workshop?

Egyptological documentation provides clear evidence of – very logical and expected – royal control exerted on the production of the king's depictions,[43] clearly self-thematised within the reign of Akhenaten, who was presented as having personally taught one of his chief sculptors named Bak.[44] Less than half a century later, the famous Vizier Paser, of the time of King Sethi I (at the very beginning of the 13th century BC), had himself depicted in a large scene of workshop inspection in the wall decoration of his monumental rock-cut tomb at Thebes, in which he compliments an unnamed chief sculptor on his work with the following words: 'May Ptah (the tutelary god of artists) praise you sculptor! This statue of the Lord (*i.e.* the king) that you have made is really wonderful (or perfect)! "Let it become like the Ancient (ones)" as One (*i.e.* the king) said in the Palace – life, prosperity and health!' And the artist answers, 'your teaching spreads throughout the workshops' (Assmann 1992), showing that the supervision of royal statue production was assigned to the highest official of Pharaoh's court.[45]

Therefore, the plaster studies discovered in Thutmose's house were seemingly used as reception pieces, to be presented to the commissioning authority outside the workshop. From this perspective, one may also hypothesise that official effigies of members of the royal family were produced in at least four successive stages

[42] See the very interesting demonstration of Thomas Merrett in this volume.

[43] See in particular Laboury (1998: esp. 74–7).

[44] Bak was 'chief sculptor and chief of works of the Lord of the Two Lands (*i.e.* the king)', and portrayed himself as 'assistant of His Majesty', 'taught by His Majesty in person' (*ḫry-ꜥ n ḥm.f, sbꜣ ḥm.f ḏs.f*) On this sculptor and this particular epithet of his, as a *topos* for self-presentations of chiefs of works of the king in the New Kingdom, see Krauss (1988).

[45] The inspection of royal workshops – notably in the context of temples – was apparently a recurrent theme in the decoration of Viziers' tombs; see Davies (1943: 48–59, pl. 52–62; 1963: 9–10, pl. 8–9). In the important domain of the god Amun in Thebes during the 18th dynasty, the Second High Priest of Amun was also in charge of the supervision of workshops and their productions; see Laboury (2015: 329–30, n. 11).

or phases, with (a minimum of) three control steps, before the creation of the final model, sculpted in stone and adorned with plaster completions, subtle paintings and, for some of them, precious inlays and even gildings (again Figure 8.3).

The best preserved of these final model busts, the famous bust of Nefertiti, was complemented with plaster additions. These were added in order to smooth the surface, either with a very thin layer before painting, or much more heavily to correct its final shape. This can be seen especially on the shoulders, where the plaster adjusts the length of the queen's neck,[46] and at the back of the crown, where it balances the composition but also the weight equilibrium of the object. The plaster is present in either a single layer or multiple layers, and is up to 2.5 cm thick.[47] Interestingly, the CT scan analysis of the bust revealed the integration of the different steps of its completion, painting being coordinated with plastering, as if all were made by the same hands or by the same artist.[48] The paint – apparently applied by a right-handed person – is particularly subtle, with five different layers of various hues of ochre (some in glazes) in order to reach the desired nuanced rendering of the queen's complexion. The so-often-celebrated perfection of the design of her face was achieved thanks to the use of a vertical guideline right in the middle of the face,[49] following a well-attested practice in ancient Egyptian art (notably on the unfinished quartzite heads of Nefertiti[50] also found in Amarna).[51]

While investigating the perfect beauty of Nefertiti's bust – or the impression of perfection it seems inevitably to elicit – Rolf Krauss, former curator at the Ägyptisches Museum in Berlin, aimed to recreate the original design of the piece as seen through the sculptor's eyes, when the artist prepared his work on the parallelepiped limestone block. By projecting a grid graduated in the ancient Egyptian measuring unit of the time (1 finger = 1.875 cm) on a 3D recording of the queen's effigy (Figure 8.10), Krauss was able to show that every single facial feature is positioned on a line or at the intersection of two lines of this grid (1991a; 1991b). This demonstrates, without any possible doubt, the extent to which this work, often designated as 'the

[46] On the importance of the length of the neck of Nefertiti in the aesthetic conception of her official image, see Assmann (1988); and Laboury (2010: 218–21).

[47] See Huppertz et al. (2009).

[48] S. Simon (Rathgen-Forschungslabor der Staatlichen Museen zu Berlin) and C. Blänsdorf (Archäologische Staatssammlung München), in their presentation on 'The busts of Echnaton and Nefertiti – art technology and conservation' at the Amarna-Workshop organised at the Staatliche Museen zu Berlin (Stiftung Preußischer Kulturbesitz), 2–5 July 2012, complemented by their own recent research on the analysis published by Huppertz et al. (2009), explained that paint layers were detected between the three successive plaster coatings at the back of Nefertiti's crown. These are visible with a lower density on the CT scan image in Huppertz et al. (2009: 237, figure 2c).

[49] These details were also provided by Simon and Blänsdorf (see footnote 48 above). Both scholars also described a very similar technique for the painting of Akhenaten's bust, with a central axis of the face marked with black paint and preliminary sketches in red ochre for the eyes and the elements of the collar, for instance.

[50] Cairo Egyptian Museum, JE 44868 and JE 59286.

[51] For parallels from other periods, see Tomoum (2005: esp. 31–55, 142–54). On sculpture techniques in ancient Egypt, see the excellent syntheses of Devaux (1998) and Tomoum (2005: 142–77).

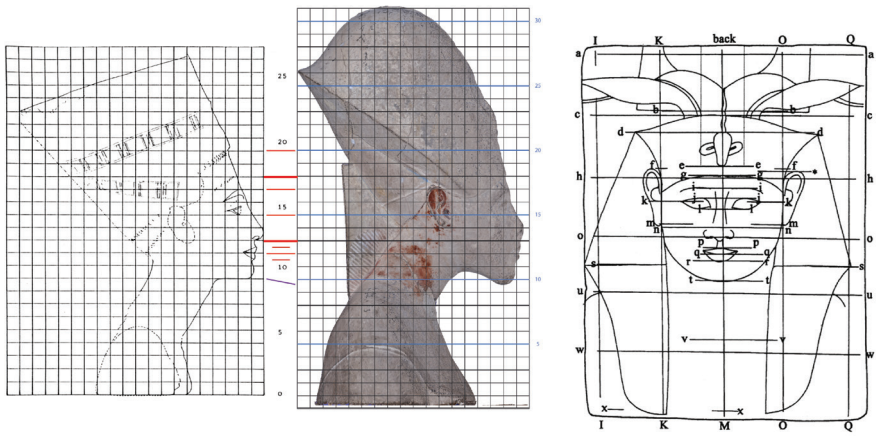

Figure 8.10 Projection of a grid graduated in ancient Egyptian fingers (1.875 cm) on a profile view of 3D recordings of the busts of Nefertiti (Berlin Ägyptisches Museum 21300) and of Akhenaten (Louvre E 11076), compared with a line drawing of the grid system attested on a 30th-dynasty miniature royal model bust (Cairo Egyptian Museum CG 33337) from Tanis (13.8 x 10 x 5.3 cm). Credit: After Krauss (1991b: 148), 3D recordings generated in the context of the project RetroColor 3D ©; line drawing after Tomoum (2005: 37).

most lifelike of Egyptian art', was artificially constructed. Moreover, Krauss also underlined that the upper part of the face of Akhenaten and Nefertiti, from the bottom of the nose to the beginning of the crown on the forehead, is exactly identical in size as well as in shape on the bust and on the plaster head of the king[52] (Krauss 2005). Therefore, although it has often seemed tantalising to imagine physiognomic convergence between Akhenaten's and Nefertiti's actual faces and their apparently extremely individualised sculpted portraits, Krauss' experiment reveals that their official images, designed by Thutmose, were aesthetically constructed and indubitably idealised royal visages.

Recent 3D investigation of the Louvre bust of Akhenaten, in the context of the project RetroColor 3D,[53] and involving the University of Liège (Laboury et al. 2019), allowed us to go a step further by demonstrating that every facial feature which defines the king's as well as the queen's official portrait is positioned in the same place on the proportion grid, with the only exception of the chin (Figure 8.10). This reminds us that the modification of one single parameter suffices to change quite significantly the face of a depicted individual.

[52] Berlin ÄM 21.351.

[53] Funded by the Région Nouvelle d'Aquitaine at the University of Bordeaux (principal investigator: Robert Vergnieux).

Even more interestingly, all of these mathematically positioned facial features precisely correspond to systematic marks on a large corpus of sculptors' models of the Late Period studied by Nadja Tomoum (Figure 8.10). These small-sized, gridded and deliberately incomplete models were used as 'didactic instructional material' to teach sculptors' trainees 'the canonized system of proportions' (Tomoum 2005: 203) and how to project the grid and reference points onto the flat surface of a block to be sculpted, allowing them to prepare and monitor the actual operation of sculpting the face, with reduced risks of mistakes.[54]

The so-called ritual of the statue is an important part of the famous 'ritual of opening of the mouth' (designed to activate or animate statues and assimilated images in ancient Egypt). This describes the theory of the creation of a statue and enables us to investigate further the emic point of view on the procedure materialised by the plaster studies found in Thutmose's workshop and hence reconstruct the artist's vision of his own work, at least in broad terms.

In this ancient Egyptian ritual, the priest – who in this context plays the role of the son of the deceased – secludes himself in the sculptors' workshop and enters into some sort of meditation in order to 'see' the image of the statue to be sculpted 'on every of its sides (or aspects)' and fix it, thanks to a 'grid' (or etymologically a '(catching-)net'). The priest then provides the sculptors with instructions on how to create the statue. Together with other texts, this ritual implies that according to the ancient Egyptians, the sculpture was pre-existing in the block to be sculpted (Fischer-Elfert 1998).

This ideological conception of the sculptural work, well attested throughout art history, from Michelangelo to Rodin, for instance, means that the clay models – then converted into plaster casts – were produced by Thutmose in order to help him visualise the future statuary piece which was supposed to pre-exist in the block and needed to be 'uncovered', to use ancient Egyptian words and concepts. Therefore, in his own cultural perception, his task was most probably fundamentally to reveal what was to be seen.[55]

[54] As far as I know, no caliper has ever been found in Egypt in a pharaonic context. Only levelling sticks – used to control the flatness of a surface – are attested, including two sets from the estate of Thutmose (Seyfried 2012a: 306–7 [cat. 90]). But this system of grid and reference points was obviously sufficient to ensure consistency in the reproduction of a model in stone, with few acceptable variations, as we shall see. The operation of sketching the facial features on a statue seems to be described as *ṯz ḥr n twt*, 'affixing the face of the statue' in a workshop scene of the tomb of Ibi in Deir el Gebrawi (Chauvet 2015: 72, with previous references).

[55] In this cultural and ideological context, it is particularly interesting to note that the first step in this 'revealing' work of the sculptor (in ancient Egyptian language, the concept referred to here is that of the verb *gmi*, 'to encounter, find, uncover') was, to use Leon Battista Alberti's classic distinction, *per via di mettere*, or by addition, rather than *per via di levare*, i.e., by subtraction, as most of what remains of ancient Egyptian sculpture, in stone, could mistakenly lead us to think (I wish to thank here Alessio Delli Castelli for his very interesting insight in this respect). This suggests that the form could also be revealed or emerge through the manipulation of matter, a conception not so alien to the one of many early modern artists and certainly consistent with the ancient Egyptian concept of *ḳd*, 'to form, to shape (out of a malleable material), fashion pots or build' (Dorman 2002), but also, as a substantive, designating the

Another point of interest in the Louvre bust of Akhenaten is its very existence, as an almost exact duplicate of the Berlin one, found – damaged – among Thutmose's plaster studies. It was purchased on the antiquities market in 1905 and its precise origin is unknown, but 3D analysis allows us to pinpoint some differences between the two busts and hence better understand their respective functions (Laboury et al. 2019: 169–71). The Paris piece in fact presents a slightly simplified version of the face and of the specific position of the head of the king when compared to its German counterpart (Laboury et al. 2019: 170, figure 9). The Berlin bust still displays clear plaster additions or corrections as well as remains of gildings (notably on the broad collar) which are totally absent on the bust purchased by the Louvre (Laboury et al. 2019: 170, figure 8). Finally, the armpits, well defined on the Berlin model, were again simplified and blurred into the large collar and the anatomically indistinct lower part of the Paris sculpture (Laboury et al. 2019: 170, figure 10). These details strongly suggest that the Berlin bust found in Thutmose's 'chamber of models' was still a work in progress, made with more care and more precious materials, and almost certainly the master copy, compared to its duplicate now kept in the Louvre.

This suggests that, once completed and agreed upon by their commissioners, the valuable model-busts created in Thutmose's workshop could then be copied and dispatched to the various workshops throughout the kingdom of Egypt in order to ensure consistency in the reproduction of the king's and the queen's official image. This has a direct bearing on our understanding of the creation of statue models and statues in general in ancient Egypt, as well as on the training of sculptors and their work methods.

As this volume reminds us, preparing and monitoring a statue to be sculpted in stone with a plaster model is very well attested and known as a technique throughout art history. In our case, the technique was applied on a serial level. Surviving Egyptological documentation demonstrates that the procedure reconstructed on the basis of the plaster studies discussed in this chapter was most probably the normal and usual praxis of ancient Egyptian sculptors, or at least one among them. Next to the very important pedagogic material gathered and analysed by Tomoum (2005), two plaster studies have come down to us. They are a mask[56] and a face[57] according to the typology suggested in this chapter. Both present the characteristic official physiognomy of Nectanebo I, one of the last indigenous kings of ancient Egypt, as well as a very delicate small plaster mask of Tutankhamun, now kept in the British Museum.[58]

Furthermore, this technique of reproducing the official facial features of Pharaohs allows us to understand the consistency and, at the same time, the

external and visible form of something, as opposed to its invisible 'interior', *ḫnw* (Laboury 2016: 379, n. 22).

[56] Petrie Museum UCL 28711.

[57] Munich Ägyptische Museum 5339. See also Tomoum (2005: 215 [cat. 42], pl. 31).

[58] British Museum EA65517.

variability of royal statue series production in ancient Egypt. Let us just briefly consider, as an example, the well-known set of praying statues of Senwosret III in the Egyptian sculpture gallery of the British Museum. On these statues, the precise rendering of the given type varies in the reproduction of the king's facial model, but also in the size of the different sculptures, although they were definitely designed as a series, made to be displayed one next to the other (Laboury 2017). Necessarily, the dimensions of the raw blocks delivered to the workshop will have affected the reproduction of the model. But so, of course, did the sculptors' particular sensibility and skills. Hence, there were a few inevitable faint alterations to the models caused by the technical and human circumstances of such artistic productions; these statues were handmade, most probably combining the use of a metrologically calibrated model of the royal face, as we have seen, with eyeballing.[59] According to the archaeological distribution of the plaster pieces on the site of Amarna, some coming from workplaces other than the estate of Thutmose (for instance, the mask of Akhenaten[60] and Nefertiti's face,[61] discovered approximately 180 metres to the east of Thutmose's residence[62]), it seems that some sculptors could also work with plaster models and not only from expensive and exquisitely finished sculpted model busts, probably mainly used in important workshops or for mass production. Finally, at least one plaster study for a non-royal sculpture is attested outside Amarna: a miniature plaster bust of a Late Period dignitary now kept in the Walters Art Museum of Baltimore.[63]

This brings us back to a very important aspect of the plaster studies discovered in Thutmose's house, that is, the existence of plaster depictions of non-royal individuals. These are actually more numerous than those portraying members of the king's family (15 versus 9): an archaeological fact which reveals that our royal sculptor certainly also had private customers. Interestingly enough, whereas four stages are attested in the production – and acceptance – of official effigies of royalties, only two seem to have been used for private clients, presumably a first attempt to be agreed upon by the commissioning patron, and then, if needed, a final – maybe amended – version made out of it.[64]

[59] This seems to be the way ancient Egyptian sculptors and their patrons addressed the issue raised by Thomas Merrett in his contribution to this volume.

[60] Cairo Egyptian Museum, JE 59289.

[61] Cairo Egyptian Museum, JE 59288.

[62] See Bednarski (2009).

[63] Walters Art Museum, Baltimore, 22.34. Tomoum (2005: 217, cat. 52–3, pl. 36) also presents two small model busts depicting private individuals of the Late Period, but these are made in limestone. Other Late Period plaster models were probably also made for the production of private statues (Hastings 1997: 63, pl. 61 [234–5, 238]), notably a fragmentary – almost life-sized – head with a definitely archaising private wig found in North Saqqara (Hastings 1997: 64, pl. 62 [242]).

[64] At least 5 of the 15 non-royal plaster studies present no physiognomic correspondence with any other piece of the discovered set (Berlin ÄM 21.261, 21.346–7, 21.350 and 21.359). As Dorothea Arnold very convincingly suggested (1996: 51), the private statues to be made after the plaster studies created in Thutmose's workshop were plausibly those sculpted in the rock-cut tombs of the site of Amarna, unfortunately now badly damaged, beyond any possible comparison. Nevertheless, the

From an art-historical vantage point, it is interesting to note that the few private statuary pieces that came down to us from the reign of Akhenaten and Nefertiti broadly display less individualised faces than many of the plaster studies of non-royal models unearthed in Thutmose's estate.[65] This plainly reveals – or reminds us – that, just like the official image of the royals (supra Figure 8.10), statues and statuettes of private individuals were meant to present an aesthetically constructed visage in the style of the time, probably on the basis of, or with reference to, the actual physiognomy of the depicted person, but also as an artistic interpretation – or projection – of it.[66]

The private clientele of Thutmose also allows us to explain the whole archaeological setting of the finds discussed so far. As we have seen, in the typology of private houses on the site of Amarna, the front or reception hall of the residence of Thutmose was exceptionally huge. It was probably 'intended to impress wealthy/high-status visitors', according to the suggestion of Kate Spence, because this is most likely where the sculptor received his private clients from the elite of the city.[67] In all likelihood, this is also why he kept all the elements to discuss potential orders (such as stone samples or work already done for previous customers) in the annex of this impressive reception hall, the 'chamber of models' as Borchardt designated it.[68] It was a way to demonstrate his skills and the fact that, as 'favourite of the king, chief of works and sculptor', he was the portrait-sculptor of the Crown. This would help him to negotiate satisfactory remuneration for his work. In ancient Egypt, as in every other cultural context studied by art history, the goal of the competing commissioning elite was to be able to hire the best artists on the market, that is, in pharaonic Egypt, royal artists.

Conclusions

Despite the low economic value of the material, the plaster studies found in the estate of the royal sculptor Thutmose on the site of Amarna represent a priceless

discovery of an unfinished quartzite fragmentary statuette of a wigged non-royal lady in the area of house P.47.3 (see no. 4 in Figure 8.1), so just a few metres away from the 'chamber of models' (Berlin ÄM 21.289; Seyfried 2012a: 388–9 [cat. 175]), definitely proves that small portable private statuary was also produced in Thutmose's workshop.

[65] E.g., Seyfried (2012a: 159, 388–9 [cat. 175]) or Cairo Egyptian Museum JE 52976–53249.

[66] For a very clear parallel in royal statuary thanks to the excellent state of preservation of the mummified face of the king (in this case Thutmose III), see Laboury (1998: 647–55). On the issue of portraiture in ancient Egyptian art, see Laboury (2009; 2017) and, more importantly, Delli Castelli (2025).

[67] If, as suggested by Arnold (1996: 51), the private customers of Thutmose were among the happy few who could afford to have a rock-cut tomb in the cliffs surrounding the city of Akhet-Aten, they represented less that the top 1 per cent of the society of their time (Laboury 2010: 429, n. 558), undoubtedly of a higher social rank than Thutmose.

[68] When the house was built, this room was designed with direct access to the open-air courtyard of the workshop (Arnold 1996: 46; Seyfried 2012b: 170), where stone statues were made: a function absolutely not incompatible with the interpretation suggested here. At a certain moment – impossible to determine – it was decided to wall up this initial door and keep at least what was found in this 'chamber of models'.

discovery for Egyptology, as well as for art history. Set in their archaeological, technological and art-historical context, they plainly reveal their original function as sculptors' models. More importantly, they offer an almost unique opportunity to reconstruct the creative process of a named ancient Egyptian sculptor, in its practicalities, but also in the way he probably perceived his own work. They allow us to cast an unexpected light on the diversity of his clientele, as well as on the way he dealt with his various classes of customers, from the royals, his main and official employer (to whom he clearly had to go himself, or to their representatives), to the members of the elite, his casual customers, whom he certainly received in his own house and small to medium-sized enterprise.

Through the various techniques he obviously mastered (modelling, casting, sculpting, painting, designing), the precision of his drawing design and the exquisite subtlety and quality of the sculpture he was able to produce, we see that the chief royal sculptor Thutmose, the author of these art pieces, was plainly a true artist, in every sense of the word, a Michelangelo or a Pheidias of his time.

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