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Computer reconstruction of the Great Sphinx at Giza

# Cambridge Archaeological Journal

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## Reconstructing the Sphinx

Mark Lehner

*From 1979 to 1983 the American Research Center in Egypt carried out an architectural, archaeological and geo-archaeological study of the Giza Sphinx. Photogrammetry and conventional surveying techniques were used to prepare detailed plans and front and side elevations of the monument. These have made it possible to construct a computer model of the current condition of the Sphinx, and its hypothesized condition in ancient times, both as originally carved in the 4th Dynasty, and as remodelled and renovated during the 18th Dynasty. Careful analysis of surviving detached fragments of the Sphinx allowed details of beard and uraeus to be included in the reconstruction. This process of creating a computer model of the Sphinx is akin to sculpting the statue again in computer memory.*

The Great Sphinx of Giza is one of the most famous images of ancient Egypt, and it is one of the most unusual monuments of the ancient world (Fig.1). Worldwide familiarity with the Sphinx, captured for about a hundred years in numerous postcard views and in thousands of tourist photographs, may have contributed to a sense that the monument was 'known'. In fact, the Sphinx was little studied and poorly documented until the late 1960s and 70s. This familiarity also obscured the uniqueness of the monument. The Sphinx is the first truly colossal royal sculpture in the history of ancient Egypt. Other larger than life-sized statues preceded it, but none of them come close to the immense scale of the Sphinx. Except for the Louvre sphinx head of Djedefre and one small limestone sphinx from Abu Roash (Chassinat 1921-22), the Giza Sphinx is also the earliest complete sphinx to wear the distinctive royal *nemes* head-scarf.

A number of studies have addressed the texts and stone architecture associated with the Sphinx (Zivie 1976; Hölscher 1912; Petrie 1883; Hassan 1949; 1951; 1953; 1960a; Ricke 1970). Others have dealt with the general subject of the sphinx in ancient Egypt (Demisch 1977; De Wit 1951; Dessenne 1957; Schweitzer 1948). It was however through the work of the Sphinx Project of the American Research Center in Egypt from 1979 to 1983 that the statue was first studied, described and photographed in a systematic way.

The Sphinx Project began in 1979, with James P.

Allen as Project Director and the author as Field Director. Maps and architectural drawings compiled during the course of the project are the basis for the description and analysis of the Sphinx contained in this study. In addition, use has been made of archival data from the Baraize excavation in the photographs and papers of Pierre Lacau, former Director of the Egyptian Antiquities Service. This includes Lacau's notes, a few sketches, and a plan of one stage of the excavation. Most valuable is a series of more than 226 photographs, many of which are dated, that record the progress of excavation over eight years. These show the condition of the Sphinx as it was first excavated in modern times, as well as many of the archaeological features that were removed from the site.

### The Setting

The Great Sphinx of Giza faces the narrow green ribbon of the Nile river valley that interrupts a swathe of desert some 1,800 km wide that sweeps across the top of Africa. It sits at the base of the Giza plateau, the platform for the three pyramids of the 4th Dynasty kings Khufu, Khafre, and Menkaure (c. 2550 BC) (Fig. 2). At the lowest part of the plateau, the ancient Egyptians quarried a U-shaped ditch out of the natural limestone, leaving a core that they sculpted as the Sphinx.

The Sphinx and the Giza Pyramids were part of



**Figure 1.** *The Sphinx with Stela of Thutmose IV in foreground.*

the vast centralized royal necropolis which served Memphis, the administrative centre of Egypt throughout most of pharaonic history. Kemp has recently argued that during the development of the Egyptian state, a 'formal Egyptian visual culture' developed at the centre and impressed upon, and supplanted, native 'preformal culture' in the Egyptian provinces (Kemp 1989). This formal culture was expressed through a program of religious and political motifs that saw distinct times of codification. The early 4th Dynasty pyramid complex was just such a systematization of royal power - a recodification of older forms exemplified by the Djoser Step Pyramid complex at Saqqara and the royal tombs of the Archaic Period (Kemp 1989, 62-3). The Great Sphinx can be seen as part of this process, perhaps even a prototype for one of the classic symbols of kingship through the later phases of pharaonic culture.

The three pyramid complexes of Khufu, Khafre,

and Menkaure define the layout of the Giza necropolis. The basic scheme of each complex includes the pyramid as the royal tomb, a temple at the centre of the eastern base of the pyramid, a long ramp or causeway stretching down to the level of the valley floor, and another temple, the valley temple, at the end of the causeway which served as an entrance to the entire complex. The valley temple was served by a harbour fed by a canal that connected to the Nile.

The Sphinx is a unique element of the Khafre Pyramid complex, making it highly likely that the Sphinx was built for this king. It sits at the valley end of Khafre's causeway. In front of the Sphinx there is a temple that must have been built for a cult associated with the Sphinx (Ricke 1970). The Egyptians built this Sphinx Temple on a terrace some 2.5 m lower than the Sphinx itself. The masonry of the temple is composed of multi-toned core blocks with granite casing like the Pyramid Temple and Valley Temple of Khafre. The

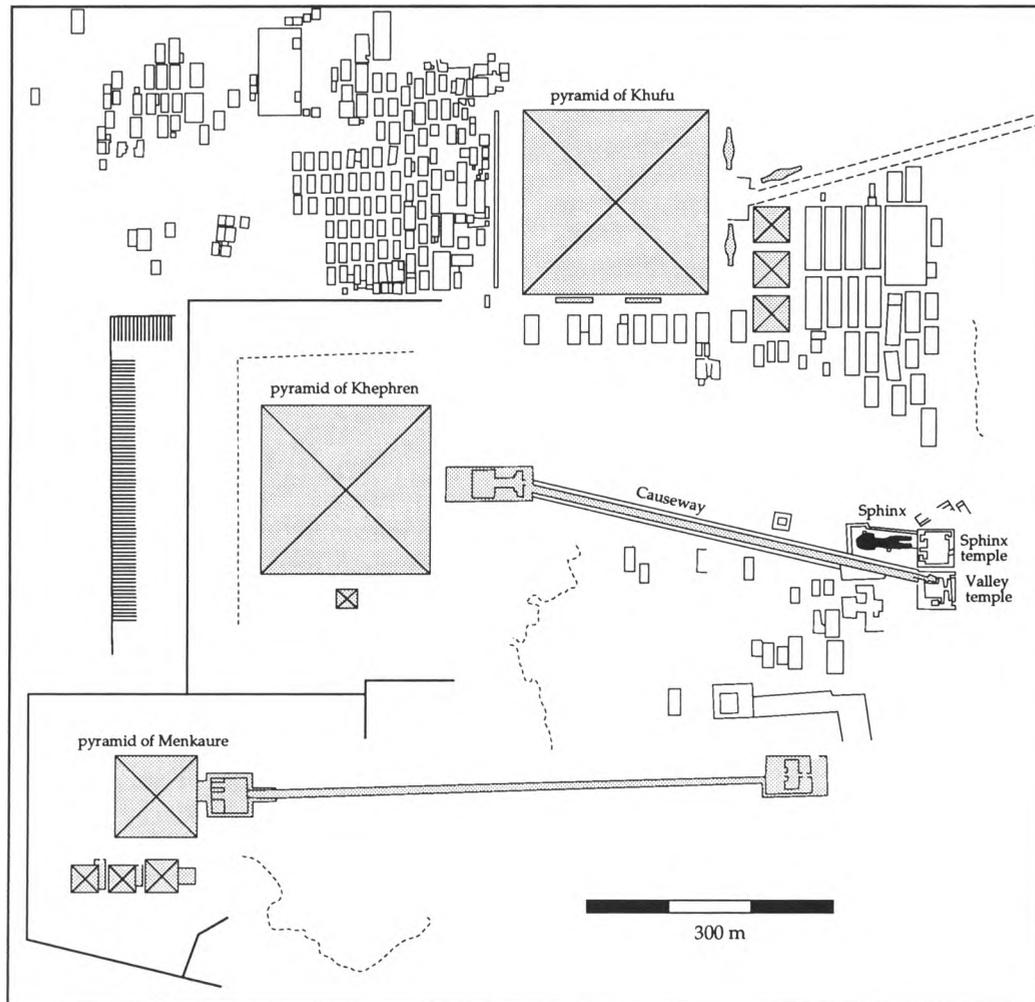


Figure 2. Plan of the Giza Plateau.

Khafre Valley Temple is also built on the same terrace, level with the Sphinx Temple, and indeed the front and backs of these two temples are nearly in alignment.

### History of Excavation

The archaeology of the Great Sphinx goes back some 3,400 years, to a time when the statue carved for Khafre was already 1,200 years old. The reports of excavations that freed the Sphinx from the sand are recorded on stone stelae and fragments of stelae found in the course of modern excavations.

The earliest of these is the famous granite stela that Thutmose IV erected around 1400 BC between the Sphinx's forepaws. The story of the stela is told to nearly every tourist at the site: Thutmose sleeps in the shadow of the Sphinx's head. The Sphinx speaks to the prince and offers him the crowns of Upper and Lower Egypt, suggesting that Thutmose free the statue from

the desert sand and restore the god's ruined limbs. The text breaks off on the deteriorated stela and any account of restoration work on the Sphinx is lost. But the record is clear that Thutmose erected the stela at the base of the colossal statue as one of the first acts in the first year of his accession to the Egyptian throne. Thutmose IV's name is found stamped in some of the bricks that were used to build a series of mudbrick walls around the entire site to hold back the desert sand (Hassan 1953, 5-7). This lends credence to the idea that Thutmose IV excavated the Sphinx.

The Thutmose IV Stela (Porter *et al.* 1974, 37), along with those of Ramses II found in the chapel between the forepaws (Piankoff 1938, 158; Zivie 1976, 196-8), and numerous votive stelae found in the neighbourhood (Hassan 1953), are the first attempts to render a graphic, albeit stylistic portrayal of the Sphinx. These show the Sphinx couchant upon a pedestal. Six or seven stelae show a royal statue at the chest of the

Sphinx, but differences in the details of these stelae, such as in the Sphinx's crown, call into question their reliability as records of the Sphinx's actual appearance (Ricke 1970, 34; Zivie 1976, 308-10).

A papyrus document (Turin 1882 vs. 3,3) of the time of Ramses II mentions that labourers were taken to extract stone for *hwr m mn-nfr*, which may refer to the Sphinx under one variant of its name Hauron (Gardiner 1937; Caminos 1954). In addition to two chapel stelae, Ramses left other monuments at the Sphinx (Zivie 1976, 194-201).

Another stela dated to the 21st or 26th Dynasty (Wildung 1969, 182-4; Zivie 1980, 95) tells of ancient repairs to the Sphinx, specifically to the tail of the *nemes* headdress, and ascribes the repairs to Khufu, implying that the Sphinx precedes Khafre. This is the 'Stela of Cheops's Daughter', discovered by Mariette in 1853 in the small Isis Temple east of the southernmost Queen's Pyramid at the foot of the Khufu Pyramid. The account is probably an example of the 'authenticating apparatus', an ancient literary device that bestows great antiquity on texts or monuments (Wilson 1950, 495), in this case on the Temple of Isis that is also said to have been restored by Khufu.

According to a stela set up by the people of the nearby village of Busiris, the Sphinx was cleared of sand again in Roman times in honour of Nero and the governor Claudius Babillus (Schwartz 1950, 49; Dittenberger 1960, 381-5).

French scholars accompanying Napoleon's 1798 expedition to Egypt mapped the Giza plateau and produced impressionistic renderings of the Sphinx which was buried in sand up to its neck (Gillispie & Dewachter 1987, pls. 11-12, A; vol V, pl.8). The French team probably cleared only the top of the back of the Sphinx.

Large scale unveiling of the Sphinx began in 1817 when Caviglia excavated a deep trench from the chest of the statue towards the east. Salt, the British Consul, recorded the results of the excavation in notes and sketches published by Vyse (1842). Caviglia found fragments of the Sphinx's beard, the chapel between the forepaws at the base of its chest with the Thutmose IV Stela as its centrepiece, and a monumental Roman stairway and viewing platform east of the Sphinx.

Vyse's own work at the Sphinx was limited to boring a large hole in the back, just behind the Sphinx's head, in search of cavities. When the drill rod he was using became stuck at about 9 m depth, Vyse ordered gunpowder (which he used freely to make exploratory tunnels through the core masonry of the pyramids) to free the drill rod. He reports that 'being unwilling to disfigure this venerable monument, the excavation

was given up, and several feet of boring rods were left in it' (Vyse 1840, I, 274-5). Vyse should have said 'being unwilling to disfigure this venerable monument further', because when the cavity created by his gunpowder was cleared in 1978 under Hawass, it contained not only his drill hole but also a large chunk of the Sphinx's headdress with its relief-carved pleating.

Mariette in 1858 and Maspero in 1885 cleared the sand from the Sphinx down to the natural rock floor and uncovered several sections of ancient protective walls around the site. It was only in the 1920s and 1930s, however, that the first large-scale investigations of the Sphinx and its surroundings were undertaken. Unfortunately, the records of this massive excavation of the site, under the direction of Emile Baraize from 1926 to 1934, and then Selim Hassan from 1936 to 1938, were never published. This is particularly to be regretted since during this work many layers of architecture, including an extensive 18th Dynasty complex that surrounded the entire Sphinx area, were removed without being mapped or described in writing.

### The Sphinx in the Old Kingdom

The Old Kingdom 4th Dynasty date for the origin of the Great Sphinx at Giza is no longer an issue. It is probable that the Sphinx dates specifically to the reign of Khafre because of its context within the Khafre pyramid precinct, and because it was part of the same quarry and construction process as the two temples in front of the Sphinx, one of which is the Khafre Valley Temple.

Although we are certain that the Sphinx dates to the 4th Dynasty, we are confronted by a complete absence of Old Kingdom texts which mention it. The monuments of the 4th Dynasty yield far fewer texts than those of later times, but the absence of Old Kingdom texts relating to the Sphinx is also due to the fact that the temple in front of the Sphinx was never finished and was entirely stripped of its facing stones, which would have carried texts, at some time between the Old and New Kingdom (Ricke 1970). Furthermore, while stone mastaba tombs of the 5th and 6th Dynasties in the Giza necropolis have furnished a large corpus of titles (Baer 1960), including those of the priests and priestesses of gods and goddesses (Hassan 1960b) and those serving the pyramids of Khufu, Khafre, and Menkaure (Wildung 1969; Hawass 1987), there is not a single title that can be identified with the Sphinx and the large 4th Dynasty temple that lies below its forepaws.

For this reason we really do not know the exact significance of the Sphinx for its Old Kingdom builders. Ricke (1970) suggested that it was already an image of the sun god, under the name Horemakhet, in the 4th Dynasty, although this name is not found until more than a millennium later. Anthes suggested that the Sphinx was an embodiment of the King as the celestial and terrestrial Horus, presenting offerings to the sun god in the open court of the temple below the Sphinx's paws.

In the absence of texts that indicate otherwise, Gardiner's conclusions about the meaning of the sphinx for the ancient Egyptians may hold true for the Giza Sphinx in the 4th Dynasty:

There are four possible ways in which an individual sphinx might be interpreted: (1) as the king under the image of a lion, (2) as some powerful god under the image of a lion, (3) as a victorious king manifesting himself in the leonine form of a god, and (4) as a powerful god revealed in the dreaded person of the king. These views were in no way mutually exclusive, and it is probable that with regard to one and the same material sphinx of stone, the standpoint of the Egyptians tended to shift rapidly from the one opinion to the other (Gardiner 1916, 91).

Whether the Great Sphinx is more solar deity or pharaoh is a question which the Egyptians themselves who made it could probably not have answered.

We must see the Sphinx within the context of Khafre's statue program. Khafre was the statue builder *par excellence* of the Old Kingdom. In addition to the Sphinx, Khafre had more than 58 large statues within his pyramid complex, and the number and great size of his statues were unequalled until well into New Kingdom times. It is within the context of this burst of statue-building that we must see the origin of the Sphinx.

### Abandonment

Little is known of the Sphinx from the end of the 4th Dynasty until the beginning of the New Kingdom, 950 years later. Texts indicate that there was no dramatic political break in the transition from the 4th to the 5th Dynasty. They indicate continuity of service in the Giza temples through the 5th and 6th Dynasties. Hölscher (1912, 80-1) used this evidence to ascertain that the Khafre temples had remained in use to the end of the 6th Dynasty. He also noted that stones which capped the tops of the walls of the Pyramid Temple showed strong weathering on their outer sides, whereas where they were joined to other pieces they were unweathered. This indicates that the temple stood

intact for a substantial period.

There is no evidence, however, of any cult activity in any of the Giza temples during the Middle Kingdom and Second Intermediate Period; the cemeteries were abandoned, and no new construction was undertaken. Giza was largely neglected (Zivie 1976, 25-7). It is not clear exactly when the Sphinx was abandoned and when the Sphinx Temple and Khafre Valley Temple were robbed of their stone finishes. This stripping of all the granite and alabaster from the entire Sphinx Temple, the exterior of the Valley Temple, and the Khafre Pyramid Temple, and the careful removal and hauling away of colossal statues that must have weighed many tons, was a systematic act that suggests royal power. In the case of Khafre's Valley Temple, stratigraphy shows that this must have occurred before the end of the 18th Dynasty (Hölscher 1912). Some inscribed blocks from Giza were re-used in the Middle Kingdom pyramid of Amenemhet I at Lisht, but these account for only a fraction of the material. It is possible that the major robbing of granite blocks from the Sphinx Temple and Khafre Valley Temple in fact took place during the 18th Dynasty renovation of the Sphinx.

### The Sphinx in the New Kingdom

In the New Kingdom the site of the Sphinx comes alive and speaks to us through ancient texts for the first time. The Sphinx was the focus of visits and votive offerings by kings, officials and, probably, commoners. This attention to the Sphinx, under the name Horemakhet, 'Horus in the Horizon', is first attested at the very beginning of the 18th Dynasty, in the reign of Amenhotep I (Zivie 1976, 51-2).

Amenhotep II built a mudbrick temple with limestone fittings dedicated to the Sphinx. His son Thutmose IV erected the great granite stela near the base of the Sphinx's chest with the text describing how the Sphinx appeared to him in a dream to ask that Thutmose free it from the sand and to foretell the prince's accession to the throne. Thutmose IV also encased the eroded body and forepaws of the Sphinx in fresh limestone blocks and built a walled enclosure around it to keep the desert sand at bay. Tutankhamen left a chapel or resthouse of some kind behind the Khafre Valley Temple. Ramses II must have built or added to this and other structures on the site, judging from the several pieces found inscribed with his name (Zivie 1976, 192-201). Ramses also left two stelae in the side walls of the Sphinx chapel. Other rulers including Ay, Horemhab, Seti I, and Merenptah left stelae or inscribed architectural elements at the site. Hassan (1953, 125) provides a list of rulers connected with the

Sphinx down through Roman times.

In addition to the royal inscriptions, there are scores of stelae in honour of the Sphinx dedicated by officials, scribes, military leaders, builders and sculptors (Zivie 1976, 327-8). These 'private' stelae dedicated to Horemakhet have been catalogued and assessed by Christiane Zivie in her *Giza au deuxième millénaire* (1976).

This is evidence of a long-term active cult, both royal and popular. It appears that royal interest in the site was strongest during the 18th and 19th Dynasties (Stadelmann 1987, 448-9) but the cult of the Sphinx as Horemakhet continued through the late New Kingdom, Third Intermediate Period, and down into Roman times (Zivie 1980, 94f).

Zivie (1976, 307-8) stresses that the name and concept of the Sphinx as Horemakhet is an invention of the New Kingdom. The name remained at all times almost completely restricted to the Giza Sphinx. There never arose a generalized, widely distributed cult of Horemakhet, because, in her view, this was a tradition invented for an already ancient statue, rather than the more usual statue carved to represent an ancient tradition. Of course, in the ancient Egyptian view, Horemakhet was not something new; quite the contrary. According to the Thutmose IV Stela, this was 'the sacred place of the beginning of time'. The Sphinx as Horemakhet is a superb example of the 'ancient language game' of inventing tradition (Kemp 1989, 83-107); or, as Zivie puts it, this was a New Kingdom theological reinterpretation (Zivie 1976, 307).

Horemakhet, like Horakhty, was a celestial and solar deity (Zivie 1976, 316-17). This is spelled out in the stela of Thutmose IV where the Sphinx is called 'a very great image of Khepri', 'Horemakhet-Khepri-Re-Atum', and an 'image made for Atum-Re-Horemakhet.' This is to say that the Sphinx is an image of the sun god in all its aspects, rising (Khepri), zenith (Re), and setting (Atum).

Stadelmann (1987, 439) points out that colossal statues on the scale of the Sphinx came only a generation after Thutmose IV, and that these statues were worshipped as forms of the sun god. The Sphinx may, in fact, have been the prototype for the association between colossal size and sun worship. It should be emphasized that the Sphinx actually precedes any other statues in this size class by 1,200 years.

The Sphinx must have presented a truly striking image in the early 18th Dynasty. The Thutmose IV Stela may contain some truth about sand covering the Sphinx until his time and, anyway, the excavations of Hölscher, Baraize, and Hassan revealed that by the 18th Dynasty there was a tremendous mound of debris covering the entire area. Approaching from the east-

southeast, the direction of Memphis, the Sphinx would have appeared much the way it did in 1798 when Napoleon came to the site: a royal head of gigantic proportions, distinguished by the *nemes* scarf of kingship, framed by the two large Giza pyramids - literally a figure of Horus-in-the-horizon.

### Reconstruction of the Sphinx

A principal aim of the recent Sphinx Project was the preparation of a set of true-to-scale, contoured drawings of the monument. Centuries of erosion and neglect have left the Sphinx worn and damaged, lacking indeed some of the symbolically crucial accoutrements such as the protective *uraeus* (cobra) on the forehead and the divine beard, though fragments of both survive.

How did this immense symbol of royal and religious power look when it was intact? As we have seen, the Sphinx left by the Old Kingdom builders differed significantly from the Sphinx that was restored in the 18th Dynasty. The following analysis is aimed at reconstructing the Sphinx in its final state, towards the end of the New Kingdom, while at the same time understanding more of the original 4th Dynasty form and the way in which this was modified by the New Kingdom rulers. The observations and reconstructions offered here, while impinging upon art history, are given primarily from an archaeological and architectural point of view.

My procedure in this preliminary reconstruction of the Sphinx was to draw various fragmentary elements, such as the pieces of the beard and the *uraeus*, to scale, and to match these to the finished surfaces in the scale drawings of the Sphinx. These parts, and other elements that are missing entirely, such as the breast lappets, were repositioned by projecting diapositive slide images of several other sphinxes and royal statues onto the side and front elevations of the Sphinx. Using a zoom lens it was possible to match the Giza Sphinx with all or parts of other royal sculptures. This proved very useful and offered several insights into the relative proportions of statuary. There are pitfalls and shortcomings to this technique, not least of which is the lack of a true eye-level or straight-on photograph of the sculptures used for comparison. Ideally, such comparisons would be carried out using true-to-scale photogrammetric renderings of all pieces.

The eventual reconstruction was a side and front view of the Sphinx with the 4th Dynasty head and face and New Kingdom additions to the body. The preliminary reconstruction is true-to-scale in the form-line drawings presented here. Computer graphics enabled us to produce three-dimensional modelling

and rendering of the reconstruction, and to try out various possibilities. Details of the procedure are described below. The work is still in progress, but the three-dimensional modelling already helps us to conceptualize the complete monument.

### General Proportions

The head and body of the Sphinx are individually well proportioned, but the size of the head in relation to the body is significantly different from most other Egyptian sphinxes. The head itself must have been sculpted from a reserved block of limestone almost exactly  $20 \times 20$  royal cubits square. Figure 3, in which the grid squares are each one royal cubit, illustrates this point. In plan, the head is symmetrical with a fair degree of accuracy. The block reserved for the head was not, however, a cube; the height of the head is a little under 12 cubits. The division of the face and head into cubits corresponds remarkably with the upper hard layers of bedrock (the unit labelled Member III: Aigner 1983) and even with the distinct beds into which Member III is subdivided. The front elevation likewise shows good symmetry, although in the face itself a subtle discrepancy appears to exist between the axis of the head and that of the facial features.

The original outer surface of the lion body that the 4th Dynasty sculpted in the bedrock still exists under the limestone cladding added in the 18th Dynasty. The surface does not look like finished sculpture, leaving room to speculate that, as with the contemporary pyramids and mastaba tombs at Giza, the plan was to finish the statue with a casing of fine Tura-quality limestone. The casing that has survived, however, appears to derive from a time when higher parts of the lion body were severely eroded. It is also the case that the original workmen took care to carve the claws onto the north hind paw, and possibly onto the front toes as well. This indicates that they did not intend to cover the paws with masonry, and the cladding which covers them today must also be part of the 18th Dynasty renovation.

The body of the Sphinx is also quite symmetrical, as shown in Fig. 3 where every grid square is four cubits. The base outline in this illustration is that of the masonry veneer, but the veneer does not alter significantly the general proportions of the lion body. The total length of the body is 138.2 royal cubits with the masonry veneer and nearly a round 137 cubits without it. Perhaps more significant is the fact that the length of the lion body, from the base of the chest to the end of the tail, is close to 55 m. Subtracting 2.2 m for the width of the tail at the rump, the body length is 52.80 m; it is probable that a round 100 cubits (52.5 m) was

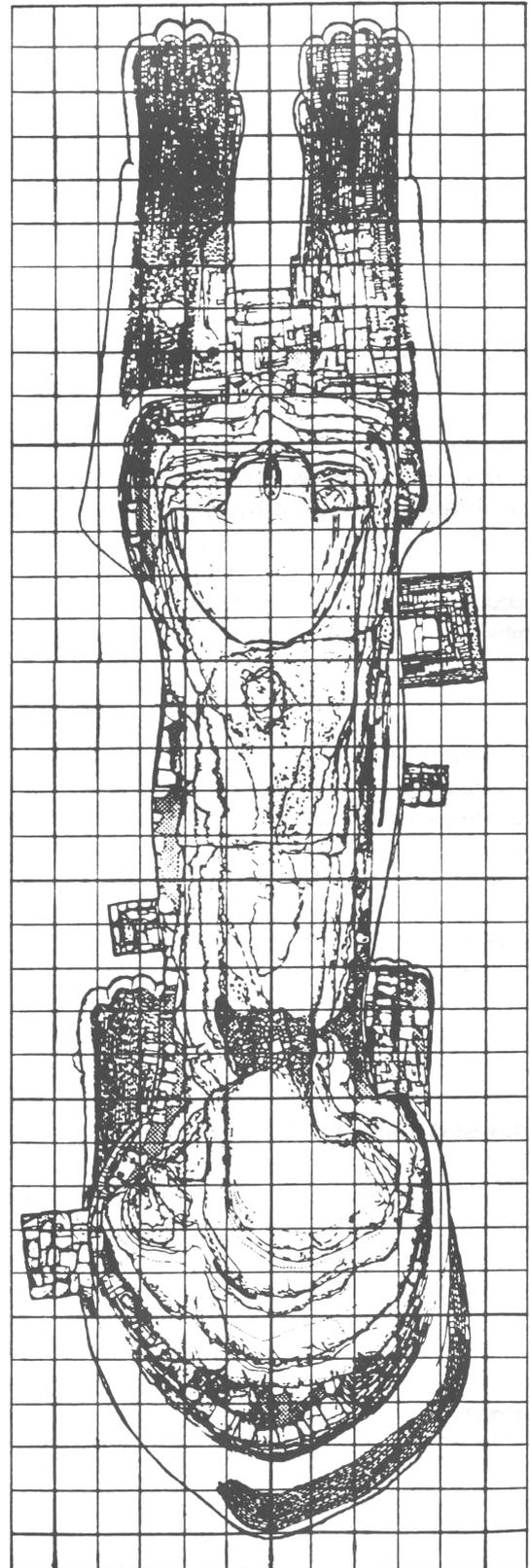


Figure 3. Plan of the Sphinx with grid of four royal cubits.

intended.

In sum, the head and body of the Sphinx are individually symmetrical, and the front elevation is fairly well proportioned between head and body. Commenting on the sphinx form, Russman pointed out that:

Usually a sphinx lies peacefully recumbent, but its body is massive, with muscular shoulders, a rib cage like a barrel, and hindquarters ready to spring. A human head on this body, if it is not to look ridiculous, must be disproportionately large. The Egyptians perceived this, and they also realized that the royal pleated headcloth, the *nemes*, gave needed width to the head, framing it in a setting not unlike a mane (Russman & Finn 1989, 82).

The photogrammetric elevations and the overlay comparisons with 18th Dynasty sphinxes make it abundantly clear that the 4th Dynasty builders did not achieve this proportionate relationship between lion body and human head. This is the case even though the head does wear the *nemes*, and they carved the human head to a scale of about 30:1 and the lion body to the smaller scale of 22:1.

The reason has primarily to do with the length of the body, upon which the above-mentioned scale is based.

When the front view of the red granite sphinxes of Thutmose III (Schweitzer 1948, 58-9, Taf. 10.3) are projected over the front elevation of the Giza Sphinx so that the heights of the statues correspond, the relative proportions of the head and body are close. Even in front view, however, the head of the Giza Sphinx is small in comparison to its 18th Dynasty counterpart, both in the overall width of the *nemes* and in the height of the head. It is perhaps to be expected that proportions between sphinxes of the 4th and 18th Dynasties would differ, since so many other stylistic details of the *nemes* headdress changed over the centuries (Evers 1929, II, 7-17).

It is the profile along the length of the body,

however, that reveals the truly anomalous proportions of the Giza Sphinx (Fig. 4). The sphinxes of Hatshepsut (Porter & Moss 1972, 370-1) and those of Thutmose III may be taken as 'classic' Egyptian sphinxes; they are fairly true to the natural form of the lion's body, with the massive shoulders, a barrel rib cage, and a back that slopes to lower haunches. If we take the measure of the head from the nose to the back of the *nemes* where the scarf is tied, the bodies of these sphinxes are four heads in length, from the base of the chest to the end of the rump where the tail begins (Fig. 4). The forepaws are a little more than one head in length from the base of the chest to the tip of the paws. The body of the Giza Sphinx, on the other hand, is five heads in length and the forepaws are a little under two heads long (Fig. 4). This is giving some allowance to the head of the Giza Sphinx for the missing nose and back of the *nemes*.

In other words, the body and forepaws of the Giza Sphinx are both about one head-length too long, making the head itself too small. It is also the case that the top of the Sphinx's back is almost level for most of its length, whereas the 'classic' sphinx/lion body slopes from high front shoulders to a much lower level between the rear haunches (Fig. 4). The Sphinx back is actually 10 m higher between the rear haunches than behind the head.

The Sphinx head is thus drastically smaller for the length than for the frontal height of the body. What are the reasons for this? The Sphinx body itself was not finished smoothly in the natural limestone. But the 4th Dynasty workmen did not leave extra bedrock to cut away later from the rear of the statue, because they were careful to leave bulk stone for the rear haunches, rear paws, and tail. Also, the body is very close to 100 cubits in length which suggests that this length was well planned.

It is interesting to speculate that the 4th Dynasty Egyptians may not yet have worked out the canon of proportions between the royal head with the *nemes*

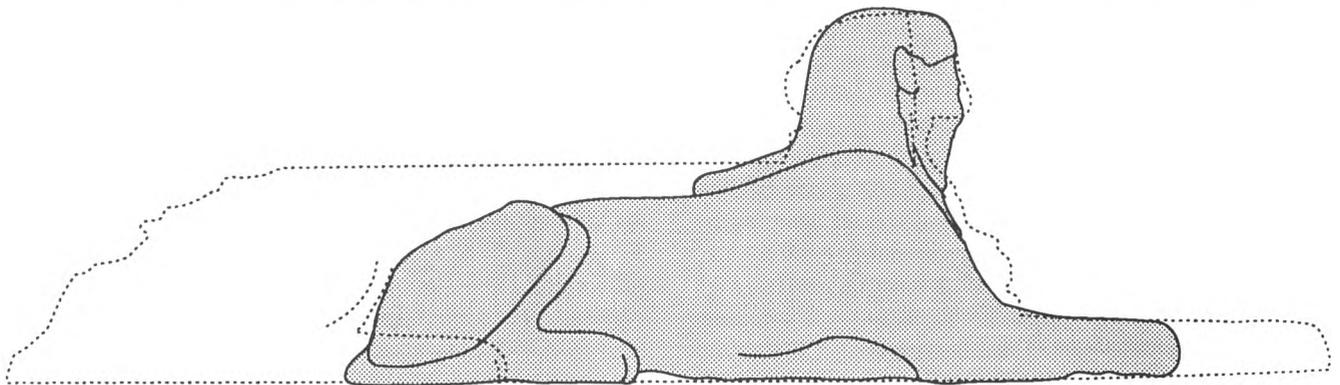


Figure 4. 'Classic' Egyptian Sphinx (shaded) with profile of Giza Sphinx superimposed.

headdress on the lion body. The Giza Sphinx might be seen as a prototype of this form. Except for the Louvre head of Djedefre (Chassinat 1921-22, 59-60, pls.8-9), no *nemes*-coiffed sphinxes earlier than the Great Sphinx of Giza are known (Zivie 1984, 1138). The Louvre head of Djedefre is thought to have been part of a Sphinx because of the very slight outward turn to the rear base of the *nemes* (Smith 1949, pl. 11a). The hypothetical lion body is missing, so we do not know its proportions. Whether or not the Giza Sphinx is a prototype, the disparity between body and head is due to the length of the lion body, which is too long for sphinx or lion. That this results from the lack of a satisfactory canon must therefore be doubted; the Egyptians had been carving smaller scale lions in the round since the 1st Dynasty, and in relief since the Predynastic (Schweitzer 1949, Taf. III-IV), and some of these are reasonably accurate in their proportions.

Geological constraints may account for the head-body size relationship of the Sphinx. If the body were the 'normal' four heads in length, the back of the rump would have fallen about where the Sphinx's waist is situated (Fig. 4). It is just here that there is the most serious flaw in the bedrock, the major fissure that cuts through all layers and opens to more than 2 m wide at the top of the back. The Egyptians may have wanted to extend the body by one head length in order to bypass this flaw, which otherwise would have disturbed the outer contours of the sculpture. As for the thickness of the head in relation to the height of the body, although here the Sphinx builders were closer to the proportions of later sphinxes, they may have reduced slightly the thickness of the head to keep it within the harder upper layers of Member III. This harder material allowed them to carve the fine detail in the natural rock in the only part of the statue where this was necessary; the lion body was more massive and did not require the same fine detail.

It is very possible that the craftsmen used separate grids to carve the Sphinx body and head. There appear to be separate grids for head and body on an elevation of a sphinx that has come down to us in tattered condition from the Graeco-Roman era (Schäfer 1986, 329, fig. 325; 1923, 141, Abb. II). On the other hand, a cubit grid laid over the front elevation suggests a high degree of harmony between the Sphinx head and body. We must remember, in this regard, that it was just this front view that was most important for the cult which the Egyptians created in the temple on the terrace below the statue. In the 4th Dynasty, the walls of the Khafre causeway would have made the common tourist view of today - from the south-south-east - impossible. The body of the Sphinx would have been

partially obscured from the west and north because the Sphinx is resting within a rock-cut sanctuary.

### Nemes, Head and Face

The finished surfaces preserved on the head of the Sphinx are original 4th Dynasty sculpture; they are not a New Kingdom recarving.

It is not surprising that the attempt to reconstruct the original form of the Sphinx *nemes* by projecting the front views of New Kingdom sphinxes, like those of Thutmose III, Hatshepsut, or the alabaster sphinx from Metrihina (Anthes 1965, 42-3, pls. 54-5), onto the scale drawing of the Giza Sphinx, proved frustrating.

A much better match was achieved by projecting a nearly straight-on view of the Khafre diorite statue (Saleh *et al.* 1987, no. 31) on to the front elevation of the Sphinx. It was immediately clear that the two statues have different proportions between their headdresses and faces. As was shown when the outlines of the scarves were matched, the Khafre face is smaller in relation to its *nemes* than is the Sphinx face in relation to its *nemes*. In spite of this, the outline of the flaring side folds, the *Seitenflügel* (Evers 1929 II, 7), of the two statues matched very well.

The inverse of the head-*nemes* relationship between the Khafre statue and Sphinx is, of course, that when the facial features of the two statues are matched for size, their corresponding *nemes* outlines do not match. This relationship may have something to do with the colossal size of the Sphinx, and with the fact that the sculptors increased the face-*nemes* ratio to make the head more proportionate to the massive lion body. As discussed above, however, the head and *nemes* together could have been significantly larger to achieve the proportions of most other sphinxes.

The comparison of Khafre and the Sphinx highlights other characteristics of the Sphinx. The eyes, nose, mouth, chin, and headband of the two statues match fairly well, but only by turning the Khafre statue off its vertical axis. This is because the Sphinx's left eye is higher than the right, and the mouth is slightly off centre. The axes of the Sphinx's facial features and that of its head (ear to ear) do not quite match.

In the reconstruction drawing that resulted from this exercise (Fig. 5), I adhered to the facial features still preserved on the Sphinx (Figs. 6 & 7), and completed the missing parts with those of Khafre. I did not take these from the diorite statue, but from the alabaster face in the Boston Museum of Fine Arts (MFA 21.351: Smith 1949, pl. 12). The match of the eyes, eyebrows, headband and mouth on this piece with the traces of the same features on the Sphinx, when the widths and

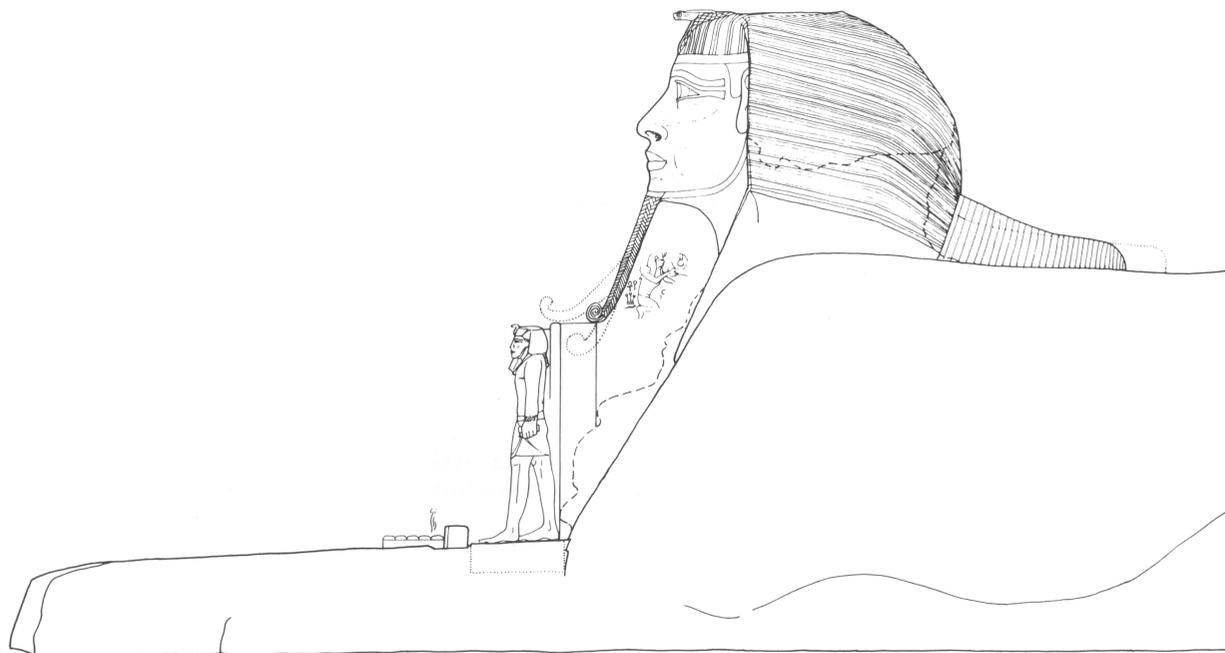


Figure 5. Reconstructed profile of the Sphinx.

heights of the two faces were equal, was better than the match with the face of the Khafre diorite statue. The nose is of particular interest, since this is entirely missing on the Sphinx. The right wing of the nose that seems to be indicated on the photogrammetric elevation of the Sphinx (Fig. 6) is substantially lower on the face than the nose wings on the alabaster face, but I am not sure that the right nose wing is actually preserved and correctly rendered in the former view. The rims around the eyes in the alabaster face were also added to the Sphinx reconstruction. These rims are missing on the Sphinx's eyes, yet a scanty trace of the lower rim of the Sphinx's right eye indicates that the lids were once modelled in this way.

Variability between the 18th Dynasty sphinxes, the Khafre statues and the Giza Sphinx was also apparent in constructing the side view of the Sphinx's former appearance. In this case a good eye-level side view of the Khafre diorite statue was used (cf. Smith 1949, pl. 5; Russman & Finn 1989, 22), but the head in the corresponding north view of the Sphinx is a little shy of a true profile. From the north side of the sanctuary, the Sphinx head was slightly beyond the range of correction for the photogrammetric system. On the south side, the camera could be stationed on the much higher Khafre causeway, and the perspective distortion could be corrected, so that the south elevation presents a truer profile. The profile of the top of the head is completed in the north elevation on the basis of the south elevation. The facial features are, unfortunately, slightly distorted; but the discrepancy

is slight.

It is of particular interest to know how the bands of the *nemes* came together in the characteristic tail at the back of the head. The *nemes* tail is missing completely and there is no way of knowing which of the various possible forms it took (Evers 1929, II, 10, no. 48). An added puzzle concerning the tail of the Sphinx *nemes* is that the relief-carved pleating appears to be headed toward a knot that would have been 2.5 to 3 m above the top of the back (Lehner 1980, 19); yet in other sphinxes, the tail of the *nemes* lies along the spine of the back. At the same time it seems unlikely that 2 to 3 m of natural rock are missing from the top of the back behind the head. The top of the back could have been built up with masonry, but the visible break at the back of the head makes it likely that the tail of the *nemes* was at least partly cut from the natural rock.

In this part of the analysis, the Thutmose III sphinx was projected so that the profile of the back of its *nemes* matched that of the Giza Sphinx, even though this brought all other head features out of alignment with the Giza Sphinx. This showed that the bands of the *nemes* at the back of the head could have dropped, with a slight bend, 2.5 m to a tail lying on or close to the natural rock surface of the back. The pleating in the reconstructed side elevation holds true to the patches of pleating still preserved on the head. In order to make the bend of the pleats less severe as they fall toward the rear, the reconstruction adopted a rather thick (2.20 m) *nemes* tail so that the pleats would not have to drop so far. The *nemes* of the Thutmose III

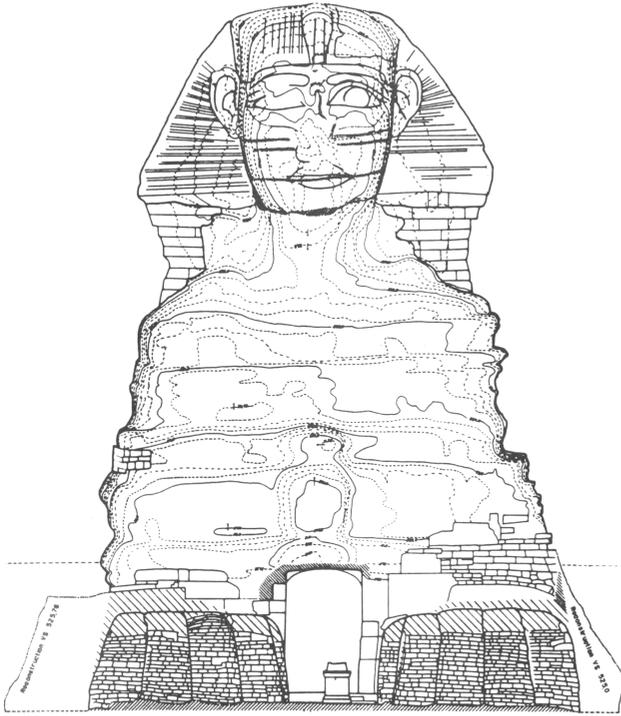


Figure 6. Front elevation of the Sphinx from photogrammetric survey.

sphinx has a tail that is proportionately thinner and longer.

This exercise raised another problem concerning the fold of the *nemes* side panels (*Seitenflügel*) to the breast lappets (*Brustlappen*) and how this fold is drawn back from the outer corners of the *nemes*, over the Sphinx's shoulder, to the tail of the *nemes*. The position of the fold in the Sphinx reconstruction is unalterable, since part of the fold is preserved on the south side. The fold is marked in the front view by the horizontal line from the outer corner of the *nemes* to the neck (Fig. 6). Because the fold is so high with respect to the low level of the back of the head, a considerable gap is left where the fold passes over the Sphinx's shoulder. There is a gap here on any sphinx, but it is less so on those of the 18th Dynasty because the shoulders are drawn up under the fold, higher than the sloping back on which the *nemes* tail rests. The back of the Giza Sphinx, as noted, is flat from the shoulders to the back, leaving the gap with the fold of the *nemes*.

This is one of several observations that cause one to wonder if the 4th Dynasty Egyptians had not already intended to encase the rough form of the lion body with masonry that would have filled in, for example, the heights of the shoulders.

The top of the Sphinx head is fairly flat and horizontal, whereas that of the Thutmose III sphinx, as seen in profile, is much higher and rounder. This



Figure 7. Reconstructed front elevation of the Sphinx.

difference was also obvious when a straight eye-level photograph of the relief-carved depiction of the Sphinx from the Thutmose IV Stela in the Sphinx chapel was projected onto the north elevation of the actual Sphinx. Given the extreme difference in scale, it was quite surprising that the small relief-carved sphinx, when blown up and superimposed, provided the best match with the principal features of the head of the Giza Sphinx. The nose, mouth, chin, headband, lower jaw, neck line, and back of the *nemes* all matched in the superimposition. The major difference in the basic lines is that the top of the *nemes* shown on the stela relief is much higher and more rounded than the Sphinx it depicts. The baseline of the stela sphinx is also much higher, which is to say its body is not as tall.

The flat-topped Sphinx head has perhaps its best parallel in the small 4th Dynasty seated royal statues from Metrihina (Cairo *Catalogue Générale* (CG) 38 and 39) attributed to Menkaure, and especially CG 41, attributed to Khafre (Borchardt 1911, 37-9, Bl. 10-11; Johnson 1990, 87, no. 344; 89, no. 36).

The nose in the reconstruction was drawn from the profile of the Khafre diorite statue. As with the front view, the match of facial features was achieved by superimposing the Khafre side view on the Sphinx side view. In order to achieve the match, however, the Khafre statue had to be tilted back about 3.5° from its vertical axis. This may indicate that the head of the

Giza Sphinx, like the heads of sphinxes of the New Kingdom (Lindblad 1984, no. 5, 23-4, pl. 10; no. 7, 37-8, pl. 20), is tilted slightly upwards. On the other hand, this tilt in order to match facial features left the Khafre ear behind and below the ear of the Sphinx.

The length of the Khafre *nemes* is substantially less toward the back of the head than the Sphinx *nemes*. The line of the Khafre *nemes* is slightly extended in Fig. 9; in actuality, the lower part is obscured by the Horus falcon.

Finally, the breast lappets on the Khafre diorite statue were not long enough for the height of the Sphinx chest, even when the respective *nemes* were matched. It is reasonable to expect that the lappets would have hung slightly lower than the beard, on the evidence of other *nemes*-coiffed statues, and of the Metrihina alabaster sphinx, which also sports a divine beard.

### Uraeus

The lower part of the *uraeus* survives, carved in relief on the forehead of the Sphinx. In the side view of the Sphinx reconstruction I have placed the head of the *uraeus* that Caviglia found in 1817 so that it projects straight forward from the break at the top of the forehead. There are chisel marks on the forehead break that are similar to some chisel marks on the bottom of the *uraeus* head. Nevertheless, the unfinished parts of the *uraeus* head do not match neatly the rough break at the top of the forehead. The back of the *uraeus* head is a sheer cut, almost square with the axis of the body. The entire underside of the head is rough and pocketed, and does not look like a break from the natural rock. It is more similar to pocketing on surfaces intended to take mortar to hold the piece in place.

Careful observation and analysis of the stone of the *uraeus* head would clarify whether this is the same rock as the Sphinx head, or a piece that was separate and added. I suspect that the latter is the case. The fact that the back of the Sphinx *uraeus* is broken and the underside is worked indicates that both surfaces were at one time joined in some way to the Sphinx head. Before it was broken, the top of the *uraeus* hood may have flared outward from the forehead, so that the head of the *uraeus* could lie on top of the hood and its connection to the forehead. The *uraeus* on the Amenemhet III head from Hawara (Lange 1954, pls. 40-41) is an excellent example of this configuration. Evers (1929, II, 25, no. 161) cites the graywacke Thutmose III statue as an example of a similar arrangement (Legrain 1906, no. 42053, pl. 30). The pronounced cranium and thick neck of the *uraeus* head on the Thutmose III statue closely resemble the same

features on the Sphinx *uraeus* head. The eyes of the Thutmose III *uraeus*, however, are rendered by recesses instead of the wide raised circles of the Sphinx *uraeus* eyes. The back of the neck of the Thutmose *uraeus* attaches to the vertical surface of the White Crown. It is possible that, if the Sphinx *uraeus* is an addition of the New Kingdom, it attached similarly to a crown that was fitted by means of the hole in the top of the Sphinx head (Fig. 1). Many of the New Kingdom stelae found on the site show the Sphinx wearing a crown above the *nemes*. Since major features of the Sphinx differ in these sources, however, they are not reliable guides to the kind of crown, if indeed it existed (Zivie 1976, 309, n.2).

In summary, the *uraeus* head probably did not attach in the manner illustrated in Fig. 7. Rather than being simply stuck onto the forehead, the cobra head probably lay higher and farther back on the hood of the *uraeus*, which flared slightly forward. Until further analysis of the *uraeus* head in the British Museum, the evidence favours the conclusion that, like the outer skin of the lion body, the cobra head was an 18th Dynasty reconstruction of a 4th Dynasty bedrock carving.

### Beard

The fragments of a long, braided and curled divine beard that Caviglia found at the base of the Sphinx's chest were central to Ricke's (1970) argument that the Sphinx was conceived as an image of the sun god, as opposed to the king, already in the 4th Dynasty. He argued that the pieces of the beard are of the same limestone as the natural rock of the Sphinx body. There is no evidence, he maintained, that it had been replaced. None of the pieces shows traces of joins. Furthermore, it would have been technically impossible to construct a beard five to six metres long from masonry.

Several of the beard fragments (A-B, E-F) are on display in the Cairo Museum, though the top part of fragment A with the relief of the kneeling pharaoh is missing (Fig. 8). Piece C is also missing, while D is in the British Museum (EA 58) and a cast is in Cairo.

Scale drawings at 1:20 were made from measurements and photographs of the fragments in the Cairo Museum. It is clear that fragments A, B and E have been worked on their two broad faces, the front with the relief-carved pattern of braiding, and the back in a rough texture that suggests it was meant to be mortared. These pieces are thin plates, less than 30 cm thick. At the same time the stone of all the beard fragments is similar to the natural rock layers in the neck and upper chest of the Sphinx, although this

point should be confirmed by more careful geological observation. Pending this confirmation, we can only conclude that the divine beard is original to the 4th Dynasty sculpting of the Sphinx, that it broke into large pieces at some time, and that these pieces were later reassembled by recutting the rear faces of some of them and mortaring them into place.

Saleh (1983) studied the beard fragments and attempted a graphic reconstruction on the basis of the photogrammetric profiles produced by the ARCE Sphinx Project. I have compared our measurements to Saleh's and I have also followed Saleh in attempting to fit the fragments back into their original position in the beard. Saleh's reconstruction was inspired by the change in the dimensions of the rectangular braids, which become thinner from top to bottom. My own attempt rests on the thickness of the side of the beard (minus the bridging plate), the angle of slope, and the most likely proportion of beard length to that of the face.

If a long divine beard is original to the Sphinx, and carved from the natural rock, it is odd that there is no trace of its attachment by means of a bridge to the chest. The contours of the chest are fairly flat from the

neck to about halfway down the chest (Figs. 5 & 8). In fact, the upper chest is almost concave between subtle protrusions to either side, which could be vestiges of the breast lappets of the *nemes* headdress. At the bottom of the chest, on the other hand, there is a very prominent boss. This lies exactly in line with and slightly forward from the chin of the Sphinx. Whether or not the 4th Dynasty sculptors succeeded in carving the rather thin divine beard and its even thinner bridging plate from the natural rock, the chest boss only makes sense as a base for a masonry support for the beard.

The angle of the beard was established by extrapolating the slope of the face from the cheekbone to the chin. Its length was estimated on the admittedly somewhat arbitrary basis of the ratio of beard length to head height on the Metrihina Sphinx, the only other good example of a sphinx with a divine beard. This measurement was taken from a front-view slide photograph of the Metrihina sphinx in which there was some perspective distortion, although the view was distant enough that the distortion was not too great. As a check, I made the same measurements on the photograph of the same sphinx in Lange & Hirmer

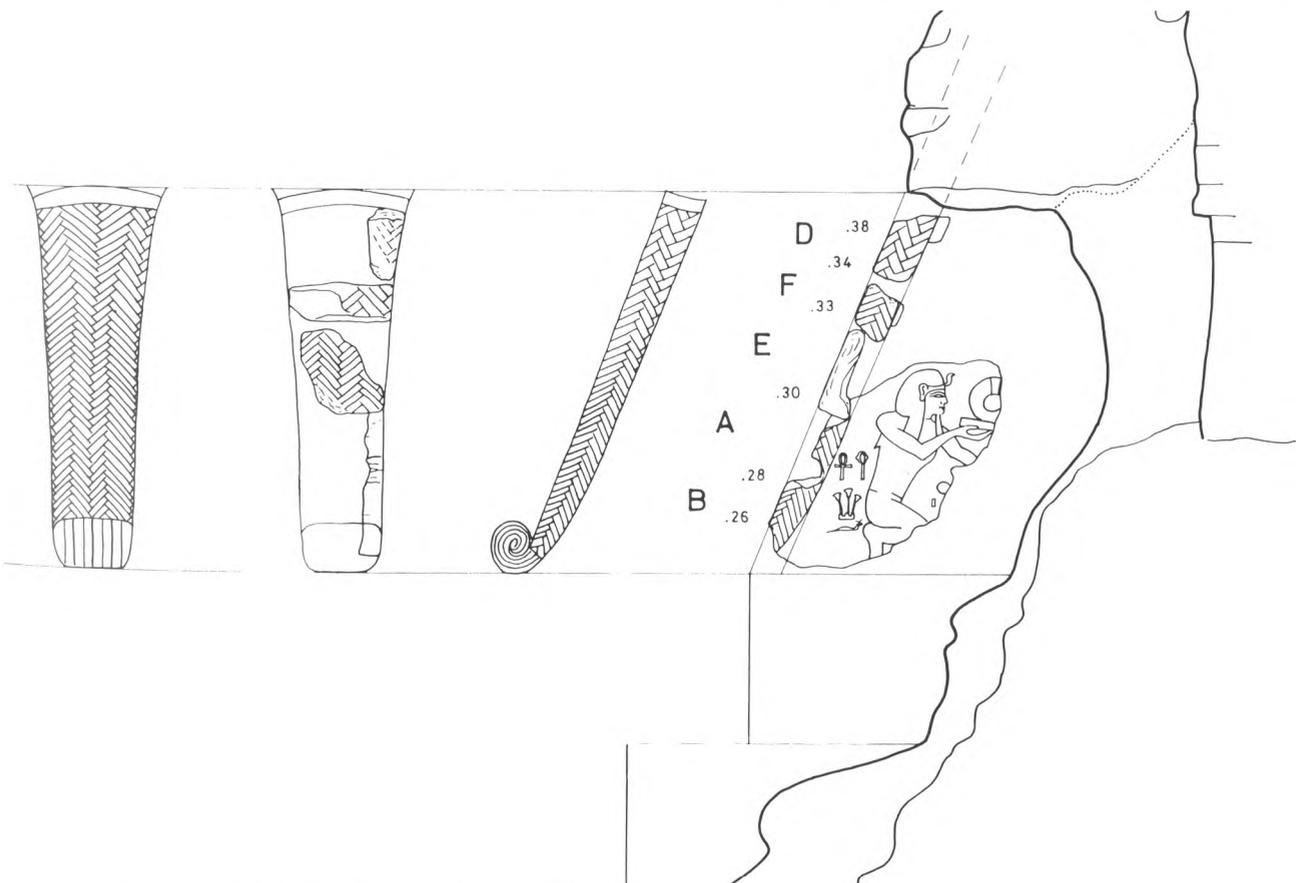


Figure 8. Fragments of Sphinx's beard and suggested reconstruction.

(1975, pl. 122). The span of the beard was 0.68 of the head in both photographs. I took this as the vertical (as opposed to sloping) length of the beard.

The bottom of the beard would then be about 2.5 m above the top of the boss on the chest (and about 2.5 m forward from the surface of the upper chest and neck). It is unlikely to have extended down so far as to rest on the top of the boss because, for one thing, this would have made the beard almost vertical. Instead, there must have been a masonry support built around and on top of the boss. The end of the beard in this analysis is directly above the top of the boss (Fig. 8). Ricke (1970, fold-out) came up with a similar, albeit more sketchy, reconstruction of the beard in which it was 3 m above the top of the boss for a length that is 0.55 the span of the Sphinx head.

The next task was to place the fragments within the span established for the beard (Fig. 8). I did so on the basis of the diminishing thickness of the relief-rendered side of the beard. This measure decreases from 0.38 m (fragment D) to 0.26 m (bottom of fragment A-B). As Saleh noted, A-B is close to, or part of, the bottom of the beard where it begins to curve outwards to make the end loop. The relative positions of the pieces are also indicated by the thickness and lengths of the braids, which, according to our notes, decrease from 10 cm in D to 4.4 cm at the bottom of A-B. The relative placement of the fragments agrees with Saleh's (1983, fig. 3), although he did not place D. There appears to have been a single weave along the sides and, judging from fragment E, three vertical lines of weave down the front.

Again, the strongest argument that the divine beard is original to the Sphinx is the similarity of the stone of the fragments to the natural rock of the Sphinx chest. In fact, E and A-B are in just the right positions in the reconstruction for bed 7a, the operculinid limestone that they resemble, while F is situated at the height of the softer layer with salient yellow lines that actually appear in F. Nevertheless, this match should be checked by a geologist, for it is strange that hardly a trace of the beard or its bridge is left on the upper chest and neck of the Sphinx.

Sphinxes with divine beards are not common, and divine beards on statues are unknown in the Old Kingdom, although they occur on gods in reliefs from the 5th Dynasty (Lehner 1990, 380).

### Chest Statue

The preceding discussion of the beard failed to mention the distinctive relief that was carved on both sides of the bridge plate, as it is depicted on fragments A-B,

and, from the opposite side, on fragment C. A kneeling pharaoh wearing the *nemes* lifts the broad collar, *wsh* (Fig. 8). The two vertical lines that Salt drew at the top of the loop must represent the break between the two ends of the collar. Such a presentation is well known from the New Kingdom (e.g. Calverly *et al.* 1933, pl. 13 and *passim*; Feucht 1977a, 732). The collar is sometimes, as here, shown in plan on a presentation platter that is shown in elevation (Brovarski 1982, fig. 1, & n. 10 for refs). Hence, in its abbreviated form, it appears similar to the *sn* hieroglyph. The broad collar could be ascribed to various deities; here, perhaps it is the *wsh* of Horus (Feucht 1977b, 934). When the relief was in place, the pharaoh was just below the Sphinx's chin, lifting the broad collar up towards the huge visage of the god.

Below the pharaoh's arms is a broken sign group that probably read *zp 4 (?)*, i.e. 'repeated 4 times'. Behind the pharaoh a group reads *nh z3 h3.f*, 'life and protection around and behind him'. Ricke (1970, 33), who wanted the beard to be original to the Old Kingdom, had to concur that the relief and inscription on its side plate, on stylistic grounds, date to the New Kingdom.

The preposition *h3* is derived from a noun, 'back of the head' and is translated 'behind', and 'around'. Gardiner (1969, 130) notes that *sh3* is "'protection around" a person, where there may be a sense of enveloping from behind, as with wings, etc.' The Khafre diorite statue is an explicit reification of the concept; the Horus falcon, god of kingship, envelops the back of Khafre's head with its wings. This signifies a merging of identities between god and king. The motif is known elsewhere in the Old Kingdom: the fragmentary alabaster head in Boston (Smith 1949, pl. 5a), the small limestone figure of Reneferet from Abusir (Saleh *et al.* 1987, no. 38), the Brooklyn alabaster statuette of Pepi I (Smith & Simpson 1981, 144), and, from the New Kingdom, the small diorite statuette of Thutmose III wearing the Red Crown with the falcon's enfolding wings behind.

In the New Kingdom, beginning in the early 18th Dynasty, the same concept was expressed in large statues of a divine animal, with long outstretched body, and a small figure of the king tucked against the chest and under the chin (Scharff 1949, 312-19; Rössler-Köhler 1978, 123-5). The best known of these is the statue of the cow goddess, Hathor, protecting Amenhotep II (Lange & Hirmer 1975, 89, pls. 146-7), or the king between the forepaws and under the chin of the sacred ram (Scharf 1949, 314, no. 4 for examples). Scharf sees the motif as a hallmark of the 18th Dynasty, in which the king is linked with, but subordinate to, the deity who is represented on a much larger scale.

He points out that in comparison with the known Old Kingdom examples where the king is larger than the god, in the New Kingdom it is the god who looms above the king.

We might interpret the Sphinx beard inscription to mean that the Sphinx is the protector and ask, 'around and behind whom?' Certainly in the New Kingdom, when the pharaoh was in the chapel between its long outstretched paws, the Sphinx that towered above was 'protecting around and behind him'. The architectural configuration of the chapel and the base of the Sphinx chest make it eminently possible that the concept was made dramatically more explicit by the erection of a royal statue above the chapel and below the Sphinx's divine beard.

It is a persistent idea that there once was a royal statue at the base of the Sphinx's chest, like the figures of the king below the chins of the ram-headed sphinxes of Karnak. Hölscher (1912, 18) suggested that the boss on the chest is a badly weathered figure, but thought it could have been carved later than the 4th Dynasty. Evers (1929, II, 86, no. 584) suggested that it was a figure of a god that stood at the chest of the Giza Sphinx. Schweitzer (1948, 35) also took the boss as a weathered figure, probably of a New Kingdom pharaoh, and suggested that it might be Amenhotep II. Ricke suggested that the vertical stack of stones against the chest of the Sphinx, alongside the boss, in Salt's drawings might have been the remains of a *naos* to protect the statue (Ricke 1970, 34).

Six, possibly seven, of the New Kingdom 'private stelae' show a royal statue at the chest of the Sphinx. Zivie's NE5 could date as early as Thutmose III, although it is more likely, as she points out, that the cartouche on this stela encloses the name of Thutmose IV and not Thutmose III. Three of the stelae, NE8-10, date to the reign of Amenhotep II, the pharaoh who preceded Thutmose IV. Hassan (1953, 84-8, figs. 67-9) designated these A, B, and C. They belong to princes; that of stela C names the prince as Amenemipet, whom Hassan thought must be the owner of the other two as well. Bryan argued (1980, 81-96) that the owner of A and B is Webensenu, who must have been an older brother or half-brother of Thutmose IV, and who, like him, was a Chief Master of Horses. The stelae have received a great deal of comment because the names and other inscriptions were intentionally erased on A and B.

We are completely dependent on the poorly reproduced photographs in Hassan's publication for details of these stelae, since they have not been located in the Cairo Museum or in the Giza storerooms (Zivie 1976, 94). On stela A the statue of the king wears the

blue crown. His arms hang down at his sides, possibly palm down. He wears the triangular skirt associated with the royal *Gebetshaltung* (Evers 1929, II, 40, no. 283-4; Lange & Hirmer 1975, 73, no. 107). That the figure is meant to be a statue and not the king in person is indicated by a low socle on which the figure stands. Above the figure an inscription gives the name and titulary of Amenhotep II. The figure and accompanying inscription are incised much more lightly than the rest of the relief.

The statue between the forepaws of the Sphinx is once again shown on a socle on stela B, wearing the triangular skirt, with arms hanging straight. An inscription above the statue once again identifies it as Amenhotep II (Zivie 1976, 97). The difference is that the statue wears the *nemes* rather than the blue crown.

Stela B differs from most of the stelae depicting the Sphinx; here the Sphinx faces left, instead of right. Most of the stelae are rendered as though, in the actual topography of the Giza Sphinx, the observer is south of the Sphinx looking north. It may be that in the New Kingdom, when the walls of the Khafre causeway were dismantled, the causeway embankment provided a good platform for visitors to view the Sphinx from the south-southeast. But many of the stelae were set in the mudbrick wall that ran along the north side of the Sphinx sanctuary, so another reason for the orientation of the Sphinx to the right may be that in the north wall, the sphinx on the stela faced east in the same direction as the Sphinx itself.

Of the six stelae that show with some certainty a statue in front of the Sphinx, the statue wears the *nemes* on four, the head is not preserved on one, and it wears the blue crown on one (Stela C), as it does in the possible seventh depiction of a statue. These differences, and other details such as the beard and crown of the Sphinx, or the fact that most of the votive stelae that render the Sphinx do not show the statue, make these sources unreliable records of the actual appearance of the monument. The depictions could simply be indicating the idea that the Sphinx is the protector of the king (Zivie 1976, 309, n. 3). On the other hand, the earliest of these documents, the stelae of the princes of Amenhotep II, make it quite explicit that the figure is a statue and not the king himself, and two of the three stelae carefully label the statue as Amenhotep II. Zivie noted that there could have been a statue of Amenhotep II against the chest of the Sphinx that was replaced by the great granite stela of Thutmose IV.

In fact there was no need for the Thutmose IV Stela to replace a royal statue at the chest of the Sphinx. The position of the granite stela actually indicates that

there was already a statue at the Sphinx's chest when Thutmose dragged one of Khafre's granite lintels down from the Pyramid Temple and into the area between the forepaws to serve as his stela. The stela does not rest against the chest of the Sphinx, but against a three-tiered stack of massive limestone blocks 2.36 m out in front of the chest. This leaves ample room for the base of a royal statue to stand before the boss on the chest. A gap in the massive masonry behind the stela might have been filled with smaller packing blocks and mortar to complete the platform for the statue.

It follows from this that the stack of masonry standing against the chest in Salt's sketches of Caviglia's excavation is not the remains of a *naos* to protect the statue, as Rieke thought, but the remains of masonry that attached the statue to the chest. A small patch of just this masonry still exists. The gap in the masonry at the centre of the chest is where the support masonry behind the statue was taken away, probably when the statue was removed. One block at the south side of the gap retains a portion of the original finished surface of the first phase casing of the chest.

This first phase of the Sphinx casing is contemporary or close in time to the Thutmose IV Stela (Lehner 1990). The missing royal statue must therefore be a part of the same restitution of the Sphinx as a cult object with a royal chapel in the 18th Dynasty.

In order not to be lost between the large size of the stela and the immensity of the Sphinx, a statue that stood on the platform behind the Thutmose IV Stela must have been more than 5 m tall. A height of around 7.8 m would be required to bring the top of the statue to the underside of the divine beard, as reconstructed in Fig. 8.

Several of the surviving photographs of the Baraize excavation show a large limestone double crown and the front part of a limestone head sitting beside the south forepaw of the Sphinx. Could these be part of the statue which stood in front of the Sphinx's chest? Baraize moved these pieces to the base of the Khafre causeway in the southeast corner of the Sphinx floor, where they remained through the time of my work at the Sphinx. Both pieces appear to have weathered substantially since the 1926 photographs. The double crown is about 0.96 m long and 0.83 m wide. I attempted to restore graphically the original dimensions by matching the double crown from the Ramses II figure on the facade of the Small Temple at Abu Simbel to the double crown fragment from the Sphinx. The comparison was made on the basis of the photogrammetric scale rendering of the temple facade (Desroches-Noblecourt & Kuentz 1968, pl. XI). It appears that part of the base of the crown of Lower

Egypt, as well as the top of the crown of Upper Egypt, are missing from the piece found at the Sphinx. With these restored, the crown is about 1.6 m tall.

The size of a statue that corresponds to a double crown about 1 m long and 1.6 m high can be found by comparison with other statues wearing the same crown. From the top of the crown to the feet, a standing royal statue proportionate to the double crown found at the Sphinx would have been about 7.5 m tall. With a socle 0.3 m to 0.4 m thick resting upon the third course of blocks behind the Thutmose IV Stela, the top of the statue would have been just under and in front of the bottom of the divine beard as reconstructed in Figure 9.

Against the idea that the double crown derives from the statue at the chest of the Sphinx, however, is the fact that the stelae which depict such a statue all show it wearing either the *nemes* or the blue crown. It is also the case that a standing king in the *s3 h3.f* position in front of a *Tiergestalt* god or the Sphinx is unlikely. The double crown and face fragment must derive from another statue that was in close proximity to the Sphinx, and the only other possibility is the Osiride statue that Mariette said he found on the south side of the Sphinx (see below).

In the reconstruction drawings of the 18th Dynasty Sphinx I have rendered the royal statue at the chest wearing the *nemes* scarf (Figs. 7, 9 & 11). In these drawings, the royal statue wears the *shendyt* skirt, whereas it may be more likely that it wore the triangular skirt (Russman, pers.comm.). In one version of the reconstruction (Lehner 1991) the statue has been drawn with the triangular skirt. Amenhotep II wears the triangular skirt on the well-known statue of himself under the protection of the Hathor cow from Deir el-Bahri (Lange & Hirmer 1975, pl. 146). Thutmose IV and Ramses II both wear the triangular skirt on their stelae in the Sphinx chapel (Zivie 1976, pl. 14; Hassan 1953, pl. XL). The reason that these stelae do not show the royal statue at the chest of the Sphinx might be that the figure of the king himself takes its place; i.e. the king impersonated by the statue moves down and turns to offer incense and libations. Without 1.6 m of the statue taken up by the tall double crown, either the actual height of the king's figure must be increased to fill the 7.8 m between the bottom of the beard and the top of the three courses of large blocks behind the Thutmose IV Stela, or the statue remains about the same size but is put on a higher plinth. The latter alternative has been chosen here, and the royal statue has been placed on a plinth about one metre thick, making the statue 6.8 m in height. This brings the feet of the statue almost level with the paws of the Sphinx,

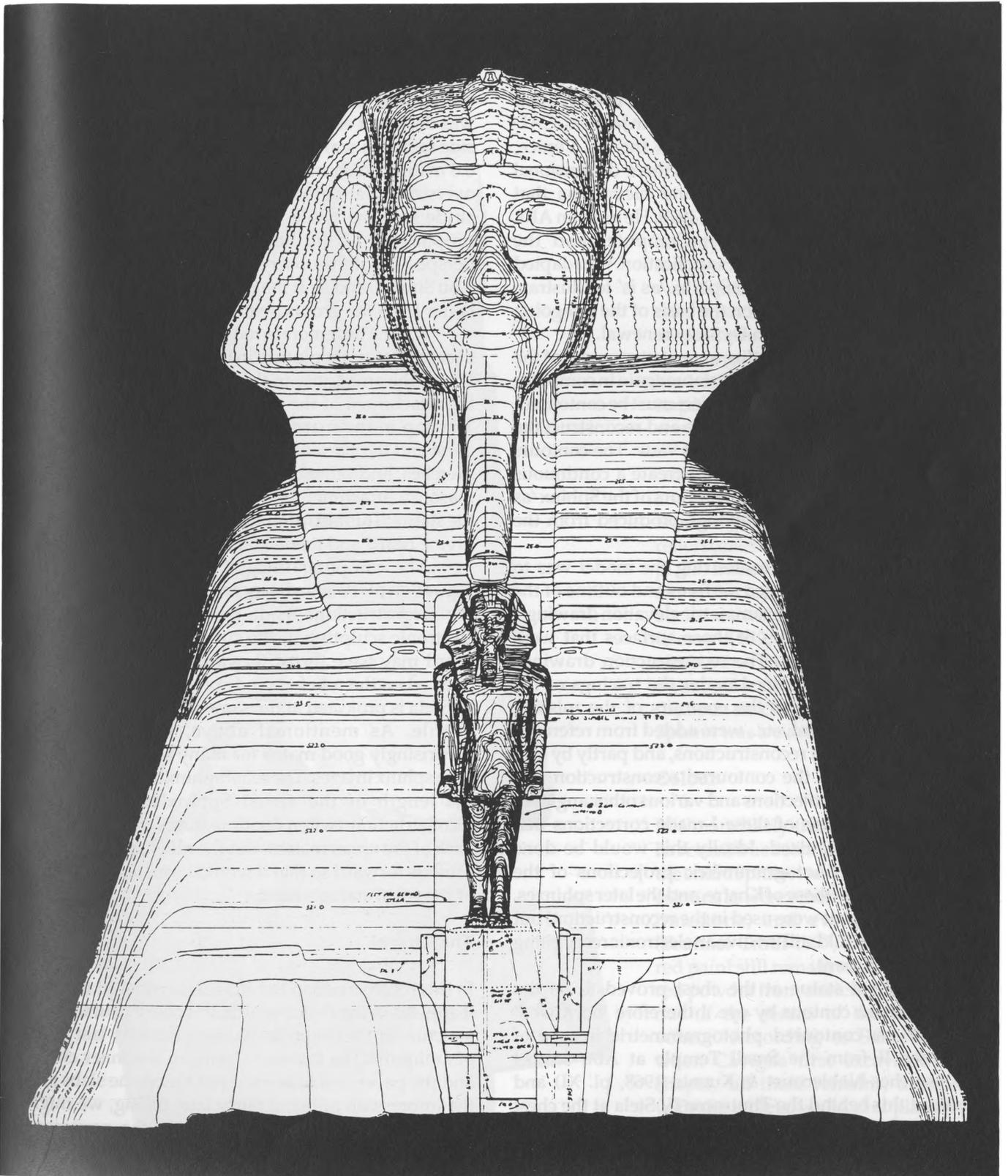


Figure 9. Reconstructed front elevation of the Sphinx showing suggested chest statue.

not unlike some of the New Kingdom depictions on votive stela.

### Computer Reconstruction

In order better to visualize this reconstruction it was modelled with computer graphics. Tom Jagers, CAD Director of the Jerde Partnership Inc. in Venice, California, digitized and produced three-dimensional images of the Sphinx plans and elevations that document the statue as it was in 1979. He used an ARL (Advanced Research Logic) Computer and the AutoCad (release 10) graphics application. We adapted the computer model of the Sphinx 'as is' to illustrate how it may have looked, on the basis of the foregoing discussion, after the 18th Dynasty renewal.

The process of creating a computer model of the Sphinx is akin to sculpting the statue again in computer memory. All features of the subject must be contoured, so that the computer can digitize and reconstruct the image from any selected point of view. The contours are then meshed and shaded to create a continuous surface over the model. The contours of the Sphinx 'as is' were given on the drawings produced from the fieldwork.

The first step in contouring the model was to trace the original sculpted surfaces and outline of the Sphinx from the photogrammetric elevation drawings, excluding the contours of those surfaces that were weathered or broken. The reconstruction drawings (Figs. 5 & 7) were placed under the tracings of the original contours and the contours of the missing features, nose, beard, etc., were added from reference points on the scale reconstructions, and partly by eye. Jagers digitized the contoured reconstruction and sent me profile projections and various other angles of view. On the basis of these I made corrections that were in turn digitized. Ideally this would be done directly from photogrammetric projections of the various statues (those of Khafre, and the later sphinxes, for example, that were used in the reconstruction) but the process would still involve an electronic resculpting of the monument.

A royal statue at the chest proved to be too ambitious to contour by eye. I therefore 'borrowed' one of the contoured photogrammetric images of Ramses II from the Small Temple at Abu Simbel (Desroches-Noblecourt & Kuentz 1968, pl. XI) and placed this behind the Thutmose IV Stela at the chest of the Sphinx so that its contour lines would correspond to our survey grid lines (Fig. 9). For reasons stated above, I chose the figure of the king wearing the *nemes*. The French photogrammetry rendered this at 2 cm

contour intervals.

The diagrams (frontispiece, Figs. 10 & 11) are preliminary images of the computer model of the Sphinx reconstruction. The Ramses statue is rendered with digitized contour intervals of only 20 cm, so much of the detail is missing. It is clear that this statue was designed especially for the massive sloping cliff-side facade, a scale two or three metres larger than its 6.8 m in the reconstruction of the Sphinx. The head is oversized relative to the body, and the figure seems to stride forward while tilting slightly backward. The proportions of the head are compensated by the perspective of the observer at the feet of the statue at Abu Simbel, and so at the Sphinx the proportions look better from the ground view in the chapel.

It must be remembered that the Ramses statue is, in actuality, not sculpture in the round but high relief. Hence the ambiguity in the model at this stage about the attachment of the back of the statue to the chest. The gap in the masonry veneer at the centre of the chest and the stack of stones against the chest in Salt's sketches, and other details, indicate that there was a masonry attachment between the Sphinx chest and the statue. This also offered a broad support for a long divine beard and its much narrower bridging plate.

The computer images indicate that the configuration of the beard may not be right in this stage of the reconstruction. Aside from inaccuracies in the electronic sculpting of the curl, it is evident that the beard may have thrust forward more, in the way it does when the relief-carved sphinx on the Thutmose IV Stela is projected at the same scale over the Sphinx profile. As mentioned above, this produces a surprisingly good match for many salient features of both sphinx images. The relief sphinx's beard is exactly the length of the actual Sphinx's beard in the reconstruction (when facial features, neck line, and back of the *nemes* match). But the relief sphinx's beard projects forward so that it would be just over the back of the royal statue's head.

### The Chapel

In this reconstruction the chapel is rendered much as it appears in the sketches by Salt. This, of course, gives a picture of the chapel as it was at the very last phase of antiquity. The low front walls of the inner chapel and the pavement of brick-sized limestone slabs give the impression of being fairly late, dating, we might guess, to the Roman restoration of the pavement, stairs and viewing platform out in front of the Sphinx (Vyse 1842, 118-19). That the entrance and pavement are not original is also indicated by the runnel in the

bedrock floor that marks an earlier threshold.

The back wall, taken up entirely by the Thutmose IV Stela, and the side walls are original to the 18th Dynasty. Although they held the stelae of Ramses II, the side walls may date to the time of Thutmose IV, judging from the material found in the base of the

south wall. The sides of the forepaws underneath the side walls did not present finished surfaces. Furthermore, the abundant evidence of ancient blue paint from the fill of the side wall very probably relates to the small pieces of Egyptian blue that occur in the interstices of the masonry of large slabs framing the Thutmose IV Stela and reconstructing the south forepaw (Lehner 1990, 289-93).

It is possible that Ramses II simply set his stelae into walls that already existed. On the other hand, it is also possible that whatever surface was painted blue in the 18th Dynasty was repainted in the 19th Dynasty, when Ramses might have renewed the side walls of the chapel and placed his stelae. Salt's sketch gives the impression that the Ramses II stelae were integral parts of the side walls.

It is very likely that the crenellations along the top of the wall are original to the New Kingdom. Models (Jacquet 1958, 164, fig. 1) and relief scenes (Epigraphic Survey 1979, pl. 53) indicate that crenellations ran along the top of other great temple enclosure walls in the New Kingdom (Kemp 1989, 189-90), making the temple the citadel of the god. And so, on a small scale with grandiose intent, the open air chapel at the heart of the Sphinx was a citadel of Horemakhet.

#### Colour

It is more likely than not that during its reconstruction in the 18th Dynasty the entire Sphinx was painted in bright colours, as were other statues in wood, limestone, and even hard stone (Brunner-Traut 1977, 121). Traces of red paint still remain on the face, and red powder from ancient paint pours out of the seams of the masonry veneer. According to Salt's notes, when Caviglia first excavated the chapel, 'all these remains, together with the tablets, walls, and platform of the temple had been ornamented with red paint' (Vyse 1842, 110).

Fragments of blue with a calcite backing have been found, and sherds

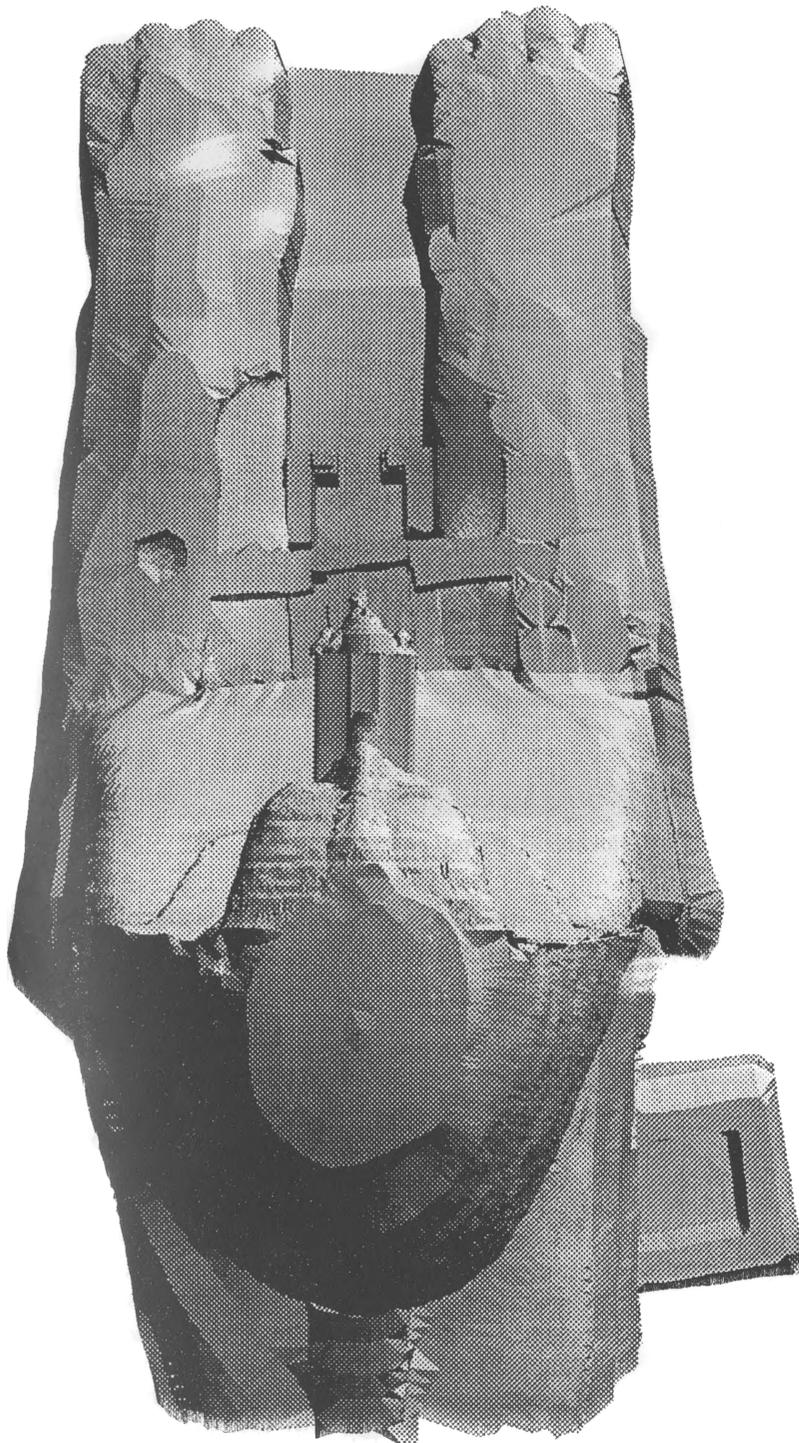


Figure 10. Computer reconstruction of the Sphinx from above.



Figure 11. Computer reconstruction of the Sphinx showing attachment of chest statue.

in the rubble fill of the base of the south chapel wall have Egyptian blue powder adhering to them (Lehner 1990, 289-93). Together with the scatter of Egyptian blue throughout the masonry of the chapel, this indicates that something nearby was painted blue. There are also scanty traces of yellow pigment from the fill of the south chapel wall. According to Johnson (1990, 98), 'traces of painted gesso remain on the surface' of the *uraeus* head, and there is 'red on the eyes and flecks of white and black elsewhere'. Russman (pers.comm.) examined the *uraeus* head in the British Museum and noted that the top is yellow and there are yellow traces along the break at the back.

A probable reason for the remnants of Egyptian blue paint is that the eyebrows and divine beard were painted blue in the 18th Dynasty. The traces of red paint on the beard fragments in the Cairo Museum may result from a later repainting of virtually the entire monument in red. Blue was the traditional

colour for the eyebrows and beards of the gods (Brunner-Traut 1977, 125) and of divine creatures. *The Story of the Shipwrecked Sailor* testifies to this, for the gigantic serpent, Lord of the Island of the Ka, was 'thirty cubits, his beard was over two cubits long. His body was overlaid with gold, his eyebrows were of real lapis lazuli' (Lichtheim 1975, 212). This association of divine facial hair and the colour of lapis lazuli applied to the beard as well, for the beard of a god was said to be of lapis lazuli (Staehelein 1973, 627).

Traces of blue are preserved on the beard of the Hatshepsut granite sphinx in the Metropolitan Museum (MMA 31.3.167). Blue is also preserved in the recessed band of the pleating of the *nemes* on the Hatshepsut sphinx, while traces of yellow remain on the raised bands. The entire tail of the *nemes* was probably blue, as it is on the seated colossus of Hatshepsut (MMA 27.3.163). In similar fashion the renewed Giza Sphinx of the 18th Dynasty was probably

given life by painting the face red, the beard and eyebrows blue, and the *nemes* blue and yellow. It is not impossible that the shoulder mantle and folded wing that are shown on the Sphinx in the stelae from the reign of Amenhotep II (Hassan 1953, 84-5, figs. 67-8) were actually painted on the body of the Sphinx to indicate, as the stelae say, 'Horus Behedite, Lord of the Sky, Great God, variegated of plumage' (Zivie 1976, 94, 96).

### The Masonry Boxes and the 'Statue of Osiris'

It remains to incorporate into this reconstruction of the Sphinx the mysterious masonry boxes attached to the sides of the lion body, found by Mariette in 1858. There are four of these, added to the flanks of the figure by the 18th Dynasty renovators. Together with the boxes we must consider Mariette's reported discovery of the remains of a colossal statue of Osiris that might have stood upon the large southern box.

According to Mariette (1882, 95), the Osiris statue was composed of separate blocks; Laorty-Hadji (1856, 382) adds in his travelogue that the number of blocks was twenty-eight. We have already seen that a large limestone white crown and a face, badly worn, were lying alongside the south forepaw a short distance from the large southern box in photographs of Baraize's excavation. The double crown, when complete, would

have been about 1.6 m tall, proportionate to a statue about 7.5 m tall. As we have seen, this is unlikely to have been the statue at the chest of the Sphinx, but it may well have been the statue to which Mariette made reference. The double crown may be more appropriate for an Osiride royal statue than for an actual statue of the god Osiris. These statues represent the deified king - actually a hypostasis of the king into a divine entity that is practically distinct from the terrestrial sovereign (Leblanc 1982, 304).

Without pieces of the lower part of the statue it is not possible to know the type to which they belonged. Nevertheless, in attempting to reconstruct graphically such a statue upon the large southern box I have, somewhat arbitrarily, chosen a design based upon a small royal Osiride statuette of limestone that Hassan found near the north side of the Sphinx (Hassan 1953, pl. 33a & b). This shows the king mummiform, like Osiris, wearing the double crown and holding an *ankh* sign. In the reconstruction I have placed this Osiride figure upon the large southern box at the scale where it equals 7.5 m in height (Fig. 12). Yet another colossal statue at the side of the Sphinx may seem unusual, but the boxes require some kind of explanation.

It is possible that the large southern box was the base for a *naos* or shrine around the Osiride statue. In order to visualize this I reconstructed a *naos* that rises from the short vertical walls at the top of the box (Fig.

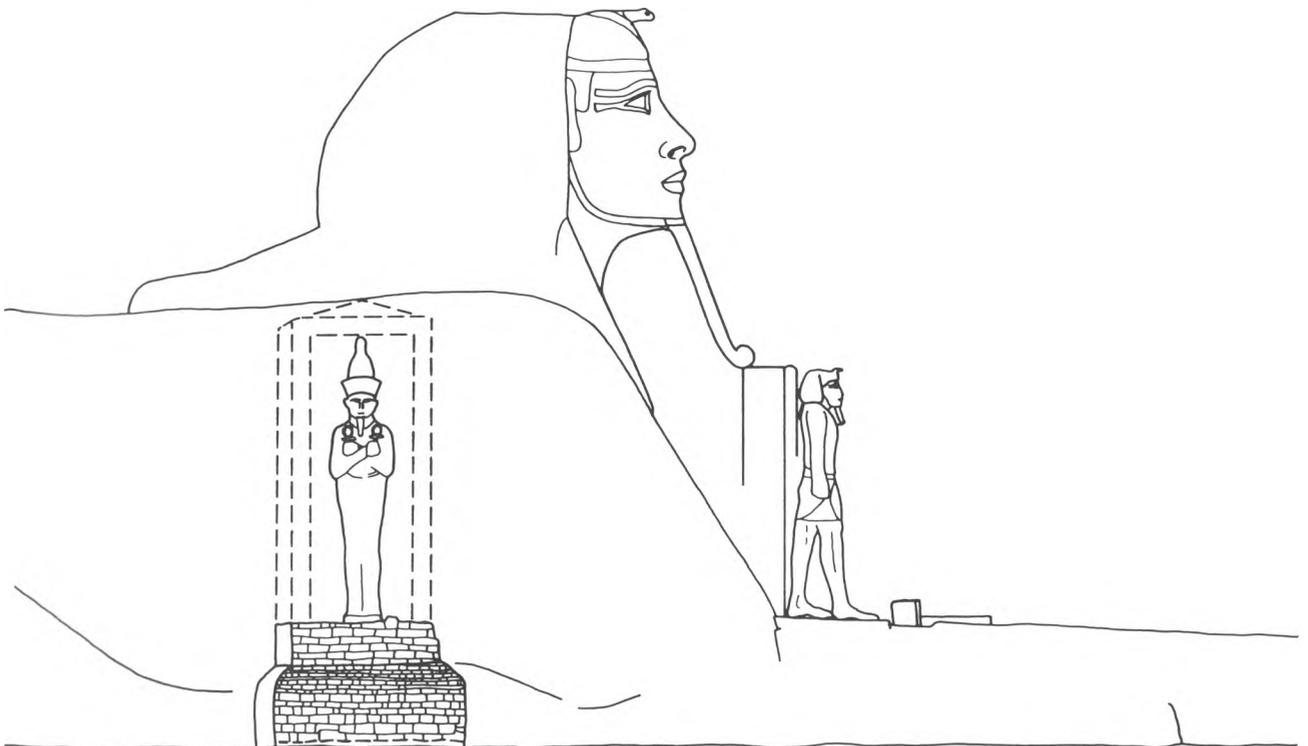


Figure 12. Suggested position of Osiris statue on large southern box.

12). In order to contain the 7.5 m statue, the *naos* would have been about 8.3 m high from the top of the large southern box, and 11.6 m above ground level at the base of the box, with a width of 3.75 m, allowing for walls 0.50 m thick. This would have been an impressive structure in its own right. The many limestone blocks that Baraize found around the base of the box would have told the story of whether the *naos* in fact existed.

The evidence indicates that the masonry boxes, including at least the core of the large southern box, are contemporary with the 18th Dynasty reconstruction of the Sphinx. They may all have been bases for shrines. The smaller boxes would be well suited for smaller square shrines, such as the Abu Simbel *naos* of Ramses II for the sun and moon gods (Roeder 1914, 22-4, Taf. 6, CG70005). A fine limestone *naos* of Thutmose IV dedicated to Horemakhet was found lying opposite the north hindpaw of the Sphinx, which is fairly close to the small northern box (Hassan 1953, 65, fig. 58; Zivie 1976, 156-7, NE32). Its dimensions are 63.8 x 41 x 35 cm, and it has a small niche 19.5 x 14 cm. It would be nice to see this *naos* as the piece that actually sat on the small northern box, but it is rather small for the 1.25 x 1.50 m platform provided by the box.

The suggestion that the boxes are *naos* pedestals implies that the floor around the Sphinx was accessible in the New Kingdom. This is suggested by the findspots of objects like the small Thutmose IV *naos*. The tall body of the Sphinx, and the massive protective walls of Thutmose IV created a kind of alley for circum-ambulating the colossus. Although he does not make the point very explicit, Hassan (1953, 64, pl. 36) indicates that the northern protective mudbrick wall of the Sphinx sanctuary was a common repository for stelae. As one walked around the Sphinx, it must have been a colourful scene with the brightly painted stelae on one side, and the *naoi* on their pedestals against the flank of the Sphinx on the other side.

## Conclusion

The Sphinx appears suddenly without precedent, although the detached Djedefre head in the Louvre (Chassinat 1921-22) suggests that the form had been executed in stone a few years earlier. The Giza Sphinx, therefore, may be a prototype. It is an excellent example of what Kemp (1989) termed *codification*, the ability of ancient Egyptian designers to come up with new combinations of 'formal Egyptian visual culture', particularly in the service of royal propaganda (Simpson 1982).

The sheer size must have conveyed tremendous importance and, like the gigantic serpent in the *Shipwrecked Sailor* (Lichtheim 1975, 211-15),

otherworldliness. The fact that it took the form of a *Mischgestalt* - when the king was first represented on a colossal scale (1:30 for the head, and 1:22 for the lion body) - is also significant. In mixed forms it is the head that conveys the essential identity; covered with the *nemes*, this must be the king. But in its attachment to the lion body 'there is a suggestion of shape-shifting, of metamorphosis, that is appropriate to the king who is, uniquely, the link between mankind and the gods, and stands constantly on the threshold of these two worlds' (Fischer 1987, 14).

The site of the Sphinx was abandoned, probably at the end of the Old Kingdom, and neglected for nearly a millennium. The colossal image was given rebirth, in effect, in the 18th Dynasty, about 125 years after the Egyptians had repulsed the Hyksos rulers from their land, and when they had pushed the boundaries of their empire to their widest extent. The Sphinx probably owes its rebirth, in part, to the re-emergence of nearby Memphis as a second capital of Egypt in the New Kingdom. A new identity for the Sphinx, Horemakhet, was either another royal invention, or it grew by popular tradition. The Sphinx may have been buried to its neck in sand, as the Thutmose IV stela indicates, and it is tempting to speculate that the Egyptians saw it as a colossal head of a king, Horus, buried in the desert, and called it 'Horus-in-the-Horizon'.

The 18th Dynasty excavators found the Sphinx in a seriously deteriorated condition. They set about reconstructing the disfigured lion form. With the royal statue at its chest, the Sphinx was a powerful image for bestowing divine confirmation on princes and newly-ascended kings, and was indeed referred to as the 'Place of Elect' or 'Place of Choosing' (Zivie 1976, 322-4; Stadelmann 1987, 440).

Looking at its role within the entire span of ancient Egyptian history, the Sphinx is as much an 18th Dynasty as a 4th Dynasty monument; it is a kind of composite that, ironically, may only have begun to serve as the subject of a functioning cult 1,200 years after it was created. The 18th Dynasty kings wanted to unite their image with this image so that, like the colossi of their successors, the Sphinx would 'convey to the viewer the impression that the union of king and godhead had created a super deity on earth' (Bell 1985, 271, n.97)

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