

Report on the evolution of funerary architecture from predynastic pit-graves, through the "mastaba tombs" introduced in the Nagada II period, to the pyramid complexes of the Old Kingdom (Using Abusir pyramid complex to describe the significance of its main elements).

The House of Death is for Life, Eternally

Napoleon enthused to the Armee d'Orient "Soldats! Du haute de ces Pyramides, 40 siècles nous contemplent". Bonaparte intimately understood the significance of the structures especially the administration and organization required to make these magnificent tombs possible.

Pyramids are the visible apex of Egyptian burial practices. Our knowledge is considerably more than Napoleon's but we are continuing to enhance our understanding of the environment that made them possible and required. The physical structures are linked inextricably to the people's ideology and their belief that physical life was the preparation for their eternal spiritual life.

Predynastic and early Dynastic

Egypt's funerary architecture can be traced through a progression of improvements, each a distinct enhancement to burial practices. Redford (2001, volume 1, p.61) writes that the history of Egypt's extant burials can be dated to "...the oldest cemetery in the Nile Valley (Gebel Sahaba)" c.12000-9000 BCE of a semi-nomadic tribe; bodies were buried within a shallow pit and in a contracted position. This practice "... continued to be used for the poor throughout Egyptian history" (David, 1988, p.35), although the orientation of bodies differed (see Figure-1).

Established tribes waned, probably because of climatic change, until c.6000 BCE with the origins of settled communities. Climatic change had reduced habitable areas of the Nile valley, bringing communities into contact with each other and into larger conurbations. Early cultures are traced from this period; centered on Faiyum, Merimde, Omari, Moerian, Ma'adi, Badari and Nagada. Our understanding of ancient people's lives is deduced from their funerary practices, especially from Flinders-Petrie discovery of an extensive cemetery at Nagada containing thousands of graves of a settled people.

From the attention given to the dead we can surmise their belief in the afterlife. Edwards (1991, p.20) wrote that this eventually extended into two critical burial beliefs; that the body must be preserved and the material needs, and that of the Ka, must be provided for - these beliefs persisted for the whole of the Egyptian history.

Emery (1991, p.130) summarizes that "designs of the tombs and funerary customs overlapped from one period to another, depending largely on the locality of the burial and the inclination and social status of the individual".

The initial development in burial architecture was the rectangular pit spanned by a wooden roof. The Abusir el-Melek cemetery, as Adams & Ciałowicz (1997, p.19) explained, demonstrate the evolving styles; containing burials including oval graves, rectangle graves and deep pits with sub-divided chambers, mud-plastered or mud-brick lined and with wooden coffins (see Figure-2). Above this was a mound of sand, possibly with a marker,

which didn't protect the burial from being exposed or robbed. The mud-brick mastaba resolved these problems. The mastaba complex, which persisted into the Middle Kingdom, had three elements: an excavated substructure, a mud-brick superstructure and ancillary structures and enclosure walls.

By the 1st Dynasty the substructure was a pit subdivided into chambers, the largest and central chamber housed the body and was covered with a wooden roof after the burial. The mud-brick superstructure was niched (the "palace façade") brightly painted to mimic reed matwork, contained internal magazines and possibly had a vaulted roof (similar to period coffins). The building was surrounded by an enclosure wall and, in some 1st Dynasty royal burials, servants were buried in structures outside the enclosure. The roof and superstructure was built after the burial until Dwen's (Den) reign, when a staircase and portcullis were added - which surfaced beyond the mastabas edge and allowed construction to be completed during the owners lifetime (see Figure-3).

Other less common developments were added; statues within a serdab, false doors, burial of solar boats, the rock-cut chamber replacing pits and an early forerunner of the royal-cult temple (mastaba of Qa'a). During the 2nd Dynasty some mastaba incorporated a smooth exterior and two false-doors. Some tombs extended false-doors into offering rooms, which later evolved into a chamber with decorated panels and stelae.

The 3rd Dynasty lasted less than 100 years and marked the beginning of a "classical era" of monumental royal tombs. Non-royal mastabas continued to develop in complexity, materials employed and size and were often clustered around royal tombs.

At least three step structures were built as royal tombs, although only Djoser's was completed. A number of small, sub 20m, pyramids were constructed close to religious sites (from Seila to Elephantine) possibly for symbolic use. By the end of this period the complex included "standard" structures of a square pyramid, royal-cult complex [David (2002, p.104) defined the modern description for mortuary complex], enclosure walls & subsidiary structures and boat pits.

Djoser's step pyramid, or step mastaba, at Saqqara was built in phases with inward-leaning accretions, attributed to Imhotep, rising in 6 unequal steps to 192 feet and clad in Tura limestone. Most significantly this is the world's first known building to be constructed entirely from stone.

A labyrinth of subterranean corridors, some decorated with blue glazed tiles and stone representations of logs and reeds, stretched nearly 4 miles and contained a huge central shaft. Within the niched temenos (sacred enclosure) were many structures; some were functional, as the north-facing royal-cult complex or the heb-sed court, and others dummy buildings for the pharaoh's afterlife activities.

It also contains a Southern tomb with similar substructure as the pyramid but with a mastaba superstructure - which could have been a cenotaph, canopic repository or a home for Djoser's Ka - this is an early form of a satellite pyramid.

The Old Kingdom

Sneferu can claim two, probably three, distinct and innovative designs; Meidum, probably attributed to Sneferu, is the transition from a step pyramid to a true pyramid. Its eight internal step phases, as Arnold (1991, p.176) explains, was "set in inward-inclined layers" and "surrounded a tower like construction at the center". The final layer was horizontal and provided the final smooth-sided form. It was added after the Bent pyramid was abandoned, possibly because Sneferu's age and the need for a practical tomb (see Figure-4). The burial chamber, which was at ground level, was the first to use corbelling and the

passage was elevated upward and exited on the north face (which allowed new layers to be added without excavating new passageways).

The Bent pyramid was an “unsuccessful” building because of the severe angle of its slope and, most significantly, the poor geology of Dahshur (see Figure-5). It contained key elements of the fully developed pyramid complex, including a southern satellite pyramid, and claims the distinction of being the first true pyramid. Uniquely it had a second passageway exiting on the western slope (Khufu’s pyramid at Giza has a possible parallel).

The North or Red (local limestone is tinged red by iron oxide) pyramid was the last of Sneferu’s buildings. It is simple and elegant with a 43° slope - it is only shorter than Khufu’s by 15m - with a centralized burial chamber. Some features are not present, such as a causeway, but it serves as a perfect transition from Dahshur to Giza. Stadelmann used worker’s graffiti inside casing stones to estimate a build-duration of approximately 20 years.

The Giza Plateau

The plateau is formed from horizontal strata of sedimentary limestone; it was an ideal site, with no overburden to be removed and the natural bedding planes made quarrying easy. The complex represents a colossal human achievement and is the pinnacle of pyramid construction. The pyramids were built using precise measurements and accurate construction giving a north-facing alignment. Non-royal burials are clustered and laid-out like an organized town (see Figure-6).

Khufu continued to use sedimentary Gypsum as a mortar to fill voids within the internal structure and bond loosely fitting blocks. Corner blocks were of greater accuracy and quality, which were equally important to the structural strength as the foundations. Herodotus reported that the causeway was lined with fine relief carvings.

The internal structure has many new features with three burial chambers; the King’s chamber has five stress-relieving chambers demonstrating an advanced understanding of engineering. The Grand gallery, built with an extravagant corbelled structure, is over 46m long and is an engineering master-piece. Efforts to prevent tomb robbery failed and it was plundered during the Old Kingdom. There are four mysterious “airshafts” and their purpose is still uncertain. Within the enclosure where three pyramids for queens, they were built to a scale of approximately one-fifth size. A number of rock-cut boat pits have been found and one sacred bark has been reassembled.

Djedefre, the first king to include the title “Son or Re”, reverted to the architecture of previous dynasties. Khafre returned to the plateau utilizing a simple internal structure but with a large and sophisticated royal-cult complex, including a large number of statues. The complex included five elements; entrance hall, broad court, statue niche, storage chambers and an inner sanctuary. The enigmatic sphinx and its unique two-sanctuary temple are examples of the period’s innovation - there is an association with the sun god and later Sun-Temples, and with the king as a “living image” ($\check{s}sp-^c\check{n}h$).

Menkaure’s incomplete pyramid was significantly smaller but compensated by using coloured stone to emphasize the structure. It is probable that architects were aware that further development could not be accommodated within the plateau; the primary route from the plain to the plateau was blocked by the valley temple. The lower 16 courses were clad in Aswan red-granite, the upper in Tura limestone. The royal-cult complex was much larger and has more decoration; some of the stone blocks weighed 200 tons. In the valley

temple were a number of triad statues demonstrating the fusion of monumental and artistic skills.

Abusir Pyramid Complex

Abusir, whose ancient name was Per-Usire or “Place of Osiris”, is the location of 5 pyramids from the 5th Dynasty and of two solar or sun-temples (see Figure-7).

The complex is approximately 1.5km square and sits on a sedimentary plateau. It would have dominated the Memphis skyline - the current cultivation demarcates the plain below the complex. The geology was formed during the Pleistocene Epoch, from sand and gravel cemented together by lithification. The complex was at the northern apex of the Abusir Lake and the Nile was more eastward than the current channel allowing the Valley Temples to connect to the lake and for building material to be transported by water. It is possible that the move to Abusir was necessitated by the Giza complex being ‘full’, Userkaf squeezed his pyramid into a site at Saqqara but needed a new location for his sun-temple. Verner (1997; p.280) reported that Abusir was the southernmost place that the Heliopolis temple of Re’s gilded obelisk tip could be seen and further suggested (see Figure-8) that the southwest corners of the Giza and Abusir pyramids would intersect at the temple’s benben stone.

Abusir demonstrates a change in theological concepts and an increasing focus on the Heliopolis sun cult. Kings associated with Abusir have ‘Re’ within their nomen.

Pyramids are significantly smaller than those of the great pyramids of Giza, for example Sahure’s pyramid has a base of 78.75m and a slope of 50° 11’ compared to Khafre’s 215m and 53° 10’ (Lehner 2000, p.17). Sahure’s complex, which stands on a 20 meter hill, is the best preserved although once the casing was removed the construction techniques allowed the buildings to deteriorate into mounds of rubble.

The use of stone non-indigenous to Abusir was limited to key architectural features. Siliotti (1997, p.95) wrote “the funerary temple seems to have gained in importance and is usually quite large, built with expensive materials and decorated with exquisite bas-reliefs, most of which have unfortunately been lost”.



The construction technique was to form a level a base (possibly constructed from limestone blocks), into which a pit was excavated. A number of inward leaning layers were built from low-quality limestone blocks, quarried to the west of the complex, with voids filled with mud mortar. A construction gap was left on the north side, allowing builders to work on the burial chamber in parallel, which was later filled with debris. Tura limestone was used for the outer casing. Neferirkare’s pyramid had an unfinished girdle of masonry with a red-granite casing and it is thought Neferirkare originally built a step pyramid and later changed it to be smooth sided.

Internal chambers were accessed from the north side via a pavement level passageway lined with red-granite and protected with granite portcullis. Later in the period, certainly for Niuserre, a north chapel was added giving access to the passageway. The limestone clad antechamber and burial chamber had a three-layered gabled roof with huge 90-ton limestone beams (see Figure-9) and to the east a serdab. A fragment of basalt sarcophagus was found in Sahure’s chamber and red-granite in Neferefre’s. An interesting observation on Sahure’s pyramid, reported by Verner (1997, p.284), is that “the southeast corner is off by about 1.58m ... and is not entirely square”.

We can determine, from unfinished pyramids such as Neferefre, that construction of the tomb occurred first, then the royal-cult complex and finally the valley temple and

causeway. The surviving structures have a similarity and Sahure's can be used to describe the repeated features.

Each part of a King's complex was named, for example Sahure's were:

Complex	Sahure's soul shines
Pyramid	The Rising of the Ba spirit 
Pyramid Town	The Soul of Sahure Comes Forth in Glory
Palace	Sahure's splendor soars up to heaven
Sun-Temple	Sahure's offering Field or Field of Re (Sekhet Re)
Nomen & Prenomen	He who is Close to Re 

The pyramids of Sahure and Niuserre and the sun-temples of Userkaf and Niuserre have valley temples connected to the royal-cult complex by a causeway. Neferirkare completed his valley temple and the causeway's foundations but Niuserre completed the works joining the causeway to his own pyramid.

The valley temple was entered via a ramp that led to a portico or covered ambulatory. The roof was decorated with gold painted stars on a blue background and the ceiling was supported by granite palm fond columns (Niuserre used papyrus bundles). The floor was of black igneous basalt, the dado of red-granite and above a layer of Tura limestone - which was decorated with polychrome bas-relief, for example depicting the king in the form of a Sphinx trampling enemies. A hall with two pillars led to the causeway.

The causeway traversed uneven ground - to keep the processional way at a constant incline from the valley to the plateau significant buttresses were employed. The 2m wide corridor was illuminated from small openings in the roof and its length was decorated "including scenes of gods leading prisoners taken from Egypt's traditional enemies" (Lehner 2000, p.142). The width of the corridor suggests that the king's body may not have been transported to the royal-cult temple through the passageway.

The royal-cult temple joined the pyramid's east side and was significantly larger than predecessors and is the prototype of subsequent temples. The walls and columns were heavily decorated with reliefs with a variety of subjects such as hunting, fishing, fowling, soldiers, sea-voyages, courtiers, victories over traditional enemies, offering bearers and the King's insignia. In Khentkawes II's temple square pillars, painted red and inscribed with her name and titles, were used.

Niuserre added to Neferefre's (who is also known as Raneferef) royal-cult temple after the ephemeral ruler's death. Part of the temple held the first hypostyle hall; its roof was supported by 20 wooden columns in four rows. Uniquely a 'Sanctuary of the Knife' was added for ritual slaughter of animals - this has a possible association with sun-temples.

Deep within the temple is an offering chapel with a false door, statue of the king and an offering basin. A sophisticated drainage system ran throughout the temple using channels, copper drains and water spouts. Neferirkare's temple was finished quickly using mud-brick and wooden columns; this indicates that Neferirkare died before it was finished and Niuserre completed the work.

During this period the temple was laterally 'divided' into outer and inner elements by an internal traverse-hall and the external enclosure wall. The outer part included an entrance hall, an open court with a colonnade (palm columns) and altar; the inner rooms included magazines, five-niche chapel, an alabaster floored offering hall or sanctuary and a satellite pyramid that simulated the main tomb. Niuserre also included a statue of a recumbent lion and a square antechamber with a central pillar supporting its roof.

Entrances led into the pyramid enclosure and Neferirkare's held two large boat burials. Niuserre introduced two huge blocks of masonry on the east side of the complex flanking the royal-cult temple and joining the enclosure wall. Lehner (2000, p.142) says these are "precursors of the great pylons at the front of later Egyptian temples".

Outside of the complexes were other burials, although the number is considerably less than at Giza suggesting a reduction in centralised authority by this period. Typically the royal-cult temple's traverse-hall has a doorway leading to a cemetery where members of the king's family and officials were interred. Lepsius XXIV and XXV suggests that important royal wives were buried in small pyramids and Vizier Ptahshepses's tomb, who was married to Niuserre's daughter Khamernernebti, is a fine example of a period mastaba. On the southern edge of the plateau is a cemetery for officials and on the northern edge is one for lower social ranks.

Abusir Sun-Temples

Userkaf was the first to build a sun-temple at Abu Gurob (an extension of Abusir) about 3 kilometers north of his Saqqara pyramid. Arnold (2003, p.234) said that "cult complexes for deities who represent aspects of the sun, including Aten, Atum, Khepri, Harmakhis, Re, Re-Horakhty and others, are attested to from the 2nd and 3rd Dynasties".

The Abusir Papyri and other documents record the existence of six temples although only those of Userkaf and Niuserre have been discovered. It is possible that only two temples existed and that each successor re-built and re-named Userkaf's temple, before Niuserre built his own. However, there are indications that Sahure's sun-temple could have been over-built by Niuserre's pyramid complex. Additionally Ty's tomb at Saqqara, records an association with the sun-temples of Sahure, Neferirkare, Neferefre and Niuserre.

Schaeffer & Borchardt excavated at Abusir in 1898-01 and Riche in 1955-7 determining that the temples were built in phases and Userkaf's was added to by Neferirkare and more extensively re-developed by Niuserre. Userkaf's temple was called Nekhen-Re (Stronghold of Re) which was also the name of the pre-dynastic capital Hierakonpolis, the primeval sanctuary of the Horus falcon. The sun-temple's focus was a blunt Obelisk which stood on a step pyramid of limestone with a red-granite casing similar to Menkaure's pyramid at Giza. In a large courtyard in front of the obelisk was an altar constructed of five slabs of calcite, shaped as the Hetep (𓂏) hieroglyph. Both sun-temples are of similar construction and have the characteristics of a pyramid complex; with a "pyramid", valley temple, causeway, upper temple, enclosure and, in Niuserre's case, a huge mud-brick boat. Inside Niuserre's upper temple were fine reliefs including Sed-Festival scenes and in the Chamber of the Seasons depictions of the Akhet, Peret and Shemu seasons.

One of the three sets of Abusir Papyri lists daily offerings brought from temple to pyramid - it is difficult to resolve the purpose of sun-temples but they were clearly an important part of the ritual offering to the gods and to the king's cult. Why their development stopped is equally unclear.

End of Monumental building

Menkauhor missing pyramid it is known to be the first 5th dynasty king to migrate to Saqqara, a custom that continued throughout the Old Kingdom. Construction continued to use the 'template' established by Sahure and supplemented by Niuserre and the subsequent complexes could be called unremarkable.

The significant differentiator is the Pyramid Texts, which is found in each of the burial chambers, including some queens. These spells, prayers and hymns (nearly one thousand are now known and they significantly pre-date the Dynasty) use magic to guarantee the king's rebirth and were carved into limestone and filled with blue paste. No burial chamber makes use of all of the utterances, which includes the Cannibal text.

The south-wall of Unas' sarcophagus chamber has a resuscitation text with utterances 213-222 containing vital texts. These include 'you have not gone away dead; you have gone away alive' and the assurance that 'your name will live on among living people even as your name comes to be with the gods'.

These powerful assurances of immortality are the extant conclusion to thousands of years of refinement - reaching back to shallow pit-graves scratched into the arid soil. Monolithic monumental building, combined with a sophisticated religious ideology, all strived to achieve an eternal spiritual life described within the phrases carved so resoundingly and confidently into Unas' pyramid.

Figure-1.1 Brunton (1937), 1.2 author

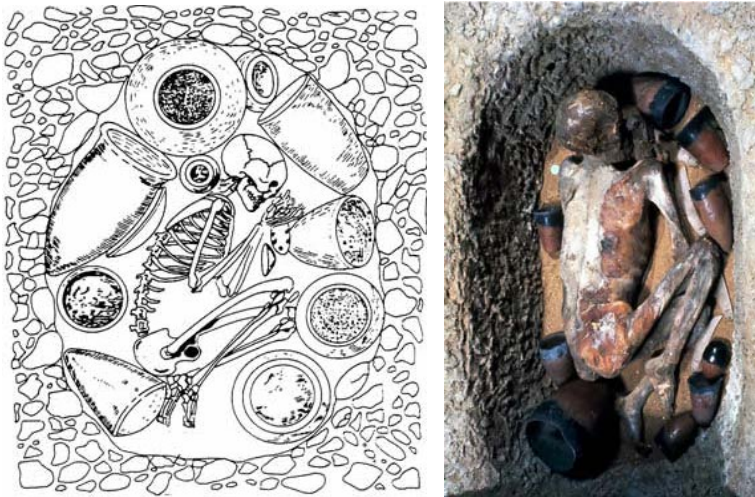


Figure-2.1 Emery (1991, p.138), 2.2 author

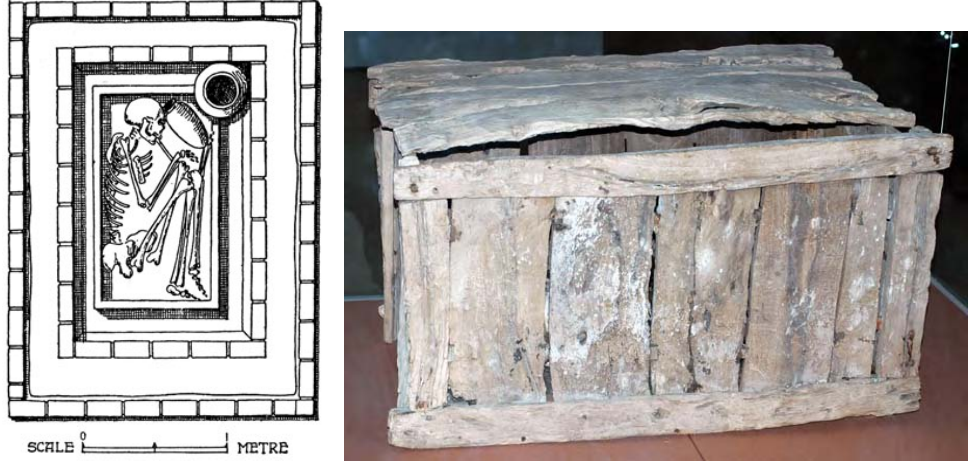


Figure-3 Emery (1991, p.72) - 1st Dynasty Mastaba.

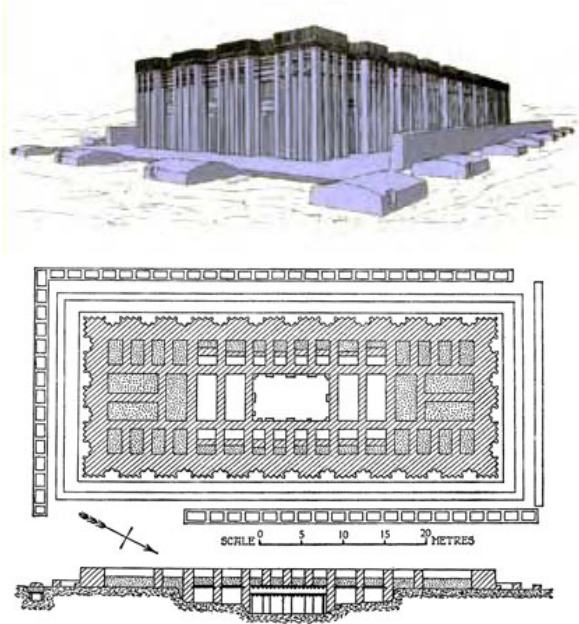


Figure-4 Lehner (2000, p.97)

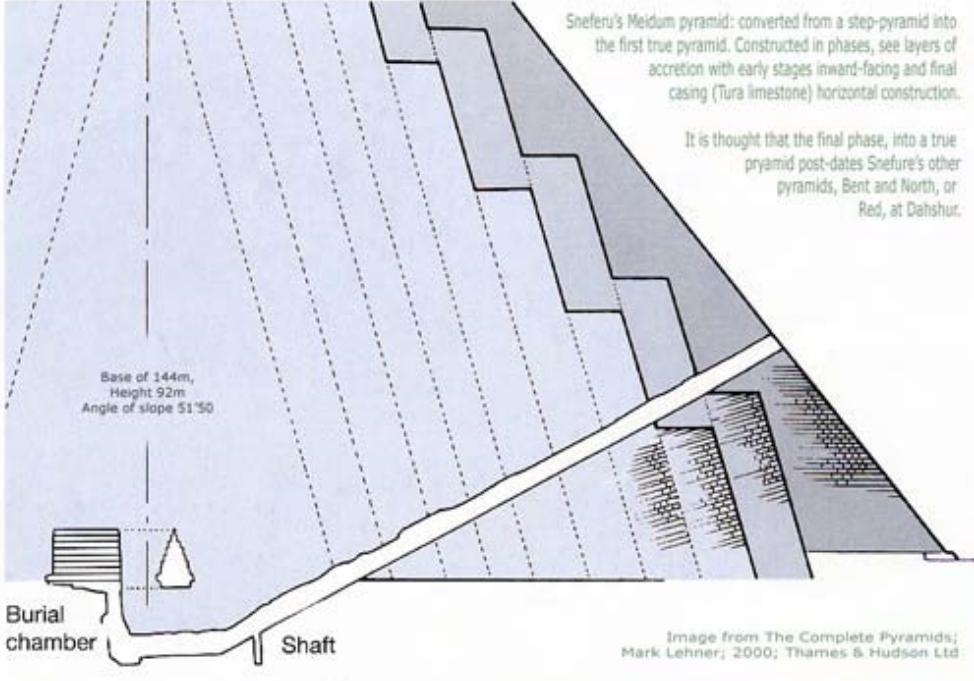
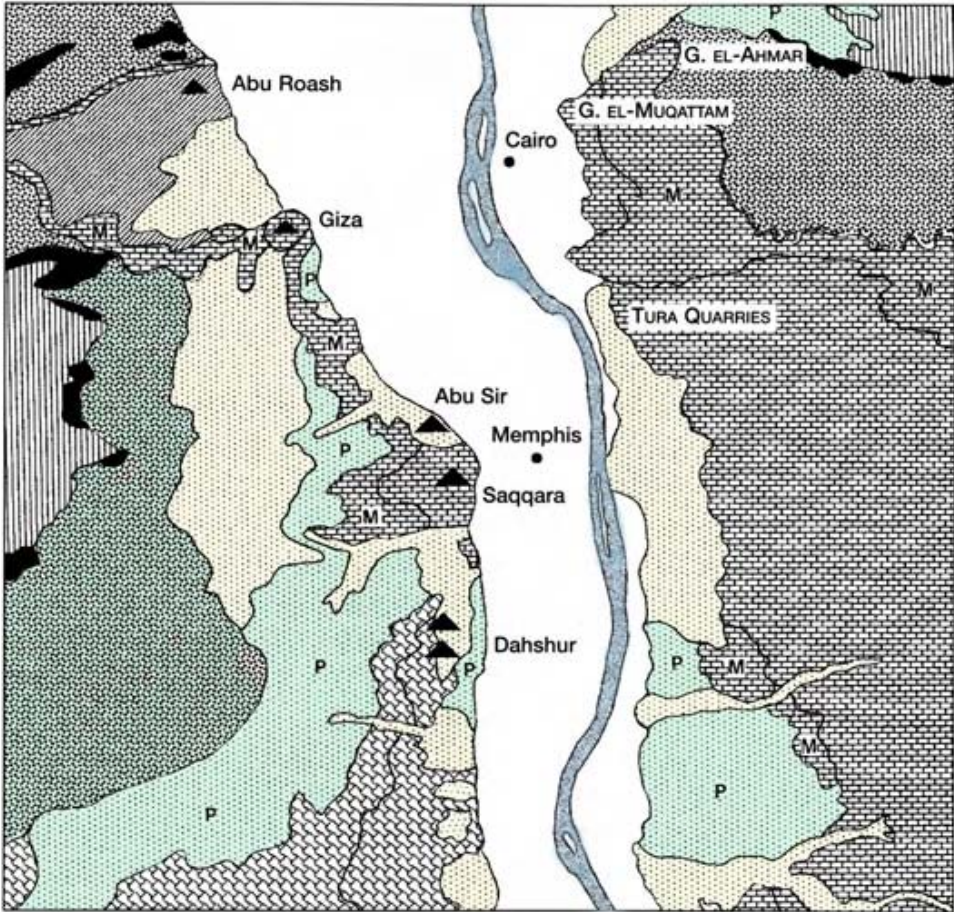


Figure-5 Sampsell (2003)



ancient Memphis region, showing sites of pyramid complexes and quarries. Patterns indicate different rock types exposed at the surface

- | | | | |
|--|---------------------------------------|--|--------------------------|
| | Cretaceous Limestone | | Basalt |
| | Eocene Limestone (Mokattam Formation) | | Miocene Limestone |
| | Eocene Limestone (Maadi Formation) | | Pliocene Deposits |
| | Eocene Limestone (other Formations) | | Pleistocene Sediments |
| | Oligocene Sandstone and Conglomerate | | Floodplain Nile Alluvium |

Figure-6 GoogleEarth

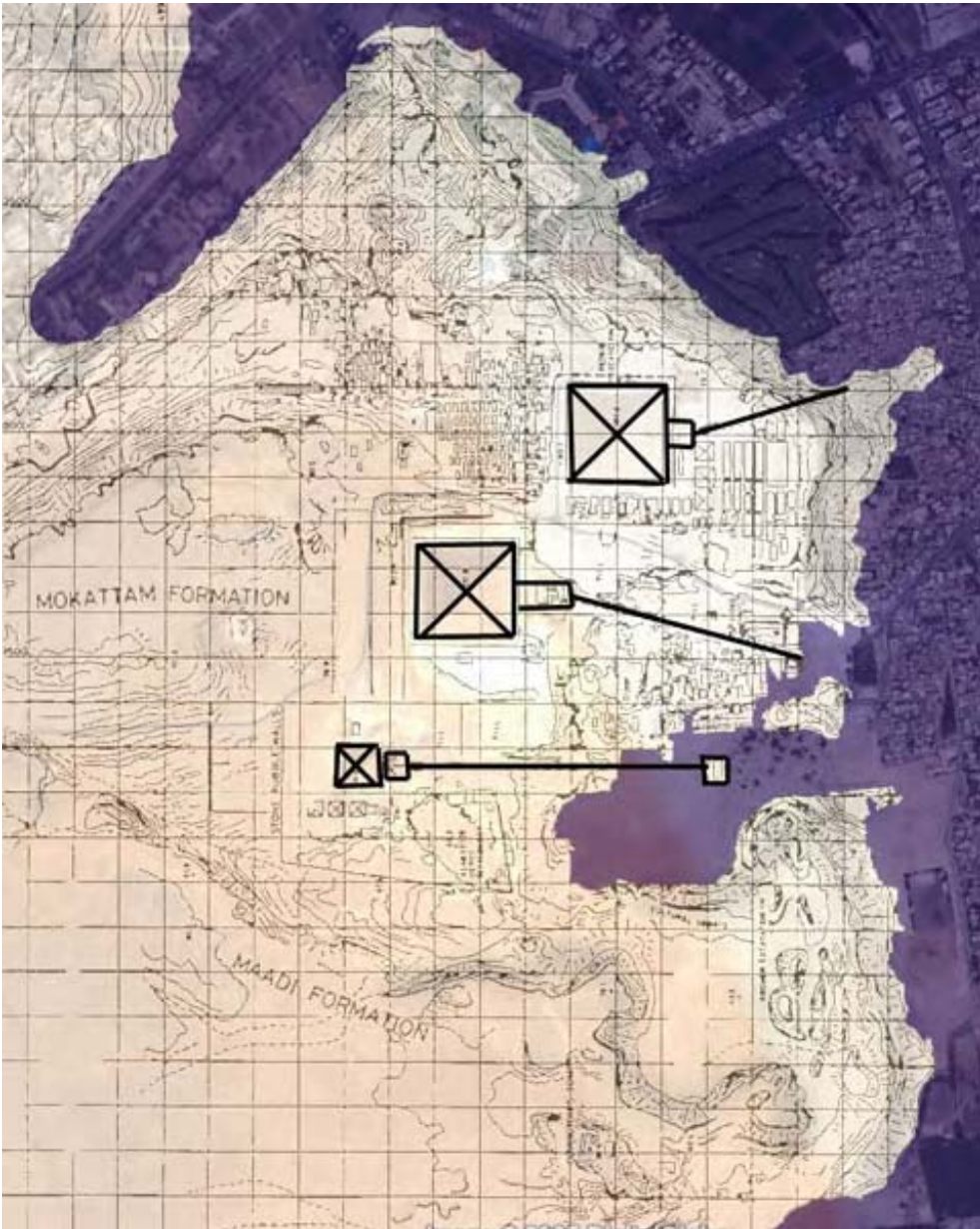


Figure-7: Abusir complex



Siliotti (1997, p.95). Abusir, northerly aspect

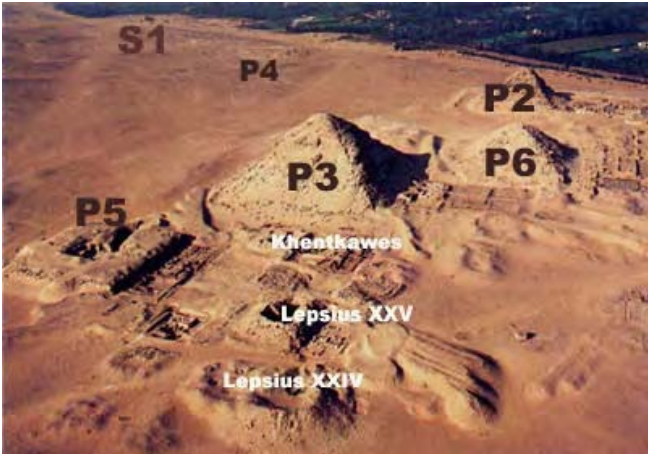
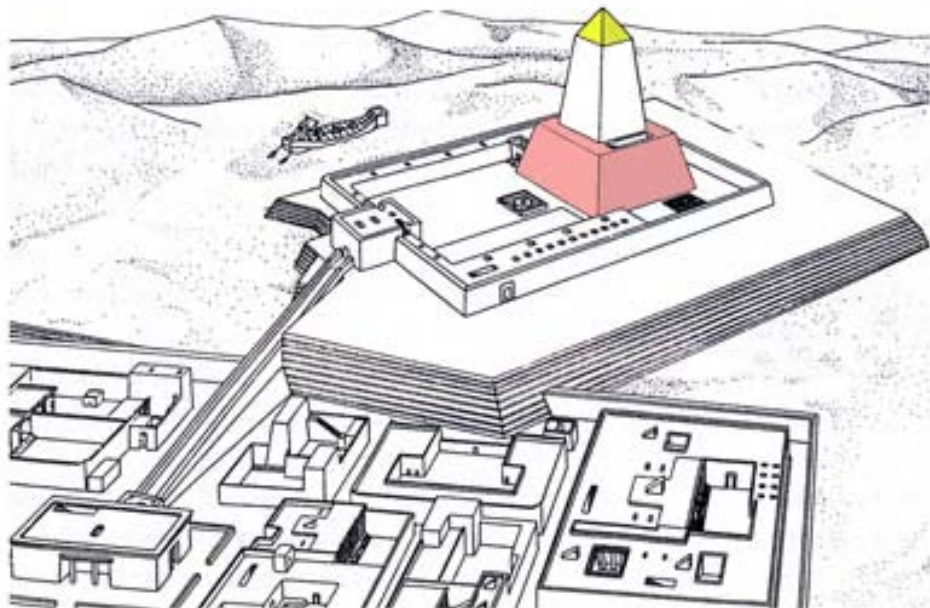
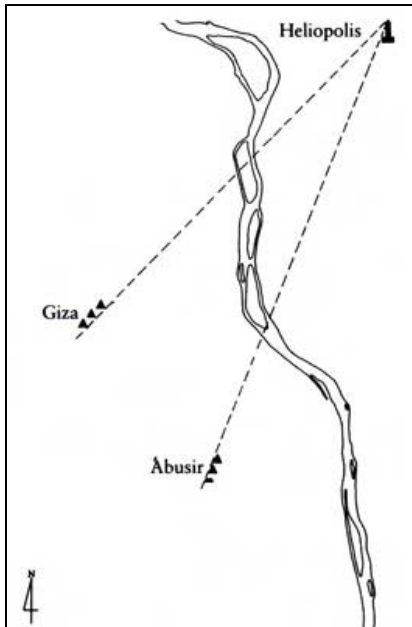
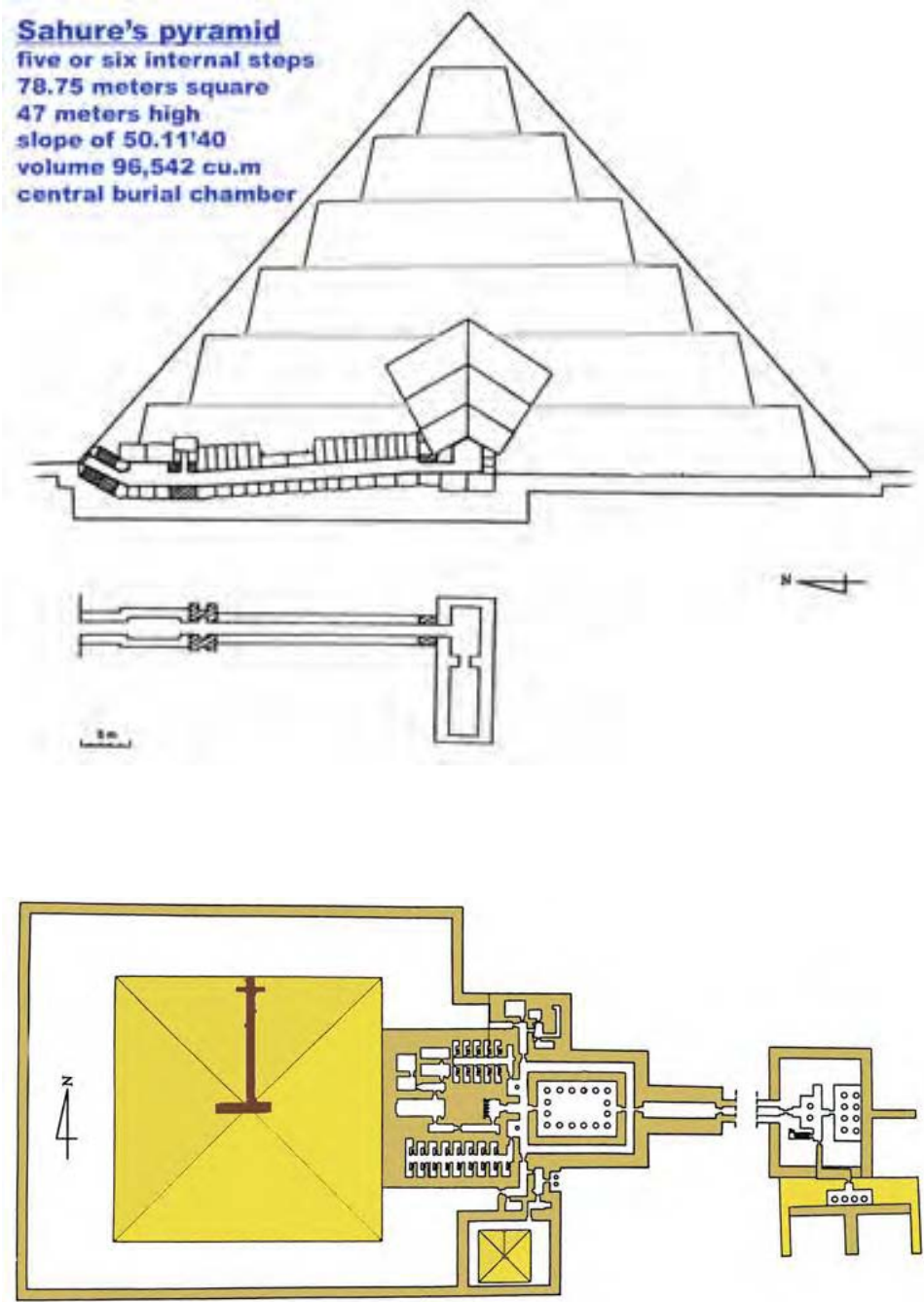


Figure-8: Verner (1997; p.303 & 271)



Reconstruction of Niuserre's sun temple in Abu Ghurab (after Borchardt). Over the temple towers a twenty-meter-high obelisk, the symbol of the sun god Re.

Figure-9, Based on Verner (1997, p.285 & 286)



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