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Explaining the Shafts in Khufu's Pyramid at Giza

ANTHONY P. SAKOVICH

Synopsis of Competing Theories

There have been numerous attempts to explain the enigma of the small shafts that lead upward from the two highest chambers of Khufu's pyramid at Giza. Some have speculated that they were designed to allow airflow through the structure so the workers would not asphyxiate. Others have suggested that the shafts actually point very accurately at various stars or areas of the night sky, supposedly to guide the spirit, or Akh, of the king to his ultimate destination among the Imperishable Ones. None of these theories, however, have sufficiently substantive evidence, either cultural or physical, to suggest that they should conclusively be considered as a tenable theory to explain the presence of the unique shafts in this particular pyramid.

In fact, to understand the reason for the presence of the shafts, we must first try to distance ourselves from much of what we know about the later cults and beliefs that governed the cosmology of Egypt long after the Giza pyramids were built. We must focus on the universe and gods that we know did exist during the time of Khufu. Only then can we begin to catch a glimpse into the worldview of the megalithic pyramid engineers of Dynasty 4, thus allowing us to understand the differences between those particular pyramids as contrasted with the pyramids that preceded and followed.

First, we must remember that the Osiris cult had not yet appeared as a major force on the historical scene. The principal gods at Giza in Dynasty 4, included neither Osiris nor Isis. Instead, the three most important deities were Horus, Hathor and Re. *"The king, as Horus, was worshipped in the lower temple as indicated by the suggested statuary program of the king in the lower temples of Khafre and Menkaure. Hathor was worshipped in the chapels of the Queen's pyramid because she was identified with the wife of the king. Re was worshipped in the upper temple. He was the universal god who accepted all that the king did in the last element of the program of the pyramid complex. He also protected the king who was buried in the "Horizon of Re," i.e., the pyramid."*¹ Due to its unique provenance we must also include in this group the god Khnum, whose name appears inside the cartouche of Khufu in his pyramid at Giza. None of these gods had particularly strong stellar associations. The divine triad mentioned above would later be replaced by a larger group, including Horus, Nut, Isis, Osiris and Re, but at this time, the three solar cult deities were known to be at center stage.²

In addition to the lack of stellar gods at Giza, nearly all of the stellar alignment theories limit the access of the king to his particular destinations in the afterlife to certain times of the year when their target "objects" were visible at their culmination in the night sky. In the case of a solar alignment, if

¹ Zahi Hawass, "The Programs of the Royal Funerary Complexes of the Fourth Dynasty" in: David O'Connor and David Silverman, eds., *Ancient Egyptian Kingship* (Leuven, 1995), 253.

² Although there are many references to Osiris in the Pyramid Texts, the references used here in this presentation are not specifically related to Osiris. Often, he is merely depicted as a god acting within the established geography of a mythic universe that the ancient Egyptians had developed over the previous centuries.

the king's funeral was not finished on the right calendar day, he could wait as much as six months before being granted access to the Netherworld. Clearly neither of these was an acceptable proposition to the king in question, given the importance of a daily revival to the Egyptian cosmogony. "Because of the continually threatening powers of Nun, called *isfet (isft)*, *Maat*, the order of the universe, had to be renewed perpetually by the daily re-enactment of the original creation, played out primarily by the daily cycle of the sun and the yearly cycle of the flood."³

According to a recent article, the dating of the shafts by archaeoastronomical methods puts it clearly outside of an acceptable date range for Khufu. As the article concludes, "*If any celestial significance is to be attributed to the shafts it should be of a general orientation towards the northern and southern skies.*"⁴

Lastly, according to James Allen, the path a king's spirit takes through the pyramid is very definite, and requires passage through various rooms before it can ultimately "exit" to the north.⁵ This idea, however, sets up a clear contradiction in logic. If we accept that the spiritual requirements of a 4th Dynasty pyramid were at least somewhat similar to that of a 5th or 6th Dynasty pyramid (which we must do in order to accept a stellar targeting of the shafts based on the 5th and 6th Dynasty Pyramid Texts), then having the king's spirit exit the pyramid prior to the passage through the proper chambers is most unlikely. The "spirit shaft" theory is therefore internally inconsistent.

If we rule out the stellar targeting of the shafts, we are left with only one other standard explanation: that they were designed as strictly logistical devices, intended to assist with air circulation in the pyramid. Although this theory appears attractive on the surface, Edwards points out one insurmountable obstacle associated with it. The shafts, he explains, "*would have had the effect (of ventilation) if their outer apertures were left open, but it is at least possible that they were covered by the limestone casing of the pyramid and consequently sealed.*"⁶ Thanks to the efforts of Rudolph Gantenbrink in 1993, and National Geographic in 2002, we now know that the two shafts leading up from the second (Queen's) chamber were both sealed with double-plugs of limestone, several meters before they reach the outside wall of the pyramid. In addition, when Dixon first discovered the shafts in the second chamber in 1872, they were still sealed on the inside. The shafts were not even delineated by a traditional false door. According to Smyth's accounts of Waynman Dixon's discovery of the shafts in the second chamber, it was only by inserting a wire along a seam in the limestone blocks that Dixon discovered the first shaft. He then measured off the location of the first shaft, and discovered the second shaft situated in the corresponding symmetrical position on the opposite side of the room.

*Dr. Grant and Mr. Dixon have successfully proved that there was no jointing, and that the thin plate was "left," and a very skilfully (sic) and symmetrically left, part of the grand block composing that portion of the wall on either side. That block, therefore, had had the air-channel tube (9 × 8 inches) sculptured into it, neatly and beautifully so far as it went; but that distance was not quite through the whole block, by the typical quantity in the Great Pyramid of five inches. The whole air-channel then, save that little unmade bit, was in place; but could never have been used.*⁷

³ Janice Kamrin, *The Cosmos of Khnumhotep II at Beni Hasan* (London, 1999), 4. See also Jan Assmann, "Schöpfung," in *LdÄ* VI, 685.

⁴ John J. Wall, "The Star Alignment Hypothesis for the Great Pyramid Shafts," *JHA* 38, part 2, No. 131 (May 2007), 199–206.

⁵ James P. Allen, "Reading a Pyramid," in C. Berger, G. Clerc, and N. Grimal, eds., *Hommages à Jean Leclant*, vol. 4, vol. 1 (Cairo, 1994), 5–28.

⁶ I. E. S. Edwards, "Do the Pyramid Texts Suggest an Explanation for the Abandonment of the Subterranean Chamber of the Great Pyramid?" in C. Berger et al., eds., *Hommages à Jean Leclant* (Cairo, 1994), Vol. 1, 159–60.

⁷ Charles Piazzi Smyth, *Our Inheritance in the Great Pyramid* (London, 1877), 392.

We know the shafts of the second chamber were sealed off from the inside. As noted by Dixon, this would certainly have prevented them from being utilized for any ventilation purposes at any stage of the construction, for the ceiling of the chamber rests on the limestone blocks that comprise the walls that blocked the shafts. The chamber would not have required ventilation until the ceiling was in place, at which state the inner walls would block the shafts. It is therefore clear that, whatever the original purpose of these architectural features, ventilation of air was never a possibility.

A Change in Perspective on the Shafts

The problem with identifying the shafts' function is that people have always begun by assuming that they must have something to do with the King Khufu himself, rather than being an element related to an established Egyptian cosmography. Consequently, many researchers have viewed them from a Khufu-centric perspective. But the shafts do not point out at the sky or the stars. In fact, as we are about to see, one of them appears to point inward, from the sky into the sepulchral chamber of the king, while the other points outward to a region of the sky, creating a continuous path (canal) through the chamber.

It is well known that the goddess Nut, as the representative of both water and coffin, is indispensable to the rejuvenation of the king in his sarcophagus. "*In the Pyramid Texts the king is given birth in or from not only the Abyss and the sky but also the goddess Nut, the 3ḥt, and the Duat.*"⁸ Nut's development, however, only parallels the arrival of sarcophagi as permanent resting places for the corpses of the kings.⁹ "*In the Pyramid Texts, as later, Nut as mother of the deceased is identified not only with the sky but even more specifically with the coffin, sarcophagus, and tomb in which the deceased's body lies.*"¹⁰ Before the appearance of the sarcophagus, the tumulus, or low mound, was a fairly common element of royal tombs of the early dynasties.¹¹ Although there are multiple Egyptian Creation myths, most, if not all, have the following key elements in common: According to Egyptian Creation mythology, "*The hill that emerged from the primeval waters of NUN was an important element in Egyptian religious thought and imagery. The potency of the image of fertile ground emerging from water must have owed a great deal to the cycle of the annual inundation of the Nile, whereby fresh agricultural land regularly appeared out of the flood waters. The primeval mound was the principal symbol of the act of creation . . .*"¹² According to one Egyptian legend, the original Primeval Mound was located in the Nile near Aswan (the "Seat of the First Time"), and is known today as Elephantine Island. It is the ancient home of Khnum, the Egyptian god of the Nile Inundation, and the potter/creator god who first shaped humans from Nile silt.¹³

The Primeval Mound and the Importance of Flooding Waters

The primeval mound was the key element of rejuvenation and rebirth, and is thought to be originally represented by the low mounds atop graves, which were subsequently replaced (in function, but not necessarily symbolism) by the mastaba.¹⁴ To a certain extent, this primeval mound symbol was

⁸ James P. Allen, "The Cosmology of the Pyramid Texts," *Religion and Philosophy in Ancient Egypt* (New Haven, Conn., 1989), 11-15, esp. 14.

⁹ Edwards, "Pyramid Texts," 162-63.

¹⁰ Allen, "Cosmology," 17.

¹¹ Mark Lehner, *The Complete Pyramids* (London, 1997), 79-81, 111-13.

¹² Ian Shaw with Paul Nicholson, *British Museum Dictionary of Ancient Egypt* (London, 2003), 73-229.

¹³ Shaw and Nicholson, *British Museum Dictionary of Ancient Egypt*, 151.

¹⁴ I. E. S. Edwards, *The Pyramids of Egypt* (London, 1972), 26.

eventually replaced by the sarcophagus, the physical manifestation of Nut, mother of Re. Certain elements of the classic inundation mythology, however, were carried forward, and are documented quite clearly in the later Pyramid Texts. These texts from the 5th and 6th Dynasties abound with references to flooding and inundation, all of them relating directly to the resurrection of the dead king. For example, Utterance 457 (§857–§859) states:

The fields are content, the irrigation ditches are flooded for this King today. There has been given to him his power thereby, there has been given to him his might thereby.

Raise yourself, O King, receive your water, gather together your bones, stand on your feet, being a spirit at the head of the spirits.¹⁵

The standard pyramid design places the burial chamber underneath the body of the pyramid, at the end of a sloping shaft that leads down into the sepulchral chamber, and when one turns and looks in the other direction, up and out of the pyramid, possibly to a destination along the shores of the celestial waterway, from where the king's Akh would travel to various other stations in the sky.¹⁶

Egyptian Cosmography

The watery Abyss is located both behind the stars, and underground, and it is the Abyss that is the source of all the spiritual waters.¹⁷ It was considered necessary, therefore, for the standard burial chamber to be underground. Since the chamber was located underground, the sarcophagus was by definition deposited within the spiritual waters of the Abyss. In ancient Egyptian symbolic thought, these waters would then serve as the Inundation of the Nile, whose purpose was to give new life to the deceased king.

Logic dictates that if one were to move the burial chamber above ground, one would then have to find a way of channeling the celestial waters of the Abyss to flow into the sepulchral chamber so that the resurrection could still occur. Nearly every pyramid in ancient Egypt has its burial chamber below the level of the entrance into the pyramid. When Sneferu began raising the pyramid chambers above ground level, he also began putting the entrance passages up into the body of the pyramid, so that in every single case there was a passage that entered the pyramid structure higher than the burial chamber. Even the Bent Pyramid at (south) Dahshur, although probably not used for Sneferu's final interment, has a second entrance that is cut into the body of the pyramid, entering the pyramid at a vertical height above the main burial chamber and exiting to the west. Khafre's pyramid has two entrances. The first entrance is at ground level. Above it he engineered a second entrance that is situated vertically above the burial chamber. It is reasonable to suggest that the purpose behind these elevated entrances was simply to allow the waters of the Abyss, probably via the "Great (Winding) Waterway," to flow into the elevated burial chambers, and recreate the original primeval mound so that the body of the king, after being duly revived each night, could rise again. In the event that the architects had not ensured that the level of the entrance passages was higher than that of the burial chamber, it would not have been possible for the cosmic waters to flood the chamber, and the king's resurrection could not have taken place.

¹⁵ R. O. Faulkner, *The Ancient Egyptian Pyramid Texts* (London, 1998), 152.

¹⁶ For a more complete explanation of the directionality/spatial functions of Old Kingdom tombs, see: Deborah Vischak, "Common Ground between Pyramid Texts and Old Kingdom Tomb Design: The Case of Akhmahor," *JARCE* 40 (2003), 133–57, esp. 139–49.

¹⁷ Allen, "The Cosmology of the Pyramid Texts," 13.

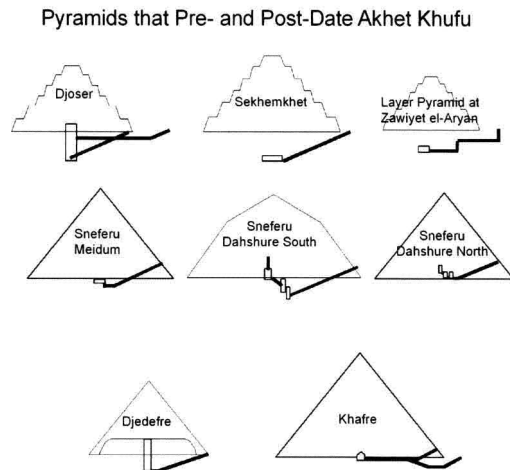


Diagram 1, Based on Lehner, *The Complete Pyramids*, 1997, 16.

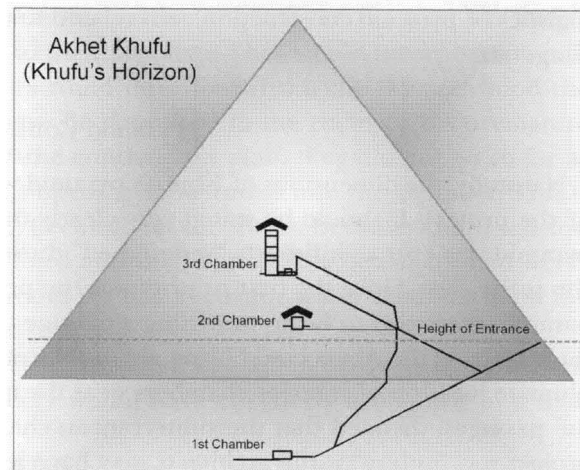


Diagram 2, based on Gantenbrink, www.Cheops.org.

Provided here is a simple set of line diagrams that show the six major pyramids that predate Akhet-Khufu, and then the two pyramids built subsequently (Djedefre and Khafre). As can be seen in the diagram, all the burial chambers either lie below ground, or have passages that exit the pyramid at an elevation that is higher than the chamber itself.

There is significant evidence to support this theory. The only pyramid that does not have an entrance above the level of the sepulchral chamber is the pyramid of Khufu at Giza. In the diagram below, we can see that the third chamber is not only well above ground (so that the waters of the underground Abyss could not flood the compartment) but is also substantially higher than the entrance that leads into the pyramid.

If the cosmic waters of the Abyss were required to flood the chamber, then the builders had to ensure that a proper channel, or canal, was cut into the pyramid in such a way that it would allow the cosmic waters to flow into the chamber. As is evident in diagram 3 below, the shafts leading to the north and south from the third chamber fulfill this requirement.

Khafre's pyramid has the beginnings of shafts cut into the walls of the burial chamber, and they have been likened to shafts in Khufu's burial chamber. The shafts in Khafre's pyramid, however, were never completed. Instead, a second entrance was created that intersects with the first passage, and proceeds upward through the body of the pyramid. When this second entrance was built, the shafts in Khafre's burial chamber were rendered superfluous. Although there are no shafts in Menkaure's pyramid, we find a similarly designed passage that raises at least one "entrance" above the level of the burial chamber. An interesting and clearly significant construction, however, exists in Khafre's pyramid in that his burial coffer is actually submerged directly into the floor of the chamber. The obvious allusion to inundation adds significantly to our understanding of the role the inundation played in the Egyptian afterlife and the king's revivification. This same "inundation" symbolism also occurs in the Fourth Dynasty pyramid of Nebka, and was probably evident in Sneferu's Red pyramid. In this particular case, the submerged sarcophagus of Sneferu was probably the reason the floor was completely demolished by looters, since it may have appeared to have been hiding a secret chamber with the sarcophagus being the entrance.

However, this does not explain the shafts connected to the second chamber of Khufu's pyramid, that neither exit the pyramid nor enter the chamber. For these, we have to briefly delve into the

logistics of pyramid construction, as it related to the life and death and afterlife of the king in the Old Kingdom.

Pyramid Construction Sequence

Naturally, the dimensions of Khufu's pyramid were planned long in advance of the commencement of the project. It should be stated very clearly that this author is not suggesting in any way that the pyramid was ever significantly "redesigned" during its construction. In fact, it appears just the opposite is the case. Since the first priority was the proper creation of a burial chamber for the king, the natural course was to begin tunneling a passage that would end with a chamber underground, where the waters of the Abyss could bring about the revivification of the king. The size of the pyramid, the ultimate location of interior chambers near the center of the pyramid, and the standard 2:1 angle of the passages, dictated that the subterranean chamber be located precisely where we find it. As this project was underway, the architects may have intended it to be a reproduction of the burial chambers found inside the Red Pyramid at (North) Dahshur. The northern passage, exiting the subterranean chamber, has a widened area that could have served as a portcullis chamber had the need arisen.

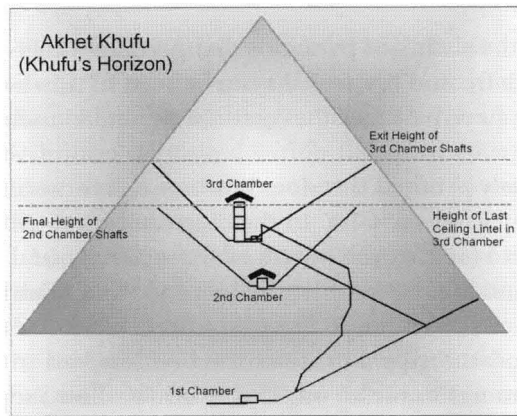


Diagram 3, based on Gantenbrink, www.Cheops.org.

the body of the pyramid meant that there was a chamber in which the king's body could, if necessary, have been interred. This meant that there was no longer any need for the first chamber to serve as a burial chamber, and if the king had died prematurely, the entire structure could have been hastily completed with a flat top, giving it the appearance of a giant, yet historically acceptable, mastaba. We see this kind of unfinished Fourth Dynasty pyramid at Zawiyet el-Aryan.²⁰

The addition of this second room in Khufu's pyramid, however, presented another problem for the architects. How were the cosmic waters to be channeled into this new chamber, situated as it was above the entrance to the pyramid? From one point of view, these life-giving waters were supposed to be in the Abyss, far below the second chamber. But the symbolic waters, as we have seen, existed in multiple locations simultaneously. In the form of the Great (Winding) Waterway (see later section on

The southern passage leading out of the subterranean chamber was the beginning of the second and third chambers,¹⁸ in the event the king died prior to project completion and needed to have his sepulchral chamber in a "spiritually correct" location. This, of course, was never intended to be the ultimate burial room, but would adequately serve as the first contingency plan in case Khufu died prior to pyramid completion.

As work progressed, the eventual construction of the second chamber (the "Queen's Chamber") was undertaken. This room, sometimes (although this author contends erroneously) considered to be a serdab,¹⁹ also served as the second contingency plan in case of Khufu's premature demise. As soon as this second chamber was covered over with its gabled roofing blocks, work on the first (subterranean) chamber would have, at least temporarily, ceased. The construction of a chamber in

¹⁸ Edwards, "Pyramid Texts," 160.

¹⁹ Lehner, *The Complete Pyramids*, 111.

²⁰ Lehner, *The Complete Pyramids*, 139.

this subject), they also flowed in the heavens, and it was this particular quality of the symbolic waters that presented architects and priests with a solution to their problem. They would incorporate a pair of shafts into the structure so that the cosmic waters could flow down from the sky and flood the second chamber in which the Khufu's body could now be deposited in the event of his premature death. Because this was merely the second phase of the contingency plan, they did not go so far as to actually carve the holes into the interior walls, thus opening these canals into the chamber. This is the reason why, in 1872, Dixon found himself having to chisel out the shafts. Because Khufu was fortunate enough to live to see the completion of his third and final burial chamber, there had never been any need for the shafts to be cleared into the room for use as cosmic water canals to flood the chamber.

Finally, the builders completed the Grand Gallery. If any work was still in progress in the subterranean chamber, the completion of the Grand Gallery would have effectively brought it to a final halt.

As course was piled upon course, the pyramid builders continued work on the very complex shaft structures aiming both north and south from the second chamber. When they started constructing the third and final chamber, the intended resting place for the king and his sarcophagus, they set about constructing another pair of shafts so that the cosmic waters could also flood this, the highest chamber.

It was not until this uppermost room was totally finished, with its walls of Aswan granite, and its hundreds of tons of ceiling lintels of the same material, that the definitive order could be given to cease the construction of the shafts that still led up from the second chamber. As we can see in the diagram below, as the last level of ceiling lintels was placed over the topmost relieving chamber, the ends of the shafts from the second chamber were finally capped off with limestone plugs.

The lower ends of the shafts were never carved through completely to the second chamber because Khufu's final burial chamber had been completed prior to his death. We know that Khufu intended the third chamber to be his final burial chamber, because the Aswan granite sarcophagus was so large that the walls of this room had to be built around it. The stone coffin was not placed in this chamber as a contingency or an afterthought. Instead, it was the culmination of a series of carefully planned, perfectly executed steps which provided for contingency burial plans during every phase of the construction process in case King Khufu should die at any point prior to project completion.

Earthly Considerations in a Spiritual Realm

Since the shafts were intended to symbolize a waterway, it was necessary that both outer ends of the canals emerge at the same height so that the cosmic water would flow evenly through the structure. The extensive use of canals and irrigation ditches in Ancient Egypt dates to the Pre-dynastic era.²¹ Given this, they were apparently quite familiar with the practical issues of building these structures. Other pyramids with aboveground chambers had large passages to conduct the cosmic water (if needed), but Khufu's pyramid had just these small shafts, approximately 20 cm on a side. As with the outside of the pyramid, the builders kept the shafts' vertical heights the same on each side of the third chamber. The first course of granite blocks in Khufu's burial chamber is approximately 105 cm tall (2 cubits). Since the Great (Winding) Waterway would logically flow as a cosmic parallel to the Nile (south to north), the southern shaft entering the burial chamber enters just above this 105 cm height, and the northern shaft exits at the same height. This coincides perfectly with the height of the

²¹ Karl W. Butzer, *Early Hydraulic Civilization in Egypt: A Study in Cultural Ecology* (Chicago, 1976), 30. Also James E. McClellan and Harold Dorn, *Science and Technology in World History, An Introduction* (Baltimore, 1999), 37-40.

coffer, which is two cubits (105 cm) in height. The cosmic water could never “well up” higher than the exit shaft, thus keeping it below the lid of the coffer, and creating an “island” of Khufu’s sarcophagus.

The slopes of the shafts were designed specifically so that when they reached the outer skin of the pyramid, they exited at almost exactly the same height. In the case of the second chamber, located on the east/west center line of the pyramid, this meant both shafts had similar slopes. The third chamber, however, was offset from the east/west center line. To achieve the same height at the exit points of the shafts, two different slopes had to be calculated and used. As clearly planned, both shafts from the third chamber exit the pyramid 154 cubits above ground level.²²

The Great (Winding) Waterway

Like the unused pair of shafts in the second chamber, the shafts in the third chamber pointed north and south, at a line that approximately coincides with our modern meridian. Why were they oriented this way? I argue that what they are in fact pointing to was the celestial location known to the ancient Egyptians as the “Great Waterway.” Later on in the Old Kingdom, this feature of the sky would transform into the Winding Waterway. Although sometimes mistakenly interpreted as the Milky Way (which Allen argues is not the Winding Waterway, but is, in fact *msqt šḥdw*, the “beaten path of stars”²³), the Great Waterway is actually the expanse of the night sky that runs from south to north. The banks of this waterway run parallel to the meridian, and are probably very near the actual visible eastern and western horizons. There is copious evidence in the Pyramid Texts supporting this “east-west crossing” of the Great Waterway:

§337 The reed floats of the sky are set in place for me
That I may cross on them to the horizon, to Re.

§359 The Winding Waterway is flooded
That I may be ferried over thereon to the horizon, to Harakhti.

§384 I have come to you that you may ferry me across in this ferry-boat.

§595 O you gods who cross over on the wing of Thoth to yonder side of the Winding Waterway,
to the eastern side of the sky.

If the original “Great Waterway” ran east/west like the later “Winding Waterway,” as Rolf Krauss suggests in his 1997 book,²⁴ then it would not be “crossed” by the gods (“*O you gods who cross over on the wing of Thoth to yonder side of the Winding Waterway, to the eastern side of the sky*” §595–§596), nor could one ferry across it to the east (“*he ferries the gods to yonder side of the Winding Waterway, to the eastern side of the sky*” §599). These motions would require a “navigating” of the Winding Waterway along its length, and not a “ferrying” of it, across its width. Perhaps the most compelling argument against an east/west flow of the Great Waterway, however, comes from the fact that there appears to be a “north” end of the river to cross:

²² Rudolph Gantenbrink, www.cheops.org/startpage/publications/publications.htm#Ordo.

²³ Allen, “Cosmology,” 7.

²⁴ Rolf Krauss, *Astronomische Konzepte und Jenseitsvorstellungen in den Pyramidentexten* (Wiesbaden, 1997), 45–67.

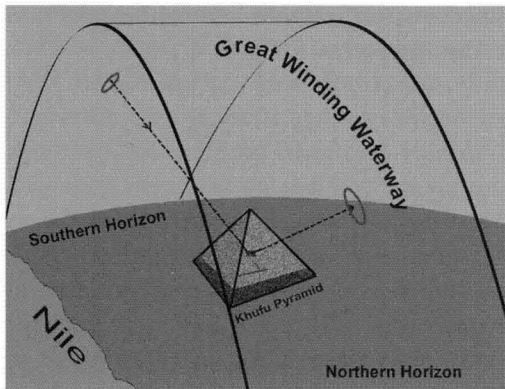


Diagram 4, showing the shafts' alignment to the Great (Winding) Waterway.

§802 for you have traversed the Winding Waterway in the north of the sky as a star crossing the sea which is beneath the sky.

According to Krauss:

- In the early texts the h^3 -canal has no determinative at all.
- Later it received the determinative “canal.”
- Even later the canal determinative gets bent (showing only once in Unas, then regularly in Pepi I).
- In the last phase of Pepi and Merenre it is completely distorted—“winding.”

The Winding Waterway, as a cosmographic feature, appears to be a concept developing during the Pyramid Texts, moving away from one, older north/south concept but into another newer, east/west one. Based on this analysis, the original Great Waterway runs parallel to the Nile, from south to north, and should be viewed as the celestial equivalent of the Nile. It is from this cosmic source that water pours down into the shafts of Khufu's pyramid, making an island of Khufu's sarcophagus, recreating the Primeval Mound, and allowing the King to be revived every morning. This is made possible by the nature of the sky itself:

*In the Egyptian conception, the sky is not so much a solid “ceiling” as a kind of interface between the surface of the Waters and the dry atmosphere.*²⁵

It should be pointed out that with or without the Great Waterway, this theory still holds true for the cosmography and inundation beliefs of Dynasty 4 pyramid builders.

Supporting Evidence

Further supporting evidence can be found. For example, the birth name of Khufu, as discovered in quarry marks painted in the relieving chambers above his burial chamber, and at a quarry in the Sinai, was actually “Khnum-Khuf,” or “Khnum Protect Me.”²⁶ Khnum is, of course, the early-Dynastic god of the Inundation. Although of much later origin, we know from the Famine Stela that: “*Khnum is the god [who rules] there, [He is enthroned above the deep], His sandals resting on the flood; He holds the door bolt in his hand, Opens the gate as he wishes.*”²⁷

Huni, Khufu's grandfather, is thought to have built a small pyramid on Elephantine Island, where Khnum's cult center was located.²⁸ This island near Aswan was believed to be the place of the first Creation, and it is from this place that Khufu had nearly a thousand tons of red Aswan granite brought hundreds of miles by barge to line and cover his burial chamber, and even to build his sarcophagus. The granite from Aswan may have been seen as having magical properties and a direct

²⁵ Allen, “Cosmology,” 5.

²⁶ Lehner, *The Complete Pyramids*, 114.

²⁷ M. Lichtheim, *Ancient Egyptian Literature: A Book of Readings*, Vol. 3 (Berkeley, 1980), 94–100.

²⁸ Shaw and Nicholson, *British Museum Dictionary of Ancient Egypt*, 151.

connection to the original Primeval Mound. Indeed, Khnum was specifically linked to the selection of temple building materials, as we see once again from the Famine Stela:

I am Khnum, your maker!
 My arms are around you,
 To steady your body,
 To safeguard your limbs.
 I bestow on you stones upon stones,
 That were not found before,
 Of which no work was made,
 For building temples,
 Rebuilding ruins. . . .²⁹

Clearly there is a link between Khnum, the Primeval Mound at Elephantine Island, Aswan granite, and the burial chamber and relieving chamber of King Khufu. When taken in the context of the inundation mythology, the selection of the Aswan granite for the burial chamber becomes quite understandable.

The earliest attestation of the god Khnum has been potentially traced back to pre-Dynastic times. His significance in the Pyramid Texts, as well as inscriptions and depictions from the time of Sahure, clearly show his nature as a protector god of kings was fully developed by the Fifth Dynasty.³⁰ Khufu's birth name includes a reference to Khnum. His significance in the time of Khufu is unquestionable, as there is a ram-head statue in the Berlin Museum that declares the figure to be "protector of the king witnessed by the name of Khufu as a king of Upper and Lower Egypt."³¹ The depictions of Khnum, however, seem to date much further back in Egyptian history, possibly as early as the Gerzean peoples.³²

Textual Evidence

Rainer Stadelmann has recently asserted that there are hieroglyphs legible on the first limestone block in the second chamber's northern shaft:

On the surface, faint traces of quarry marks are detectable, the sign of the work-gang wadj ('the green one') and probably the hieroglyph prjj, "to come out" (of the tomb).³³

Setting aside the first "work gang" hieroglyph for the moment, as this sort of graffiti tends to appear randomly throughout many of the places in a pyramid's core construction, it seems quite plausible that the second hieroglyph, the one denoting "to come out" of the tomb, was not referring, as Stadelmann suggests, to the spirit of the dead king. Instead of the king's spirit, I suggest that the inscription refers to the waters that ran parallel the south-north flow of the Nile. Indeed, the northern shafts would have been the place for the waters "to come out" of the pyramid, after they had flooded the burial chamber and revived the deceased king.

Perhaps some of the most compelling evidence supporting this theory, however, comes in the form of a second-hand textual reference. In the Fifth Century B.C.E., the Egyptian priests at Giza could still

²⁹ Lichtheim, *Ancient Egyptian Literature*, 98.

³⁰ Nigel Strudwick, *Texts from the Pyramid Age* (Atlanta, Ga., 2005), 85.

³¹ D. Abou-Ghazi, "Favours to the King from Khnum in the Pyramid Texts," in U. Luft, ed., *Intellectual Heritage of Egypt. Studies Kákosy* (Budapest, 1992), 29.

³² Abou-Ghazi, "Favours to the King," 30.

³³ Rainer Stadelmann, "The Pyramids of the Fourth Dynasty," in Zahi Hawass, ed., *The Treasures of the Pyramids* (Cairo, 2003), 124–25.

accurately read what was written on the pyramid, temple and causeway walls. They were familiar with the history of these structures because they could read it for themselves. It was in that century that the Greek historian, Herodotus, visited Egypt and was told many factual details about the kings who had built the pyramids at Giza. Simply by reading the walls, the priests were able to tell Herodotus the "cost" of building Khufu's pyramid. "*There is an inscription in Egyptian script on the pyramid about how much was spent on radishes, onions, and garlic for the labourers, and if my memory serves me well, the translator reading the notice to me said that the total cost was sixteen hundred talents of silver.*"³⁴ They accurately communicated to him the pyramids' function as burial edifices for ancient kings, and they gave him many other facts that, as more information about the ancient Egyptians has come to light, have turned out to be correct. Historians have regularly dismissed one of the most puzzling accounts told to Herodotus because it simply didn't make sense in our modern, physical world. Obviously, Herodotus was not an Egyptian, so he simply translated and wrote what he was told, with little or no ability to interpret the data with regard to Egyptian cosmography or mythology. However, in light of the in-depth understanding of ancient Egyptian creation and resurrection myths that we now possess, the mysterious tale recounted by Herodotus becomes clear. Herodotus wrote:

*So they spent ten years over this road and the underground rooms which Cheops had constructed as his sepulchral chambers in the hill on which the pyramids stand, **which he turned into an island by bringing water from the Nile there along a canal.***³⁵ (emphasis added)

Herodotus then goes on to contrast Khufu's (Cheops') pyramid with that of his son, Khafre (Chephren):

*There are no underground chambers in Chephren's pyramid, nor does a channel come flowing into it from the Nile, as in the case of the other one, where **a conduit was built so that the Nile would encircle an island on which, they say, Cheops himself is buried.***³⁶ (emphasis added)

Although the references speak directly of the canal connecting to the Nile, it is not unreasonable to suppose that Herodotus, who was not overly familiar with Egyptian myths and cosmology, would mistake a reference to the Great Waterway, as a reference to the waters of the geographical Nile. The Nile is the only body of physical water near the Giza pyramids. What is significant about the quote, however, is that it clearly explains that Khufu's pyramid was different from others, in that it had canals that guided water into the burial chamber to create an island. This obvious parallel to the Egyptian Creation mythology and the physical structure we see today should not be overlooked or dismissed. It is, in fact, a clue to the cosmological mindset of the builders of Akhet Khufu, Khum-Khuf's pyramid at Giza.

This suggestion of a miscommunication is further endorsed by a quote from another Greek historian, Strabo, who visited Egypt over a century after Herodotus. During his visit, he was told that the Osireion, a (possibly symbolic) resurrection structure built by Seti I at Abydos, also included a canal. "*There is a canal leading to the place from the great river; and in the neighborhood of the canal is a grove of Aegyptian acantha, sacred to Apollo.*"³⁷ There is no significant body of water near the Osireion, and the Nile, being the only terrestrial "great river" in Egypt, is over twelve miles (20 kilometers) away. In addition, the "Aegyptian acantha," otherwise known as the acacia tree, is more of a desert plant and not found near water. Given these facts, this was likely not a genuine, material canal designed to

³⁴ Robin Waterfield (trans.), *Herodotus: The Histories* (Oxford, 1998), 145-47.

³⁵ Waterfield, *Herodotus: The Histories*, 145.

³⁶ Waterfield, *Herodotus: The Histories*, 145.

³⁷ Horace Leonard Jones (trans.), *The Geography of Strabo*, Book 17, 42 (London, 1932), http://penelope.uchicago.edu/Thayer/E/Roman/Texts/Strabo/17A3*.html.

carry water from a terrestrial source. Indeed, we must also remember that the sky was divided into several regions, one of which was the Field of Reeds (or Rushes). Acacias figured frequently in New Kingdom mythology, as we can see from this extract from “The Book of the Dead”:

*I have been in the stream [to purify myself]. I have made offerings of incense. I betook myself to the Acacia Tree of the [divine] Children.*³⁸

Since many land features had cosmic counterparts, it is not unreasonable to assume that a grove of acacias was also to be found in a place not necessarily physically located on the surface of the earth.

The Osireion was built by Seti I, possibly in his effort to revive the old religions after the Amarna period. The Aswan granite sarcophagus, granite “burial chamber” with 2:1 dimensions (length-height ratio)³⁹ and a dead-end canal used to flood a central “island” is highly reminiscent of the burial chamber of King Khufu at Giza. Another clear parallel exists between Khufu and Seti in that they both had sons who took the Re- suffix as part of their titulary (Re-Djedef, Re-Khaf, and Re-Messes). According to Kamrin:

*Beginning at least in the 4th Dynasty, the king is also identified explicitly as the son of the sun god through the title s3 Rꜥ, “son of Re.” This identification becomes even more explicit in the New Kingdom, when the divine birth of the king was given great prominence.”*⁴⁰

Although there is no evidence of the resurrection god Osiris himself having been a part of Khufu’s belief system, the rebirth and flood mythology is a constant throughout Egyptian history. I suggest that Seti, in an attempt to instigate another “golden age” in Egyptian history, had probably tried to create a (then) modern “resurrection machine” that incorporated the known features of Khufu’s tomb. Naturally Seti would know of these features in Khufu’s pyramid from the same source that Herodotus would use centuries later. In fact, based on this understanding, it is reasonable to suggest that Seti I was originally laid to rest in the granite coffer in the Osireion, only to have his mummy later removed to the Valley of the Kings after his formal revivification process was complete, for burial according to the “modern” custom.

Conclusion

The shafts in Khufu’s pyramid are not star shafts, sun shafts, spirit shafts, nor are they ventilation shafts. These shafts serve as one single canal linking the southern end of the Great Waterway, through Khufu’s sepulchral chamber, to the northern end of the same celestial counterpart of the Nile. They were a mandatory part of a rich, deep and complex system of magic and religion. This kind of “sympathetic magic,” in which models could serve just as capably as the actual object they were modeling, allowed the king to divert the waters that were essential for his revivification, while still allowing him to move his body upward into the body of the pyramid thus enabling him to be joined with, and in fact become, the god Re himself, in the afterlife.

Independent Scholar

³⁸ E. A. Wallis Budge (trans.), *The Papyrus of Ani 240 B.C.*, Ancient Egyptian Book of the Dead, [The Chapter of] Entering Into the Hall of Maati to Praise Osiris Khenti-Amenti (London, 1895), http://www.sas.upenn.edu/African_Studies/Books/Papyrus_Ani.html.

³⁹ Margaret A. Murray, *The Osireion at Abydos* (London, 1904), 8.

⁴⁰ Kamrin, *Cosmos of Khnumhotep II*, 9.