

WATER TRANSPORTATION AT GIZA DURING KHUFU TIME

Water was the fuel that powered the engine of ancient Egypt and the instrument that facilitated the construction of the pyramids. I demonstrated the magnitude of this power in “Pharaoh’s Secrets of the Pyramids,” in which I theorized that the Egyptians harnessed water by using sluices and shadufs to transport building materials and construct the Great Pyramid of Khufu.

In this text, I will further explore how water was instrumental in constructing the Great Pyramid. I propose that an infrastructure of waterways within the Khufu Basin was the method of transport beyond inundation and throughout the year. I will detail how the Egyptians utilized and manipulated this water-powered infrastructure by constructing sluice systems and a dam within the Khufu Basin. This innovation enabled the movement of massive stone blocks and other building materials from within the Khufu Basin and the Khufu Quarry to the pyramid base for use in the Great Pyramid’s construction.

The Giza Plateau

In the 1980s, an American-British consortium (AMBRIC) drilled 72 boreholes before installing a new sewage system east of the Giza Plateau. Data collected from these boreholes yield valuable information about the terrain, including the depth of sediment deposits beneath the surface and the elevation to sea level. I utilized this data and insights from books, maps, photographs, and other materials to develop my theory of how the Egyptians used waterways within the Khufu Basin to facilitate the movement of building materials.

Dr. Mark Lehner analyzed the AMBRIC and AERA borehole core findings, which showed silt and clay 2-5 meters above sea level, thus identifying and confirming the location of the bottom of the Nile River’s old channel or Western Branch in the old Libeini Canal.

Egyptian builders dug next to the Giza Plateau, in the floodplain from the Nile branch to the Khufu Basin, expanding upon the existing canal, making it broader and deeper. This expansion enabled the Egyptians to deliver stones and supplies needed for the construction of the Khufu Pyramid.

Khufu HARBOR Temple and Khufu Basin Water Levels

I believe that in ancient Egypt, every pyramid was built near a lake or water basin with a harbor, and each pyramid had a causeway that led down from the pyramid to the temple in the harbor. The temple at Khufu Harbor is known as the Valley Temple, but due to its location at Khufu Harbor, I will be using, and I suggest using, a more appropriate name, the **Khufu HARBOR Temple**.

The Platform of Khufu HARBOR Temple (uncovered in 1994 during excavations for a high-rise building) is 14.5 meters above sea level. During annual flooding, the water rose 7 meters (23 ft) from the lowest level in the Nile. To keep the Khufu HARBOR Temple dry during the yearly flooding, the highest tolerable water level in the marina and floodplain would have been 13 meters above sea level.

The AMBRIC borehole cores showed solid clay and silt bottoming out at 7 meters above sea level in north Khufu Basin, near the Khufu HARBOR Temple. The south Khufu Basin was 4 meters above sea level, with a 3-meter slope from north to south. River water deposited black silt from the Ethiopian and Sudan mountains to the old Kingdom floodplain. The basin’s deepest (lowest) point was the same depth as the lowest level of the ancient Nile River Western Branch channel.

During Spring and early Summer, the water level in the Western Branch of the Nile was relatively shallow, measuring approximately 3 meters deep (7 meters below the floodplain). In the Khufu Basin, the water depth ranged from 0-3 meters. During this time of the year, water would only be present in the deepest parts of the basin (Probable Small Lake), for example, in front of the present-day Khafre HARBOR Temple. Although there was enough water to operate canals to the pyramid base and the sluices on the pyramid all year, without controlling water flow, water transportation within the basin would need to halt for a few months due to low water levels.

Use of Levees and Dams in Egypt During Inundation

By the end of the summer, Nile water levels would increase by 7 meters due to rain and runoff from melted snow in the Ethiopian mountains. This influx of water would flood basins and deposit significant quantities of silt. The Egyptians considered this water and sediment a “gift” and made openings (small dams) in the basin levees to allow the rising water to distribute silt, which enabled intensive cultivation.

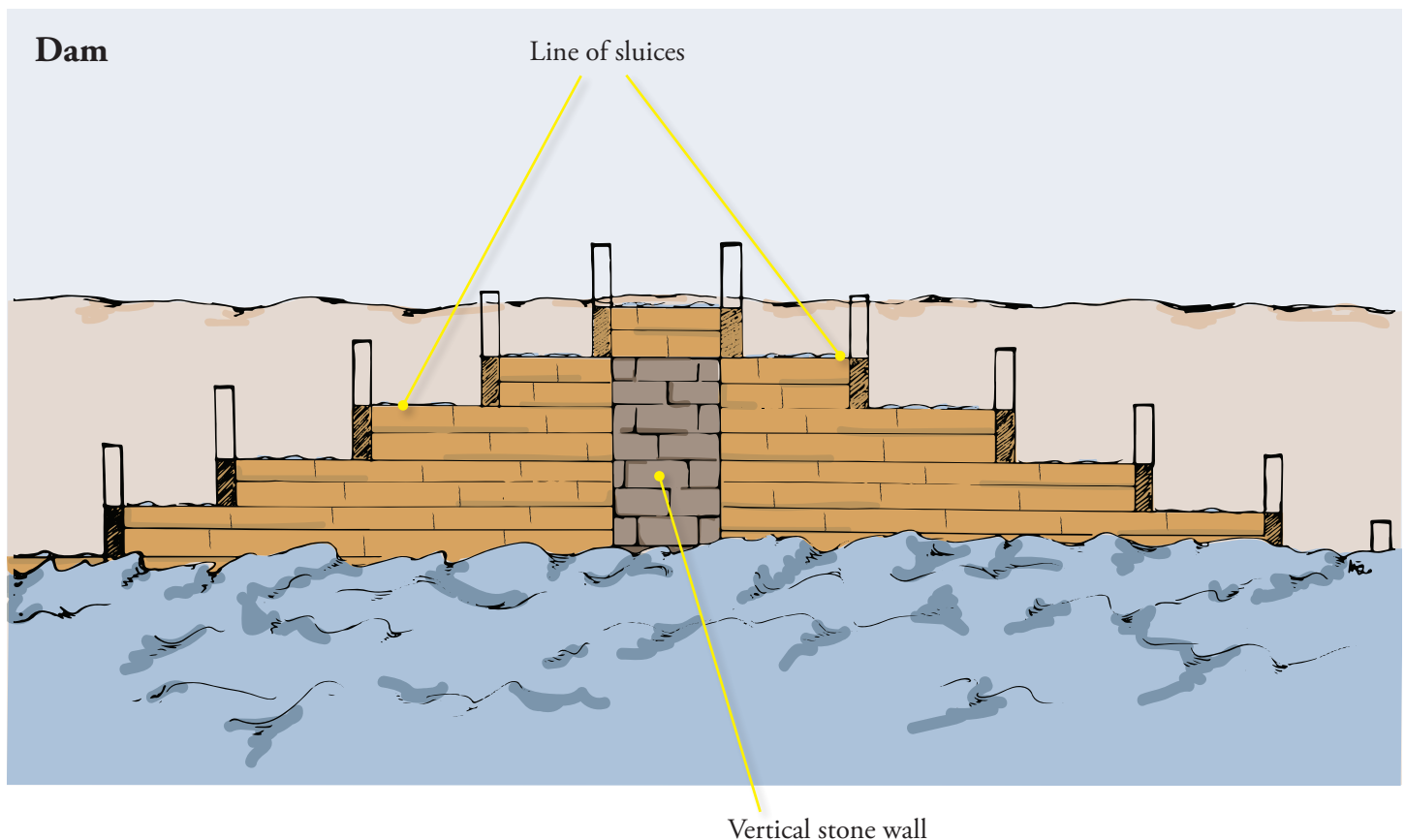
When basins were full, the Egyptians closed the openings (small dams) in the levees and retained the water within the basins for approximately two months. When the Nile water levels began to recede, the Egyptians would release water from the basin through the small dams.

Khufu Basin Dam

Employing their knowledge of agricultural basins, I theorize that the Egyptians constructed a dam in the Khufu Basin that would allow water transport to continue all year.

When the annual inundation began, the Egyptians allowed the water to flow into the basin. During this time, large boats were delivering massive granite from Aswan, casing limestone from Tura, and unloading the cargo close to the Khufu Pyramid from the Khufu Quarry site. This proposed site is near the current Khafre HARBOR Temple location.

In anticipation of dam construction, the Egyptians positioned stones and clay at the top of the bank where the dam was to be built. As the water began to recede, construction of the dam in the Khufu Basin commenced.



Khufu Basin Dam Construction

The Khufu Dam could have been built using short vertical limestone walls on both sides of the canal bank, beginning at the canal bank's lowest point and extending to the top of the canal bank.

The dam's base could have been built using one layer of stones on the bottom with a wooden railing. Ropes would have been attached to the railing, acting as a guidance system for stone placement during the dam's construction. By the end of flooding, when water began receding, the dam would be completed by sliding the ropes from the canal banks into the center of the canal and dropping stones into the water where needed. Clay (widely available tafla) sealed the dam from leaking.

Water levels were constantly changing due to leakage, evaporation, and the use of sluices. As a result, the water level in the basin would slowly recede, and the top part of the dam, above the water level, would be disassembled. Stones above the water level would be removed and placed on the top of the bank to be reserved for use during dam construction the following year. The water level recession was also why the main harbor and Khufu HARBOR Temple had lower water ramps.

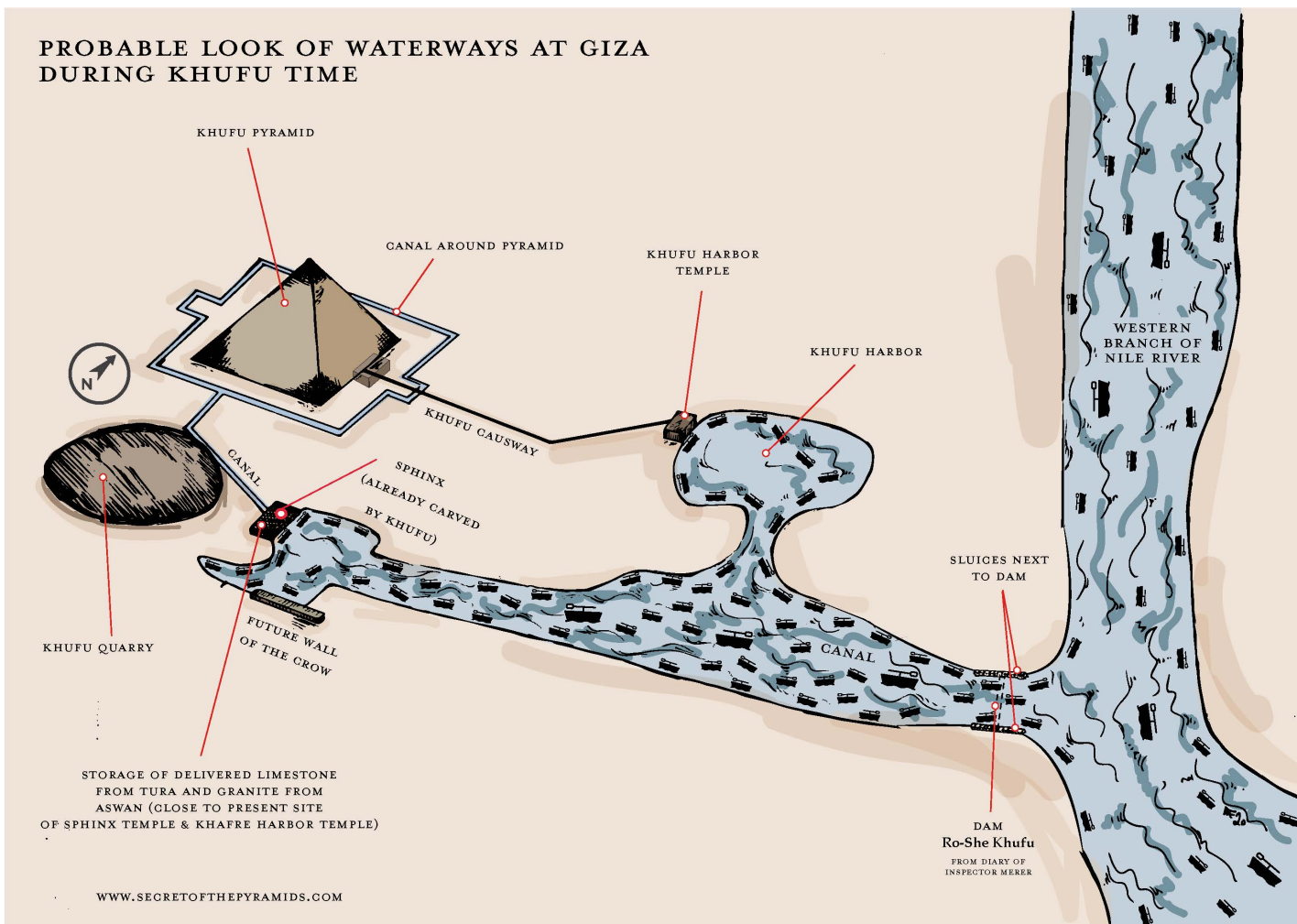
These are my thoughts on how the Egyptians could have constructed the Khufu Basin Dam. Dams were not a novel concept to the Egyptians. We know they had experience constructing the dam at Sadd el-Kafara. It is also common knowledge that beavers are masterful dam builders and that the Russians did a good job building the dam at Aswan. If these engineers could master the art, I believe it is safe to assume that the Egyptian engineers who built the Great Pyramid were more than capable of building a dam in the Khufu Basin.

Sluice Lines at Khufu Basin Dam Site

On both sides of the dam, workers built sluice lines to permit transport during periods of reduced water depth. The lowest sluice was at the same depth as the lowest water level in the Nile during early summer. The sluice lines would have escalated in height to the top of the canal bank and back down to the lowest level.

When the dam was closed, boats coming from the Nile delivered materials to the dam location, where they were reloaded onto barges. Smaller stones, construction supplies, and materials necessary for the workers' support, were transported via barges that were lifted in the dam's sluices to reach the basin.

PROBABLE LOOK OF WATERWAYS AT GIZA DURING KHUFU TIME



Canal Between Khufu Basin and Pyramid Base

Egyptians dug or built a canal on the top of the terrain adjacent to the Khufu Quarry to move materials from the basin to the pyramid. Inspector Merer described a delivery point in an ancient papyrus found at Wadi el-Jarf, which I believe is the area close to the present-day Khafre HARBOR Temple. The Egyptians stored materials like granite from Aswan and casing limestone from Tura at this site before moving it to the pyramid base.

In “Pharaohs’ Secrets of the Pyramid,” I theorized that the elevation change required a Header System of sluices to facilitate the transport of barges carrying stones and building materials along the canal from the basin to the base of the pyramid and eventually to the spot on the pyramid where they were needed.

The water elevation in the basin was 13 meters above sea level (Khufu HARBOR Temple was 14.5 meters above sea level). The base of the Khufu Pyramid was 60 meters above sea level, the difference being 47 meters. The Egyptians needed to build approximately 34 Header System sluices in the canal to move stones from the basin to the pyramid’s base.

The elevation of the Khufu main quarry was 40-45 meters above sea level, so moving core stones from the quarry to the base of the pyramid required 15 Header System sluices within the canal. Besides each Header System sluice, lines of shadufs were necessary to increase the water level and meet the canal’s next highest elevation point.

Conclusion

Every aspect of the Great Pyramid's construction required the use of water. Constant water use led to fluctuating water levels in the Khufu Basin.

- a. Operating Sluices next to the Khufu Dam.
- b. Operating sluices in the canal between the Khufu Basin and the base of Khufu Pyramid
- c. Operating sluices in the canal between the Khufu Quarry and the base of Khufu Pyramid
- d. Operating sluices on the Khufu Pyramid
- e. Moving stones in canals on each level of the Pyramid.

A dam was integral in managing basin water levels and facilitated uninterrupted transportation within the basin. This brochure sheds light on how Egyptians could have constructed and used a dam in the Khufu Basin to promote transportation beyond inundation from the Khufu Basin and the Khufu Quarry to the base of the pyramid and finally to the pyramid location where materials were needed.

Inspector Merer described Ro-She Khufu 4,500 years ago on papyri that Professor Pierre Tallet uncovered in Wadi el-Jarf in 2013. I believe Ro-She Khufu is the dam I describe in my theory, located between two mounds, Nazalet el-Sisi and Nazalet el-Batran.

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The ancient Egyptians were masters at handling water and understood what water meant to their way of life. With incredible skill and creativity, they constructed one of the most significant structures in history by harnessing the water around them. Without the Nile, there would be no Egypt, and ***without the water from the Nile, there would be no pyramids.***

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