

Egyptian Pyramid Building

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The Great Pyramids at Giza are located on the Giza Plateau, situated on the western bank of the Nile River, just outside modern-day Cairo, Egypt. This location was strategically chosen due to its proximity to the ancient capital of Memphis and its geographical significance as a high, flat area that provided a stable foundation for the monumental structures.

Construction

The construction of the Great Pyramids utilized a variety of materials that were readily available in ancient Egypt during the Old Kingdom period (around 2580-2560 BCE). Some of the key materials used included:

Limestone: Majority of the core structure, locally quarried on the Giza Plateau.

Granite: Used for interior chambers and casing stones, quarried in Aswan, transported by river.

Mudbrick: Constructed workers' villages and support structures.

Reeds and Papyrus: Used for tools, ropes, and baskets.

Copper Tools: Chisels and saws for quarrying and carving.

Water: Nile River, vital for workers and reducing sled friction.

Gypsum: Used in mortar for casing stones.

Construction techniques involved the use of ramps or internal spirals, and precision in alignment and geometry was remarkable. Copper chisels, wooden mallets, and stone hammers were used as tools, while limestone mortar was employed for casing stones. The original smooth, white Tura limestone casing stones have mostly eroded. The construction is estimated to have taken around 20 years to complete.

Geopolymer

The "geopolymer" hypothesis suggests an alternative construction method for the Great Pyramid at Giza, proposing that some stone blocks were cast in place using geopolymer concrete made from crushed limestone and water. Supporters highlight unique characteristics of certain stones, such as Tura limestone casing stones, showing signs of casting. Advocates argue that this approach could have been more efficient, though it remains controversial among experts. Traditional quarrying and transportation methods are still widely accepted, and ongoing research may provide further insights into ancient Egyptian pyramid construction techniques.

Technology

In the period of 2580-2560 BCE in ancient Egypt, available technology included basic agricultural tools, pottery, rudimentary irrigation, copper metallurgy, advanced construction techniques for monumental structures like the Great Pyramids, hieroglyphic writing, basic mathematics, a lunar calendar, limited medical knowledge, shipbuilding, textile production, cosmetics and perfume-making, jewelry craftsmanship, beer brewing, and boat building for trade and transportation. These technologies reflected the Egyptians' ingenuity and adaptability in addressing their needs and contributing to the development of their civilization along the Nile River.

Rollers and Wheels

Wooden rollers have been historically used for various purposes, including moving massive stones, logs, and boats. In construction, they allowed for the transportation of large stone blocks, reducing friction and effort. In forestry, wooden rollers facilitated the movement of logs from forests to processing sites, while in boat transportation, they helped move boats between water bodies and around obstacles. Additionally, these rollers found application in construction, engineering, and materials handling, with their cylindrical design and use of hardwoods contributing to durability. While modern transportation methods have largely replaced them, wooden rollers remain a testament to the ingenuity of ancient civilizations in overcoming logistical challenges.

The use of wooden rollers played a crucial role in the construction of the Great Pyramids at Giza. During the construction of these monumental structures, massive limestone and granite blocks were transported from quarries to the construction site. Wooden rollers were placed under these colossal stone blocks to reduce friction and facilitate their movement across the desert terrain.

Evidence suggests that the ancient Egyptians had a basic understanding of wheels and had invented the potter's wheel by the Copper Age (4500-3300 BCE). These early wheels were typically solid wooden disks with a hole for the axle, likely used for pottery production and other small-scale applications. However, there is limited direct archaeological evidence to support the extensive use of wheels for transporting massive stone blocks during the pyramid construction.

Iron

Evidence for iron-making in ancient Egypt is limited and seems to have occurred between the Third Intermediate Period and the 23rd Dynasty, roughly dating from 1100 to 750 BCE. However, what is noteworthy is the absence of concrete evidence of iron ore smelting during this pre-modern era in Egypt. It's important to mention that the earliest indications of iron production are found in Central Anatolia around 1800 BCE, primarily used by elites during the

New Hittite Empire (~1400–1200 BCE). Furthermore, the emergence of carbon steel, a significant metallurgical advancement, was observed approximately 2000 years ago (around the first century CE) in northwest Tanzania, featuring complex preheating techniques. These findings shed light on the history of metallurgy and iron-working practices, but the exact extent of iron smelting capabilities in ancient Egypt during the timeframe of the construction of the Great Pyramids (2580-2560 BCE) remains uncertain.