**Akhenaten's Religious Reforms**



**By Stephen E. Thompson**

Akhenaten is one of the most controversial Egyptian pharaohs. There is much disagreement among scholars over even the most basic facts concerning his life and reign. Under Akhenaten's father, Amenhotep III, Egypt was the strongest and wealthiest nation in the world. Akhenaten, whose name originally was Amenhotep, grew up during one of the most prosperous periods in Egyptian history. Later, historians called this period the New Kingdom.

Akhenaten was not the intended heir of his father’s, but with the death of his older brother he became crown prince. Akhenaten's chief wife was the beautiful Nefertiti, whose portrait is one of the most attractive artifacts preserved from ancient Egypt. With Nefertiti, Akhenaten had six daughters, three of whom possibly died in childhood. In the twelfth year of Akhenaten's reign, Nefertiti took on a lesser role for reasons unclear to scholars. During this time, Akhenaten's eldest daughter, Meritaten, served as his chief wife.

Akhenaten may also have had sons, although none are found in any of the numerous portraits of the royal family. In one fragmentary inscription, King Tutankhaten (who is better known by his later name, Tutankhamun) is described as “King's physical son.” It is known that Tutankhamun had a brother, Smenkare, who preceded him on the throne. Some scholars believe these two kings, who both succeeded Akhenaten as pharaoh, to be his sons. Others believe, however, that Tutankhamun and Smenkare were sons of Amenhotep III and, therefore, half-brothers of Akhenaten.

In the second year of Akhenaten's reign, this Egyptian pharaoh began making major changes in the religious and political life of his country. During this year, he introduced a new image into the Egyptian pantheon. The usual depiction of the sun god as a falcon-headed man disappeared. Its replacement was the figure of the sun-disk, called in Egyptian the *Aten*, with rays extending downward and ending in little hands. Until the fifth year of his reign, Akhenaten was known as Amenhotep IV. It was in his fifth year as king that he officially changed his name to Akhenaten, which means “He who is beneficial for the Aten (sun-disk).” It was also at this time that Akhenaten founded a new capital city for Egypt. He called it *Akhetaten*, which means “The Horizon of Aten.” (Today, this city is known as El-Amarna.) In the eighth year of his reign, the king and his court moved to their new capital.

Behind all of this name changing and moving lay a plan for introducing a radical new element into Egyptian religion. In fact, Akhenaten is regarded by some as the founder of the first new religion history. Before Akhenaten became pharaoh, the chief god of Egypt's rulers was Amun-Re, a combination of the god Amun and the sun god Re. It was to Amun-Re that Akhenaten's predecessors had attributed their success in building Egypt's empire. Many of the spoils of war had gone into the storehouses of Amun-Re's temples.

Akhenaten, however, preferred another form of the sun. He chose to worship the Aten, the disk visible in the daytime sky. To prefer to worship one god over the many others worshiped by the Egyptians was not unusual. What was unusual about Akhenaten's belief is that he did not even acknowledge the existence of any other gods. Akhenaten believed that the Aten was the sole god. Because he held this belief, Akhenaten closed down the temples of the other gods. He also sent workers throughout Egypt to remove the name of Amun-Re, and even the word “gods,” from the country's monuments. Aten was the only god officially recognized to exist. In addition, Akhenaten put forth that he was the only one to whom this new god revealed himself. He alone served as the mediator between the Aten and the Egyptians. Individuals worshiped the Aten by praying to an image of the king and his family.

In addition to changes in religion, Akhenaten also introduced changes in the Egyptian political administration. For several generations prior to Akhenaten's rule, important government offices had been held by individuals from only a few important families. Akhenaten installed new people of his own choosing into these offices. Akhenaten also allowed Egypt’s diplomatic relations with countries in Asia to deteriorate. The result of these changes was that Egypt's control over its empire in this part of the world had greatly diminished by the end of Akhenaten's reign.

Akhenaten's reforms were never very popular with the average Egyptian. In the workers’ village at Akhetaten, archaeologists have discovered prayers to Amun. Upon Akhenaten's death, his religious program was discontinued. His successor, Tutankhamun, eventually reopened the temples of the other gods and moved the capital of Egypt from the Horizon of Aten to the traditional location of Memphis. Akhenaten's religious “reform” had ended.

**Use complete sentences to answer the questions!**

1. **Why might Akhenaten’s choice to worship one god instead of many anger the average Egyptian?**
2. **How does the Ancient Egyptian government’s role in religion compare to the US government’s role in religion?**

## Farmers: VIPs of Ancient Egypt



#### By Dorothy Phillips Mobilia

A **VIP** is a **V**ery **I**mportant **P**erson. In many ways, farmers were the most important people in ancient Egypt. After all, it was they who fed the country. During the flood season, farmers were also called upon by the pharaoh to do other work, such as building pyramids, mining gold, and serving in the army. Most of the population of ancient Egypt was farmers and their families. Although not enslaved, farmers were tied to the land of a wealthy master. They worked the master’s land, cared for the animals, and sometimes had a small plot of their own to garden. With prayers and offerings to the gods or an abundant harvest, the farmer followed a calendar of three seasons:  
  
**1. Akhet, the flood season**, went from around June through September. Monsoon rains in the African highlands to the south swelled the Nile River, flooding its banks and bringing rich nutrients to Egyptian fields. Farmers waited anxiously as the waters receded. Too much water and they could not plant; too little and the crops could not grow. Either case meant hunger for everyone.  
  
**2 Peret, the growing season**, went from around October through February. Farmers broke up the soil in the muddy fields with a wooden plow pulled by men, oxen, or cows. Women scattered grain for crops of barley, wheat, and corn. Pigs, sheep, and goats were then let loose to roam the fields, pressing the seed into the soil with their hooves. If the farmer had his own plot, he might plant onions, garlic, lettuce, squash, beans, grapes, melons, and more. After planting, farmers worked on the canals and irrigation ditches that brought water to their fields. Little rain fell during the growing season, so farmers had to divert Nile water to grow their crops. An important tool used by farmers was a shaduf. Invented by farmers in nearby Mesopotamia, shadufs were used to lift buckets of water by a simple system of poles and weights. (Shadufs are still used today in parts of Africa.)  
  
**3. Shemu, the harvest season**, lasted from around March through May. During the harvest, singers chanted work songs while the farmers labored. Most of the harvest went to the landowner, but some went to the government for taxes, and some went to the farmer and his family. Farming was hard work, but ancient Egypt survived —and thrived—on the labor of the farmers.

**Use complete sentences to answer the questions!**

1. **What role did the Nile play in farming? Explain 2 ways how farmers depended upon it.**
2. **How did farmers have the power to “make or break” Ancient Egypt? Explain.**

## Religion and the Afterlife



#### by Leonard H. Lesko

Excavations of Egyptian burial sites predating the oldest recovered written documents have revealed much about early Egyptian beliefs. The burial customs practiced at these sites indicate a widespread belief in an afterlife that closely resembled the life these dwellers along the Nile River enjoyed on earth.

In this early period, Egyptians sought to preserve the bodies of the dead on the low desert beyond the reach of the Nile’s waters. The early graves were small ovals or rectangles dug in the sand. They could accommodate the body of the deceased in a contracted position on its left side along with a few jars of food and drink and slate palettes with magical religious significance. Gradually, the graves increased in size to keep pace with the increased status or wealth of the deceased.

The simple mounds of sand and rubble that covered the early graves evolved into mud brick superstructures filled with rubble, known locally as **mastabas**. In time, these tombs came to be built in more durable stone, and the simple offering places in the form of false doors (stepped-back niches or recesses) on their façades grew into multi-roomed decorated chapels. Whether on the façades of tombs or inside chapels, the false door was the focus of the offering cult and the place of passage for the soul of the deceased between this world and the next.

The burial chambers deep in the rock below the mastabas contained personal goods, including valuable objects and commodities. Since these required protection, architects had to design security features. For example, the openings of the burial shafts were hidden under the paving of the roofs, and the entrances to the burial chambers were sealed with blocking stones. Royal mastabas developed into “step pyramids” and then “true pyramids.”

While a pyramid’s large size was intended to protect against robbery, it also may be related to religious beliefs associated with the cult of the sun-god Re, since the pyramid shape resembled the rays of the sun descending to earth. Although most religious centers in ancient Egypt had specific beliefs about the afterlife, it is the beliefs concerning the afterlife of the king that are the most fully documented. These beliefs are found in the collection of rituals, hymns, descriptions, prayers, offering lists, and magical spells that we know today as the Pyramid Texts.

Inscribed on the interior walls of the pyramids, these texts associated Egypt’s kings with the various gods and their religious worship in such a way that the kings became divine unifying sources both for religious practices and for the people of Egypt. Every living king was identified with the sky god Horus, who avenged the murder of his father Osiris. Thus, as Osiris was the Egyptian god of the dead, every deceased king became an Osiris.

Osiris’ spiritual rebirth is also connected with the richness of the land and with the source of this richness—the Nile River and its yearly flood cycle. Osiris also had his place in the Field-of-Offerings in the sky. There, lower-ranking followers spent their afterlives working for him.

The Pyramid Texts offer many descriptions of the ascension of the deceased to the sky so that he might take his place in the boat of the sun-god Re. There, the king is associated with the Lord of All. As the pilot of Re’s boat, the king accompanies him on the journey through the clear day sky and the threatening night sky, which the Egyptians believed was filled with obstacles and demons. Descriptions of the geography of the sky, names and images of its guardians, and serpent spells to use in self-defense are all contained in the Pyramid Texts. Beginning with Unis, the last king of the Fifth Dynasty, these texts have been found on the walls of the royal burial chambers. They may also have been written on **papyri** included in earlier royal or private burials that were plundered by robbers.

For the Egyptians, it was important that the deceased kings, and eventually others not of royal rank, return to the womb of their mother Nut to be reborn. In myth, Nut was the mother of Osiris. She is also described as the female sky goddess stretched across the heavens (like the Milky Way), who swallowed the sun-god Re every evening and gave birth to him every morning. Inscriptions identify burial chambers and coffins with the goddess Nut. The cycles of death and rebirth were goals for the divine kings that clearly became much more widespread by the end of the Old Kingdom.

For a non-royal Egyptian, the most important goal was to become an equipped spirit—an akh. To be “equipped” referred to the preparations an Egyptian made for death and the afterlife. These preparations involved building a sturdy tomb and storing up treasure. More important, however, it meant having knowledge of the afterlife. This knowledge was available in the Pyramid Texts and other similar guidebooks to the afterlife.

**Papyri** is the plural of papyrus, a tall water plant that grows along the Nile River. The ancients cut thin slices from the center of the plant’s stem, and then soaked, pressed, and dried them crosswise to make a form of paper.

**Use complete sentences to answer the questions!**

1. **Why were pyramids designed to be so large?**
2. **How did Egyptians involve the gods when planning for burial?**

## Reading the Rosetta



#### By Emily Teeter

The ancient Egyptian language was written in a picture script, called hieroglyphs. It was in the form of objects -- animals, plants, and household items -- that the ancient Egyptians saw around them every day. Hieroglyphs were known as early as 3100 BCE, and the last inscription dates to 394 CE. Soon after 394, the knowledge of how to read hieroglyphs was lost.

In the following centuries, people tried to decipher the script in order to understand more about ancient Egypt. Some of the earliest scholars tried to read the signs strictly according to the shape of the hieroglyph, while others believed that the signs were entirely symbolic. These early attempts failed because scholars did not understand that most of the signs were used for their phonetic (sound) values, not for what they represented. For example, the owl is simply the sign for the sound “m,” and a foot and leg is “b.” Words were written by combining the signs that represent the sounds that make up each word, regardless of what the signs looked like.

A major step in deciphering hieroglyphs was the discovery in 1799 of a slab of granite at Rosetta on the north coast of Egypt. The stone was covered with three types of writing. One was Greek, which could be translated. Above the Greek was demotic, another script that was used to write the ancient Egyptian language. Above the demotic were hieroglyphs. Scholars did not immediately start studying the hieroglyphs because they still thought that they were symbolic rather than a real phonetic language.

The key was the frequently repeated name of the king. Scholars identified the Greek royal name Ptolemaios in the demotic text. Then, in 1816, an Englishman named Thomas Young compared that name to a word written in hieroglyphs within an oval called a cartouche, which we now know surrounds royal names. He concluded that the name Ptolemaios as written in Greek (PTOLEMAIOS) was the same as the hieroglyphic writing. However, Young never progressed further in the decipherment. Although he correctly concluded that the royal name was written alphabetically, he assumed that the other hieroglyphs were symbolic.

The man credited with the final decipherment is the French linguist Jean-François Champollion, who had access to additional bilingual inscriptions. Again working with names, he matched the signs in “Ptolemy” on the Rosetta Stone the name that he found on another monument. He was able to read:

? + l + e + o + p + a + t/d + ? + a

He guessed correctly that the second name was Cleopatra. In 1822, he presented his thesis that hieroglyphs were a combination of phonetic signs and nonphonetic signs, and that the script was related to Coptic. Today, Egyptologists can read almost any hieroglyphic text. The only problem lies with words whose meaning is no more precise than, for example, “a variety of flower.” There may be no specifics to identify which one. Scholars also continue to have discussions about fine points of grammar.

## How Hieroglyphs Work

There are more than 800 commonly used hieroglyphs and several thousand others. Most common are the 24 glyphs that each represent one consonant sound. Most signs are more complex. A single sign may stand for two, three, four, or even five sounds together. Some signs, called determinatives, have no sound value at all, but are added to words that are spelled the same way to indicate which word is intended. Words that sound the same but have different meaning are called “homonyms.” In English, as in Egyptian, most homonyms are clarified by their spelling -- for example, “pair” and “pear.”

**Use complete sentences to answer the questions!**

## How did the Rosetta Stone help decipher hieroglyphics?

## Why do historians have a hard time deciphering hieroglyphics, even with Champollion’s work with the Rosetta Stone?

## Why do you think Egyptians stopped using and forgot about hieroglyphics?

## All Wrapped Up: The Many Tasks of Mummymakers

#### By Damian Fagan

Ancient Egyptians believed that after a person died, he or she lived on in spiritual form for eternity. To help the spirit reconnect with the body in the afterlife, the body had to be preserved. Mummification was a way to prepare the body for the spirit’s return.

You probably know that mummies are preserved dead bodies wrapped in strips of cloth. But you might not know how much work and how many different people were involved in making mummies.

The three main processes in mummifying a body were removing the internal organs, drying the body, and protecting the remains. It took about 70 days to make a mummy, with many different people doing different jobs. Let’s take a step-by-step look at making a mummy and find out who was involved in the work. (Count the words in boldface to find out how many different jobs were involved, and remember, there were probably many more we don’t know about.)

**Step 1** Someone died. If the dead person was a pharaoh, a special burial chamber—perhaps inside a pyramid—had been built while he or she was alive.  
  
**Step 2** **Embalmers** did the main work of making mummies. Some embalmers worked in special buildings; others worked in tents. After washing the body, the embalmer placed it onto a wooden table. Then he made a long cut on the left side of the body, below the ribs. Through this cut, he removed the liver, lungs, stomach, and intestines. (These were mummified separately.) He used a metal hook to pull the brain out through the nose. The heart was usually left in the body. During this process, **priests** chanted prayers to protect the mummy.

**Step 3** The embalmers and their assistants covered the body with natron, a saltlike chemical collected by **natron gatherers** along lakeshores. Natron dried the body and prevented bacteria from decaying the body. It could take as long as 40 days for the body to dry completely.  
  
**Step 4** Once the body was dried, it was cleaned and coated with oils, resins, and perfumes to purify it. Sometimes sawdust or linen pads were put inside the body to fill out the shape. Then the embalmer sewed up the cut and placed jewelry and amulets on the body. (Amulets are objects intended to protect against evil.) Some members of the royal family even had gold caps put onto their fingers and toes.   
  
**Step 5** Using strips of linen, the embalmers wrapped the fingers, toes, arms, and legs individually. Often the arms were folded across the chest. More layers of linen were wrapped around the body. The embalmer painted a sticky resin between the layers as a waterproof layer to protect the mummy. A scribe wrote the dead person’s name on one of the bindings. There might be hundreds of yards of linen covering the body. The wrapping process took about 15 days.  
  
**Step 6** In some cases a mask was placed over the head. If the dead person was a pharaoh, the mask might be made of gold. The mask was wrapped then a final cloth covered the entire mummy.  
  
**Step 7** The mummy was placed into a coffin. Sometimes several coffins were nested inside each other, especially if the person was very important or wealthy. The scrolls were placed in the coffin with the mummy to help him or her in the afterlife.

**Step 8** The coffin was brought to the person’s home. There, the funeral procession began as family and friends took the coffin to the tomb where the funeral took place. The funeral procession included family, friends, servants, and sometimes professional **mourners** who cried for the dead.

At first, only pharaohs were mummified. Gradually, members of royal families and wealthy Egyptians could afford the expensive process. But soon mummification was available for all—expensive mummification if you were rich or inexpensive if you were poor.

**Potters** made vases called canopic jars, named after a god. The embalmer placed the mummified organs into four jars. Each jar was decorated with images of a god and prayers were written on the outside to protect the contents.

**Herbalists** made and gathered oils, perfumes, resins, and spices from plants growing along the Nile. The embalmers used some of these substances to clean, dry, and perfume the body, and used others to preserve and wrap the skin. **Jewelers** made amulets, necklaces, bracelets, and rings.

**Farmers** grew and harvested flax plants for their long, strong fibers. **Weavers** wove these fibers into linen cloth, which was made into rolls of bandages and other cloths. Some linen was also soaked in oils and resins and placed inside the body. **Papermakers** collected wild reeds, or papyrus, growing along the river and made paperlike scrolls. **Scribes** wrote spells from the Book of the Dead onto these scrolls. The Book of the Dead was sort of a guidebook on how to navigate the afterlife. It was intended to help the spirit find its way safely.

**Artists** made portrait masks and painted the coffin with images and hieroglyphics.

**Sculptors** and **carpenters** made coffins as well as artifacts and furniture.

**Now that you read about the mummification process, draw a comic book pane for each of the EIGHT STEPS on the space below!**

## Why do you think mummification was so important to Egyptians?

**How to Make a Mummy**

**Process**

The mummification process took seventy days. Special priests worked as embalmers, treating and wrapping the body. Beyond knowing the correct rituals and prayers to be performed at various stages, the priests also needed a detailed knowledge of human anatomy.

The first step in the process was the removal of all internal parts that might decay rapidly. The brain was removed by carefully inserting special hooked instruments up through the nostrils in order to pull out bits of brain tissue. (ICK!) It was a delicate operation, one which could easily disfigure the face. The embalmers then removed the organs of the abdomen and chest through a cut usually made on the left side of the abdomen. They left only the heart in place, believing it to be the center of a person's being and intelligence. The other organs were preserved separately, with the stomach, liver, lungs, and intestines placed in special boxes or jars today called canopic jars. These were buried with the mummy. In later mummies, the organs were treated, wrapped, and replaced within the body. Even so, unused canopic jars continued to be part of the burial ritual.

The embalmers next removed all moisture from the body. This they did by covering the body with natron, a type of salt which has great drying properties, and by placing additional natron packets inside the body. When the body had dried out completely, embalmers removed the internal packets and lightly washed the natron off the body. The result was a very dried-out but recognizable human form. To make the mummy seem even more life-like, sunken areas of the body were filled out with linen and other materials and false eyes were added.

Next the wrapping began. Each mummy needed hundreds of yards of linen. The priests carefully wound the long strips of linen around the body, sometimes even wrapping each finger and toe separately before wrapping the entire hand or foot. In order to protect the dead from mishap, amulets were placed among the wrappings and prayers and magical words written on some of the linen strips. Often the priests placed a mask of the person's face between the layers of head bandages. At several stages the form was coated with warm resin and the wrapping resumed once again. At last the priests wrapped the final cloth or shroud in place and secured it with linen strips. The mummy was complete.

The priests preparing the mummy were not the only ones busy during this time. Although the tomb preparation usually had begun long before the person's actual death, now there was a deadline, and craftsmen, workers, and artists worked quickly. There was much to be placed in the tomb that a person would need in the Afterlife. Furniture and statuettes were readied; wall paintings of religious or daily scenes were prepared; and lists of food or prayers finished. Through a magical process, these models, pictures, and lists would become the real thing when needed in the Afterlife. Everything was now ready for the funeral.

As part of the funeral, priests performed special religious rites at the tomb's entrance. The most important part of the ceremony was called the "Opening of the Mouth". A priest touched various parts of the mummy with a special instrument to "open" those parts of the body to the senses enjoyed in life and needed in the Afterlife. By touching the instrument to the mouth, the dead person could now speak and eat. He was now ready for his journey to the Afterlife. The mummy was placed in his coffin, or coffins, in the burial chamber and the entrance sealed up.

Such elaborate burial practices might suggest that the Egyptians were preoccupied with thoughts of death**.** On the contrary, they began early to make plans for their death because of their great love of life. They could think of no life better than the present, and they wanted to be sure it would continue after death.

But why preserve the body? The Egyptians believed that the mummified body was the home for this soul or spirit. If the body was destroyed, the spirit might be lost. The idea of "spirit" was complex involving really three spirits: the ka, ba, and akh. The ka, a "double" of the person, would remain in the tomb and needed the offerings and objects there. The ba, or "soul", was free to fly out of the tomb and return to it. And it was the akh, perhaps translated as "spirit", which had to travel through the Underworld to the Final Judgment and entrance to the Afterlife.

**Who Was Mummified**

After death, the pharaohs of Egypt usually were mummified and buried in elaborate tombs. Members of the nobility and officials also often received the same treatment, and occasionally, common people. However, the process was an expensive one, beyond the means of many.

For religious reasons, some animals were also mummified. The sacred bulls from the early dynasties had their own cemetery at Sakkara. Baboons, cats, birds, and crocodiles, which also had great religious significance, were sometimes mummified, especially in the later dynasties.

**Use complete sentences to answer the questions!**

## Why do you think mummification was so important to Egyptians?

How To: Build a Pyramid



OK, who scheduled the pyramid tour for twelve noon on the hottest day of the year? The intense desert sun, the blast-furnace heat, the annoying sand that seems to end up everywhere is getting to you. A dip in the pool back at the hotel sure sounds like fun, you think, as you stumble along, grumbling. . .

And then you see it. Your tour has brought you to the foot of the largest of three pyramids at Giza -- the Great Pyramid. Nothing could have prepared you for the feeling of awe you experience gazing up at row after row after row of giant stone blocks put into place over 4,000 years ago. Your tour guide points out that over 2 million stone blocks are present, each weighing two to three tons! Math whiz that you are, you quickly calculate that over 4 million tons of stone occupies the area right in front of you. Amazingly, the sun, the heat, and the grit seem to have vanished.

Standing taller than a 30-story building and covering an area greater than eight football fields packed together, this behemoth reigned for over four millennia as the largest man-made structure in the world. Only in 1933, with the building of the Hoover Dam, was anything engineered with greater bulk and size. How did the Egyptians -- without access to diesel-powered cranes, and cutting and transporting machinery -- build such a mammoth structure?

The Egyptians didn't leave any telltale records that describe their engineering techniques, so Egyptologists have devised experimental methods for testing hypotheses about possible techniques.

**Transporting Two-Ton Stones**

Clues from artwork and hieroglyphic writings lead Egyptologists to conclude that the ancient Egyptians used neither wheeled vehicles nor animals to haul building materials. More likely, they used sleds pushed and pulled by men, as ancient drawings suggest. But how did a group of men manage to haul sledloads of several tons? And how were blocks maneuvered into their final resting positions on the pyramid?

After considering ways to ease these processes, an archaeologist experimented with liquids in reducing the frictional factors involved. He did so by testing the force needed to slide one stone block over another. A whopping five-times-greater force was necessary to slide blocks that were completely dry as compared to blocks that were greased with either mud or liquefied gypsum, the mortar used for cementing the stone blocks together. So the Egyptians probably slid the heavy weights over lubricated surfaces.

**Lifting the Blocks Vertically**

No one knows how giant, two-ton blocks of stone were hoisted up onto a growing pyramid. The Egyptians managed this without machinery or cranes. But how?

An expert group of civil engineers from the firm of Daniel, Mann, Johnson, and Mendenhall (DMJM) -- the firm that built the Pentagon -- performed a project analysis based on the physical possibilities and the limitations of ancient Egyptian times. After careful consideration of all of the known information, the engineers hypothesize that the vertical challenge was met by ramps, ramps, and more ramps. In fact, they suggest that the Egyptians most likely used at least three different ramp systems.

First, a long, wide, exterior ramp about the length of three football fields and wide enough for both "on" and "off" worker traffic could have allowed stones to be moved up through the lower levels to about level 50. About two-thirds of the total number of stone blocks used for the pyramid went into these base levels.

To move the remaining one-third of the stone mass up above level 50, the DMJM engineers propose that a series of "wraparound" ramps could have been built on the outside faces of the pyramids as they grew. These ramps would have been much narrower than the one leading from ground level, and would have required more coordination of worker traffic. Such a ramp system could have serviced the building process up to level 120.

Blocks for the uppermost layers (from level 120 to 140) could have been brought through an internal, staircase-type ramp built into the structure as it grew. The 7,000 or so blocks needed would have been pushed or pulled up by ropes strung over poles above the heads of the workers.

All ramps would have been removed as the construction neared completion, explaining why we don't see any of them today. Still, there are traces of ramps at other pyramid sites, lending support to the ramp theory.

**Numbers of Workers**

How many Egyptians does it take to build a pyramid? Legends claim that 100,000 men were involved, but more recent calculations suggest a much lower number. In their project analysis, engineers from DMJM estimate that the stones would have required 20-man labor teams for transport and that such teams could have moved two stones per day. Factoring in the skilled labor needed for stone finishing, masonry work, and worker management, the entire ten-year building project would have required an average labor force of 13,000. This smaller number fits very well with other evidence based on the size of the city lying adjacent to the pyramids.

**Ongoing Search for Answers**

If and when archaeologists uncover records that reveal the engineering secrets of the Egyptians, we will know with more certainty how these structures were built. As much as we hope to be able to do this, it is interesting to try to solve the mysteries of Egyptian engineering using scientific methods, don't you think?

**Use complete sentences to answer the questions!**

1. **Name AND explain two ways Ancient Egyptians were able to build such impressive, long-lasting structures.**
2. **Where do you think you the government got these workers? Was life easy for them?**

**The Magnificent Nile**

The Egyptians have had a very interesting relationship with the Nile. For thousands of years, they referred to its annual flooding as the "Gift of the Nile." Each summer, like clockwork, the river would flood a strip of land on either side of its banks. When the water receded, a very thin, evenly spread layer of black mud was left behind. Farmers would immediately plant their crops -- never needing fertilizers because the flood soil was so rich.

This narrow strip along the Nile, together with the delta at the river's northern mouth, is the only farm land Egypt has. Though it totals only three percent of the county's land, it has provided enough food for thousands of years. But recently, a population boom has forced Egyptians to increase their agricultural output. Some years the river would not rise at all, causing drought and famine.

To solve this problem, in 1952 Egyptian president Gamal Abdal-Nasser pledged to control his country's annual flood with a giant new dam across the Nile River. His plan worked. Now in the middle of the arid Egyptian desert lies one of the largest [**embankment dams**](http://www.pbs.org/wgbh/buildingbig/glossary.html#embdam) in the world. It is called the Aswan High Dam and it captures the mighty Nile River in the world's third largest reservoir, Lake Nasser. The Aswan High Dam captures floodwater during rainy seasons and releases the water during times of drought. Now farmers along the Nile plant crops year round. In fact, the area has become one of the most intensely cultivated pieces of land in the world. The dam also generates enormous amounts of electric power -- more than 10 billion kilowatt-hours every year. That's enough electricity to power one million color televisions for 20 years!

Unfortunately, the dam has also produced several negative side effects. In order to build the dam, 90,000 Egyptian peasants had to move. To make matters worse, the rich silt that normally fertilized the dry desert land during annual floods is now stuck at the bottom of Lake Nasser! Farmers have been forced to use about one million tons of artificial fertilizer as a substitute for natural nutrients that once fertilized the arid floodplain.

**Use complete sentences to answer the questions!**

1. **Why was Ancient Egypt called the “gift of the Nile”?**
2. **Why was the Aswan Dam built? What good things has it done? What bad things?**
3. **Should Egypt have built the Aswan Dam? Why/Why not?**