

# THE OSTRACON



## EGYPTIAN STUDY SOCIETY

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# THE MONUMENTS OF SNEFERU

## THE BEND IN THE BENT PYRAMID AND THE COLLAPSE OF THE MEYDUM PYRAMID

BY JAMES R. LOWDERMILK

### About the Author

Jim Lowdermilk is a long-time ESS member. He has been ESS Treasurer and Membership Secretary. An accomplished mathematician, Jim has addressed the ESS on the subject of Egyptian mathematics. In this article, he looks at some specific examples of applied mathematics and engineering in ancient Egypt.

The Egyptian Pharaoh Sneferu is credited with performing work on three major pyramids — two pyramids at Dashur, the Bent Pyramid and the Red Pyramid, and the pyramid at Mejdum. Although Sneferu was one of the greatest pyramid builders of the age, there are no records to indicate the order in which these pyramids were built. With no records we must look to clues in the designs of these pyramids in order to perform a chronological analysis. These clues give a possible scenario detailing why the Bent Pyramid changes slope 49.7 meters above ground level, why some blocks are placed parallel to the ground while others are placed perpendicular to the faces of the pyramids containing them, and why the Mejdum Pyramid collapsed.

The pyramid-building age began with the architect Imhotep designing a new tomb for his Pharaoh, Djoser. This tomb, like its predecessors, was to be of a mastaba type, a low, flat, rectangular structure built above a burial pit. However, Djoser's tomb was to be built of a material never previously used in large-scale, aboveground construction — stone. Imhotep's ideas for building in stone were so effective he was able to enlarge this mastaba, then enlarge it into a four-step pyramid, then enlarge it again into a six-step pyramid. Imhotep was a brilliant architect and scholar, and it was his genius that made it possible to complete this monumental project.

The Turin Papyrus gives Djoser's successor, Djoserty, a reign of only six years. He built the Unfinished Pyramid and was succeeded by Khaba, who built the Layer Pyramid. All that are left of these attempts at pyramid construction are largely plundered piles of stone. It is obvious that these Pharaohs fell far short of completing their goals.

The next stone pyramid was constructed at Mejdum. This pyramid, constructed in three phases (fig. 1.a), appears to never have been completed and now stands in a ruined state (fig. 1.b). Evidence from the cemeteries surrounding the pyramid suggest that work on this pyramid was abandoned, then continued at a later date, only to be abandoned again before completion. The most common reason for stopping pyramid construction was the death of the Pharaoh. Construction may also cease because of a loss in workforce or a massive design failure.

Many scholars have suggested that Huni constructed the first two construction phases, resulting in a step pyramid, and Sneferu attempted to complete this as a true pyramid. Others suggest that Sneferu built the entire incomplete monument. Had Sneferu initiated this construction the first abandonment could not have been due to his death since he returned to try to complete this work. Sneferu's prolific building career does not suggest a loss in workforce, and if he first abandoned work because of a design failure, his return would have indicated he had a solution. Since work on this pyramid was again abandoned and it subsequently collapsed, his solution was either incorrect or nonexistent, and no design flaw was perceived. This rules out all three reasons for Sneferu to first abandon work on the step pyramid at Mejdum. Therefore, work on the step pyramid was first halted by the death of a preceding Pharaoh.

Sneferu's predecessor, Huni, nearly completed a seven-step pyramid. Borchardt called this building phase E1. This third attempt to recreate the feats of Imhotep was finally a success. Huni was only the second man in history able to assemble a team of architects, a workforce, and overseers able to transport and place millions of tons of stone blocks to complete their intended design. All external faces were polished smooth anticipating its imminent completion. It appears that at this time, Huni, like his predecessor Djoser, was still in good health and did not wish to see his tomb standing complete, waiting for him to die. Huni decided to expand his pyramid into a larger, eight-step pyramid, E2. Unfortunately, Huni did not survive to see this expansion completed.

Huni's untimely death is evident from the missing eighth step of his pyramid (fig. 1.a). Upon Huni's death, transportation of stone to the top of the incomplete monument ceased, and the lower stone faces were again polished smooth. In 1899 when M.A. Robert, inspector of the Register of Land Survey, climbed to the top of this pyramid to erect a pole for his survey, he found a hole that had contained a pole in antiquity. This missing pole was originally placed by Sneferu's men as

Figure 1

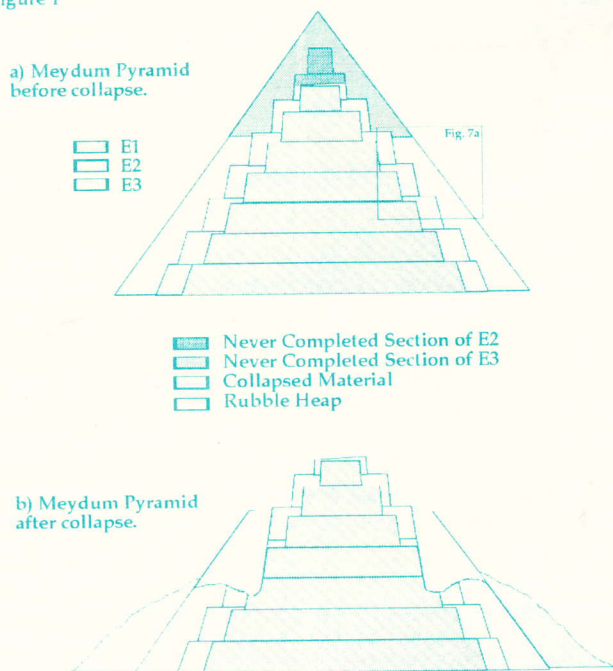
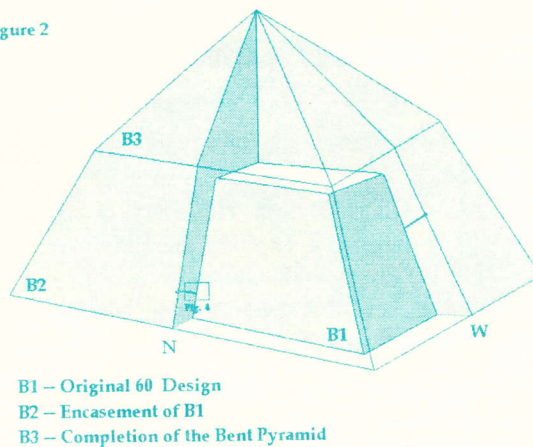


Figure 2





a survey mark for the apex of the true pyramid Sneferu wished to complete after Huni's death, Borchardt's E3. If the eighth step of E2 had been removed by stone robbers as many scholars suggest, this hole would not exist. Robert also claimed this highest step appeared unfinished.

The Prisse papyrus notes that Huni was succeeded by Sneferu. Upon succession to the throne, Sneferu began work on his own pyramid of an unprecedented and radical design, the first true pyramid. This construction began at the site of the Bent Pyramid outside of present-day Dashur. Rinaldi and Maragioglio noted that 12 meters from the northern entrance and 10 meters from the western entrance, the ceiling and floor stones were very damaged. Within each passage the seams between these damaged blocks and the blocks closer to each entrance run continuously around the walls, ceiling, and floor at an angle 60 degrees to vertical. When these lines are projected down to ground level, the damaged blocks correspond to the entrances on two sides of a true pyramid with a slope of 60 degrees and a base of 300 cubits (fig. 2.B1). Sneferu began work on a true pyramid with the cross-section an equilateral triangle (fig. 3a). This part of his design will be called B1.

The design they chose would mimic that of Sneferu's successful predecessors. The blocks were to be laid perpendicular to the 60-degree face of the pyramid, sloping toward the center of the pyramid at a 30-degree angle. A force diagram of blocks placed in this manner reveals a design flaw (fig. 4.B1). This design leaves unbalanced lateral forces, the x-component of the normal force. These forces increased as the height of the pyramid grew until each face of the pyramid was being pushed outward by the weight of the blocks above. This same phenomenon is exhibited when books are stacked on a slant. The books appear stable until the weight above the bottom books grows to the point that the reactionary forces can push the books out from the bottom of the pile. The force is exerted toward the center of the pyramid, but because the center of the pyramid cannot move, the blocks on each of the lower faces push themselves outward.

When the height of the frustum was between 34 and 50 meters, someone, possibly a foreman heading up work on the interior apartments accessible from the northern entrance, noticed the ceiling block above the entrance was improperly placed. He viewed the results of a 3cm shift from that block's original position. Where the ceiling was supposed to be smooth this block was 3cm too low. He returned to his workers and ordered them to chip away this block to return the ceiling to its correct height.

The triangular section the workers chipped out is still visible. It runs the full width of the block for .75 meters, decreasing from 3cm on the south end down to nothing. When the foreman returned to inspect the work, it is quite possible that the block had moved even more because of increased weight continually added to the top of the incomplete pyramid. As the pyramid grew taller and the weight above the lower blocks grew heavier, these blocks had a greater tendency to move.

The foreman took word of this strange phenomenon to his overseers. Work continued to progress normally while the overseers would have observed and measured this curiosity, a moving block. The news quickly reached Sneferu, and he himself may have entered the pyramid to view this occurrence. As the pyramid grew taller, the lintel block above the western entrance would begin to move also. News of the moving blocks in time would reach the workers, and they were probably quite agitated by the thought.

Sneferu and his overseers would have been concerned about the secret burial chamber accessible through the western entrance. Dr. Abdulsalam Hussein found a pit beneath the floor slabs of the horizontal corridor leading to this room. This shaft was four meters deep to the desert clay with well-dressed walls and filled with yellowish limestone blocks. In combination with the rough "chimney" room accessible from the northern entrance, it was probably a ruse to keep workers from knowing the importance of the corridor and large room that were laid out. Gangs working on each of these features would have been led to believe they would meet.

The massive chamber, 16.5 meters high with 16 corbelled overhangs for a roof, was built in secrecy in order to deter any would-be tomb robbers. Sneferu ordered a structure of cedar beams to be erected horizontally and vertically in this room as a shrine to try to stop the destructive forces from moving any more blocks. These beams could also be used to measure any movement within this chamber. Work continued, and the exterior blocks continued to move.

Eventually Sneferu had to succumb and admit that his radical new design was a failure. He ordered work stopped and had the western entrance sealed. The workers first lowered the portcullis blocks and sealed them with mortar as they left. They then filled the slanted portion of the western corridor with limestone blocks, sealing the trailing edge of each block with mortar as they left. This corridor was filled for its entire length with limestone blocks. The chamber was intended to never be entered again.

Sneferu's dream stood incomplete and blunted just as his predecessor's pyramid before him. Pyramid B1 reached almost half its intended height. At this time four large-scale pyramids stood incomplete

Figure 3

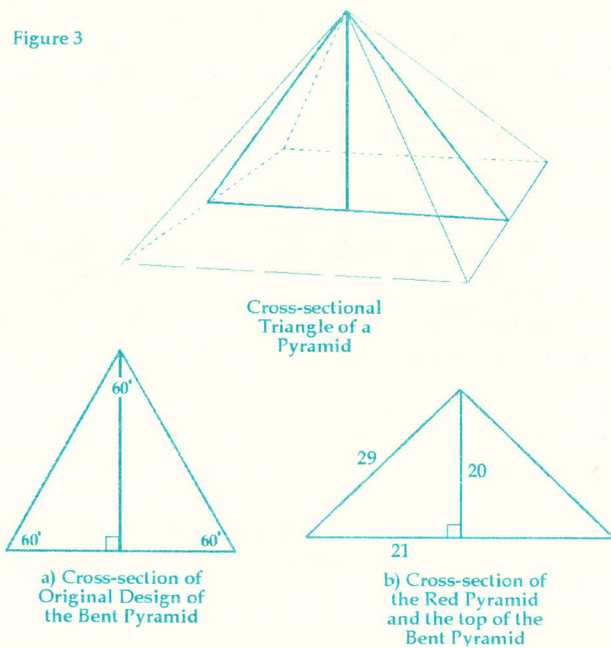
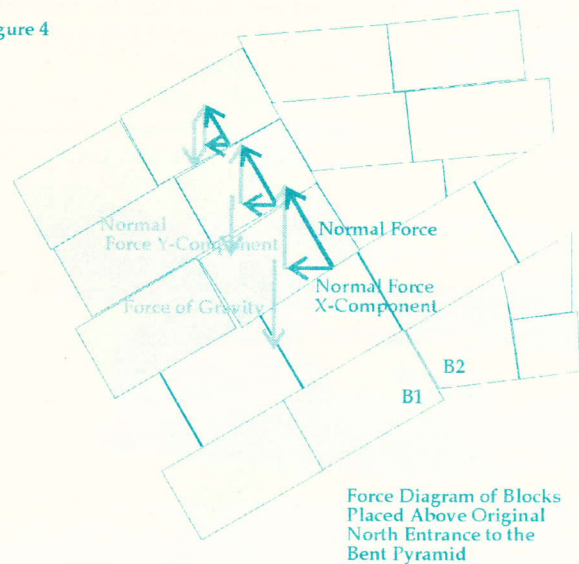


Figure 4





within Egypt and only one stood complete. Sneferu, powerful and determined, mustered his workforce and had his architects redesign a new pyramid.

Design of this pyramid, the Red Pyramid, would have to solve the structural problems encountered in the previous failed attempt. These problems had never been encountered in prior construction, and the architects could only guess at their cause and solutions. One might surmise that the success of the step pyramids was due to the low rise of each step. The problem with the 60-degree structure could be in its long continuous rise. A continuous rise is necessary for completion of a true pyramid, and one solution is to build the pyramid at a greatly reduced angle.

Possibly the stone in the failed pyramid was of an inferior quality and tended to break up under pressure. The new pyramid could be built of a lower-quality stone to test that hypothesis. No previous structure had ever been built with large chambers and passageways within the super-structure. The new design called for three large interior rooms and a redesigned passageway. Finally, if this pyramid was a success, Sneferu wanted to be able to superimpose this design upon his failed structure and no longer have to view his troublesome first experiment.

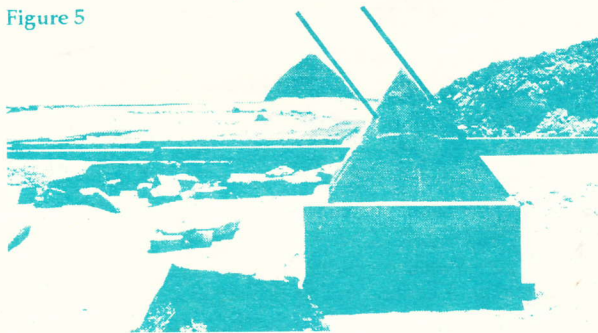
The architects would have presented a variety of solutions to Sneferu. The design modifications the architects came up with were impressive. The angle chosen for the Red Pyramid was to be such that the cross-sectional triangle be cut into two 20, 21, 29 right triangles by an altitude dropped from the apex of the pyramid (fig. 3b). The base was designed to be just large enough to raise the height of the pyramid to the point where the new pyramid would encase the existing failed structure, B1, if Sneferu chose to later encase that attempt. Despite the fact that the design creates a pyramid slightly less than imposing, Sneferu chose this design because of its geometric elegance and the possibility of rebuilding the same design over his previous monument.

The exceedingly low angle of this pyramid posed a new problem in the previous design. If the blocks were to be placed perpendicular to the 43-degree faces of the pyramid, the blocks would be placed at an angle steeper than 45 degrees from the level ground. They may as well be placed flat, one stone sitting level upon the others. This change in design removed the problem of lateral forces attempting to shift the blocks. It is possible that the architects made this design change without considering the slanted blocks to be a problem.

There were other design changes in attempts to account for the failures within the previous structure. At the base of the sloping entrance passage two extremely large blocks were placed in an attempt to give support to the passageway above. These blocks were placed on either side of the passage and cut to support sections of both the horizontal and sloping passage. Part of the block was cut to lie flat. The other part was cut parallel to the incline of the passage above.

The pavement blocks within the horizontal section of the entry passage were cut into a U shape. These blocks were arranged to give a

Figure 5



The Bent Pyramid and the capstone of the Red Pyramid

Note: The Red Pyramid is the same angle as the top of the Bent Pyramid, but the capstone of the Red Pyramid is the same angle as the base of the Bent Pyramid.

firm foundation in an attempt to prevent any blocks composing the inclined section of the passageway from sliding down the passage. This attempt shows the lack of understanding the Egyptians had of the gravitational forces they had encountered when building B1.

The foundations of the three chambers within the Red Pyramid were constructed with extreme care in order to prevent any shifting and movement of the walls of the chambers. The flooring of the rooms and horizontal passageways connecting them was built with blocks placed in pairs — one block laid from the eastern wall, one block from the western wall, nearly meeting at the center line of each room or corridor. Each block was fitted closely with its northern and southern neighbors, but gaps were left down the centerline between them. These gaps were left open during construction of the pyramid in order to measure any movement in the foundation of the pyramid. The long flooring stones would magnify the slightest movement in the foundation. Upon completion of the pyramid these gaps were filled with odd-shaped stones after careful measurements were taken. The measurements would show little or no movement of the foundation, and each of the architects would have been rewarded for their triumphs.

With the Red Pyramid nearing completion and the project deemed a success, the question of enlarging B1 to a true pyramid became more imminent. Many questions still remained as to reasons why the blocks moved. When the northern chamber was entered again, the damage would have appeared no worse than when construction had ceased. However, Sneferu's team had no idea how the sealed higher chamber, with its wooden shrine in place, had fared. Sneferu would have wanted to see for himself if this chamber had suffered any damage. He ordered a tunnel to be dug between the ceiling of the northern chamber and the horizontal section of the western passageway.

The designer of this tunnel plotted the shortest distance between the beginning and projected end of the tunnel and noticed that it would come dangerously close to the "chimney" room next to the chamber where they needed to begin digging. This tunnel was first dug straight toward its destination then veered right toward the west, then back left toward the east, before continuing straight up its constant slope, ending at the horizontal passage. This jog in the tunnel's course carried it a safe distance from the adjacent room.

The workmen who dug this tunnel expended much energy chipping away a large bore. This was for Sneferu to be able to crawl through this passage comfortably. A very steep stairway was constructed of stone chips and mortar from the base of the northern entry passage to the mouth of this tunnel, high in the corbeled ceiling. Outlines of these steps are still visible on the walls. In this manner Sneferu could reach the massive chamber that was sealed deep within the pyramid.

When Sneferu entered the chamber, he and his men inspected the walls, ceiling, and wooden shrine for damage and movement. Little or no damage had occurred during the time the room stood sealed. Sneferu wanted to see construction continued. On his way out he ordered the eastern side of the portcullis block closing the western entrance sealed with mortar. The western entrance was useless.

The original intention when designing the Red Pyramid was to make it large enough to encase B1. However, as this possibility appeared more likely, questions were raised about using the same design as the Red Pyramid. It was noted that if the sides of this structure were trimmed to the height of the existing frustum, making them steeper, then continued at the same slope as the Red Pyramid (fig. 2.B2,B3), the bulk of the new pyramid would be greatly reduced. This reduction in bulk would translate to a reduction in the workforce needed. This workforce could be transferred to Mejdum to not only complete Huni's pyramid, but transform it into a true pyramid. The change in the new design would render the new pyramid bent and not a true pyramid, but it would enable Sneferu to finish his father-in-law's pyramid.



The capstone of the Red Pyramid had not yet been placed. Its capstone could be cut at the same angle as the bottom of the Bent Pyramid, rendering the Red Pyramid untrue also (fig. 5). In this manner Huni's pyramid was meant to stand as the first true pyramid. Sneferu must have known this was a lofty ambition. He ordered work to begin on Huni's pyramid only after the height of the expansion of the Bent Pyramid reached the height of the inner failed structure (fig. 2.B2). If no additional flaws in the design were noted at that point, work would progress again at the site of Huni's pyramid. The slope chosen for the lower part of the Bent Pyramid had a rise of seven units to a run of five units ( $\arctan 7/5 = 54^\circ 27' 44.4''$ ).

The first task at hand for the architects and builders was to raise the expansion of the failed structure to a height of 47 meters, surrounding the 60-degree structure on all four sides. There appears to have been a debate about mixing the courses of blocks previously laid slanted toward the center of the pyramid in B1 with blocks laid parallel to the ground (fig. 4.B2). A decision was made to place the blocks of the lower courses slanted slightly toward the center of the pyramid, approximately  $6^\circ$ . The blocks were laid in this manner, completing the lower 47 meters of the Bent Pyramid. This construction phase will be called B2. The lintel above the northern entrance was made from an especially large stone to prevent it from moving again. This encasement would cause no increase in damage to the inner failed structure of B1, and the expansion of Huni's pyramid could commence.

Huni's mummy was extracted from his pyramid in preparation for Sneferu's expansion. Cedar beams used for the scaffolding that supported Huni's sarcophagus as it was lowered from his burial chamber are still in place. Sneferu's desired expansion of his father-in-law's pyramid into the first true pyramid was ready to begin.

During the course of building the Red and the Bent Pyramids, Sneferu's mathematicians were busy studying the geometry of the true pyramid form on paper or papyrus. Possibly, one of the greatest mathematicians in the land noticed that when a pyramid is constructed so that the area of one of its four faces is equal to the height squared, some wonderful mathematics appear (fig. 6). The ratio of the perimeter of the base of the pyramid to the height of the pyramid is a very good approximation for twice pi ( $2 * 3.144$ ). The ratio of one of the legs of the cross-sectional triangle to half the base of that triangle is equal to the Golden Section or phi, a naturally occurring number in geometry. This would have been a very difficult angle to reconstruct during the building process. With a minor adjustment, approximately 1 minute of arc, the angle was chosen to have a rise of 14 units to a run of 11 units. This angle approximates  $\pi = 22/7$  and  $\phi = 1.6186$ , and gives the previously mentioned areas equal to within 0.08%.

The expansion of Huni's incomplete step pyramid into a true pyramid was to be built with blocks laid parallel to the ground. Because the bulk of the pyramid had already been constructed in the form of the step pyramid, this expansion work progressed quickly and relatively easily.

As work progressed at the Bent Pyramid past the bend and into the section B3 (fig. 2.B3), problems were recurring. When blocks were again placed above the slanted blocks of B1, the lateral forces increased in magnitude. This caused the blocks in the passageways that had moved previously to move again. However, these blocks were now encased by the stable blocks of the expansion, B2, and had nowhere to move. As the unstoppable force met the unmovable blocks, the moving blocks were crushed (fig.4). Sneferu was warned of this occurrence as soon as it was noticed. Completion of the pyramid was within sight, and Sneferu ordered his workers to continue work at an increased pace. This caused the top of the Bent Pyramid, B3, to be constructed with hurried, sloppy craftsmanship.

With the 60-degree facing stones encased, there was no means for the forces to be relieved by moving the stones. The blocks within the inter-

rior chambers began to show signs of cracking. Some of these cracks were filled with plaster by the workmen working inside the pyramid. The ceiling of the northern chamber was accessible via the stairway to the tunnel entrance. Holes were cut in each side of this ceiling, and beams were placed laterally to measure for movement of the blocks in this ceiling. These beams were later removed, but the holes remain. The cracks deep within the pyramid continued to worsen until this imperfect pyramid was completed.

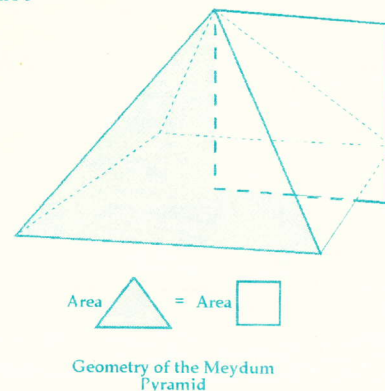
As Sneferu's construction, E3, on Huni's pyramid neared the fifth step of E2, one of Sneferu's men noticed a very troubling sign. This man was probably appointed specifically to look for moving blocks. He would have seen the blocks that had been placed against the riser of the fifth step slowly shift away from that section of E2 as work progressed. These gaps appeared on all four sides of the top level of construction. The forces that were moving the blocks would not allow Sneferu to complete work on his father-in-law's pyramid.

Sneferu's advisers warned him of possible unrest if the populace knew of blocks moving within a second pyramid. This meant that work could not continue on this pyramid and there was only one way to stop construction. Sneferu must die. Although construction had not yet ceased, Sneferu would have known this pyramid would never be completed. He would not wish to bury his father-in-law in this abomination. He ordered his workers to bury Huni beneath the largest mastaba yet built. This mastaba was constructed northeast of the Meydum Pyramid and is now known as Mastaba 17. It was constructed without an entrance because its inhabitant was already dead. The burial was left with no markings to identify the mummy to cover Sneferu's embarrassment at his failure. Before it was sealed, Sneferu was dead.

The problems with Huni's pyramid were much more severe than the problems with Sneferu's first attempt, B1. When Huni's seven-step pyramid, E1, was expanded to an eight-step pyramid, E2, rough-cut blocks were placed on a slant directly against the smooth faces of the previous structure. When Sneferu placed blocks above these blocks, the smooth, polished faces of E1 gave very little support (fig. 7.a). Furthermore, wedge- or trapezoidal- shaped blocks were placed by Huni on the flat finished steps of E1 for the blocks of E2 to regain their slanted position (fig. 7b). The lateral forces would push these blocks outward first, but with nowhere to move they would be crushed, leaving the slanted blocks above unsupported. This meant that the only section lending support to the weight of E3 was a group of blocks directly below the riser of the fifth step of E2.

This situation is similar to boxes being stacked below a shelf and on the shelf. When the weight of the boxes on the shelf grows too large, the shelf will sag and rest on the boxes below. If these boxes do not lend enough support, the shelf will break, and the boxes will fall. The shelf represents the small section of E2 giving support to the blocks of E3. The boxes below the shelf represent the blocks of E2 stacked against the smooth faces of E1. These blocks were undermined by the

Figure 6





trapezoidal blocks sitting on the flat steps of E1.

Sometime after the 18th dynasty, when the scribe May came to view this "very great pyramid" and left his graffiti within the Eastern Temple, the pyramid collapsed (fig. 1.b). An earthquake hit Egypt, and the small shelf section of E2 gave way, leaving a rough band of stone high on all four faces of what remains of the pyramid. The stones below could not support this sudden increase in pressure from above and were pulverized all the way down to within the interior structure of E1, leaving rough bands of stone close to the base of the remaining towerlike structure. The expansion work attempted by Sneferu came crashing down, burying the Eastern Temple and the base of the pyramid.

Sneferu would have been devastated by his failures. Before his death he ordered the wooden shrine within the Bent Pyramid covered with mortar and stone. He did not wish to view this structure in his after-life. He also knew the reaction from the noble men of Egypt could stop future pyramid construction. The citizens of Egypt needed a distraction to take their minds off these failures. Since Sneferu had decided to place an off-angle capstone on his one success, the Red Pyramid, Egypt still had no large-scale true pyramid. He decided that the population needed to concentrate on constructing a true pyramid of enormous proportions. He chose for this task his most ruthless son, because he knew construction of such a large-scale pyramid would stretch the Egyptian resources to their limits. Sneferu needed someone to force his will upon the people. His final act as Pharaoh was to arrange for his son, Khufu, to take the throne.

Sneferu was buried in his one successful pyramid, the Red Pyramid. He was worshiped as a god, and his cult continued into the New Kingdom. The Red Pyramid was later plundered, and it is quite probable that the body found on the floor of the first chamber by Perring, was that of the great Pharaoh Sneferu. For unknown reasons the stones in the floor of the passageway leading to the third chamber, the stones of the false floor within this chamber, and the stones surrounding Sneferu's burial chamber beneath this floor were removed from the pyramid at a later date.

At some point in history the Bent Pyramid was entered, most likely by the Greeks. They went through the connecting tunnel into the western passage. Here they broke through the portcullis block leading to the western entrance and began to remove some of the blocks sealing that passageway. After digging for a distance of 10 meters, they realized they would not find any treasure. They left behind a box sealed with mortar containing a small human-shaped mummy. This mummy consisted of an owl and some bats wrapped in linen and painted with a gumlike substance.

Petrie, after a long search, found a robber's tunnel leading to the burial chamber of Mastaba 17. It is known that this tunnel was dug in antiquity because it leads directly to the burial chamber. This chamber was encased in huge limestone blocks, and any entrance was

sealed during construction with the mummy inside. The robbers left the heavy lid of the sarcophagus propped open with a wooden mallet, and Petrie found the desecrated mummy lying on the floor. The chamber contained no indication of the owner of this tomb; however, the evidence could suggest that this was the body of Huni. This mummy was boxed up and accidentally crushed on its way to England.

The block that moved at the northern entrance of B1 has not moved since the pyramid was completed. It now sits 12 meters from the current entrance. The north edge of this block sits 23cm lower than the rest of the ceiling with its bottom chipped off. The block directly south of this block sits 8cm below the rest of the ceiling and its north edge is crushed for 30cm south. The block that moved within the western corridor sits 5cm below its original position. The western entrance, constructed higher within the pyramid, had less incumbent weight above. For this reason, the block movement was not as great as in the northern passage. These blocks remain as testament to the troubles Sneferu had building this pyramid.

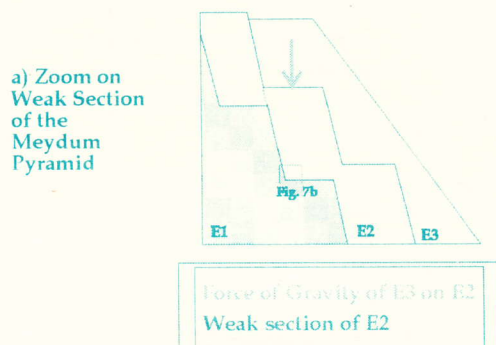
Through a search for reasons for the change in slope of the Bent Pyramid and the collapse of the Meydum Pyramid, nearly every visible feature of the three pyramids of Sneferu can be explained. Sneferu had problems with blocks placed on a slant moving within the first attempt at a true pyramid. He abandoned this attempt to successfully build the Red Pyramid. When he returned to the site of the Bent Pyramid to encase and finish his failed pyramid, B1, he decided to steepen the lower half of the pyramid to reduce its bulk. This enabled Sneferu to send workers to complete his father-in-law's unfinished step pyramid at Meydum. Completion of the Bent Pyramid exacerbated the problems within B1. Soon after, design flaws within the Meydum Pyramid became evident when Sneferu placed blocks high upon the steps of E2. Sneferu had to cease construction before the pyramid collapsed. Later in antiquity the pyramid did collapse, and it stood then as it stands today.

Had Sneferu not been such a great man, able to deal with adversity and the unknown, pyramid construction might have ended with his failures. The Egyptians were practical people, and they were able to learn from his mistakes. Their illustrious civilization continued to flourish, beginning with construction of the greatest pyramid of them all. The Great Pyramid was built with the understanding gained from Sneferu's mistakes. It was built with blocks laid parallel to the ground.

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Figure 7





# Study Group Spotlight:

## The Egypt and the Ancient Records Study Group

by Charles Cook



kmt  
EGYPT

hnc p3 gnwt  
TOGETHER WITH

is ht  
THE RECORDS OLD

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STUDY GROUP

We began to "walk like an Egyptian" back in 1988 when the ESS was organized. As this fascinating assembly marched along, certain interests in particular set a distinctive step, or cadence, that became noteworthy as a "Study Group."

*Ramses II: The Great Pharaoh and His Time* sparked the flames for these Study Groups. One of the sparks touched upon the tinder "and they built for Pharaoh supply cities, Pithom and Raamses." Of course, "they" points to the ancient Israelites, and the Ancient Record is the Old Testament.

In the Hebrew text of the Old Testament, *Egyptian*, *Egyptians* and *Egyptian's* are entered 703 times, and *Pharaoh* and *Pharaoh's* 265 times, for a total of 968 times. In the Received Text of the New Testament there are 54 references, for a total of 1,022 for the Biblical record as a whole.

Steps were taken for due process, and on March 12, 1991, there was the first meeting of a new Study Group - the *Egypt and the Biblical Records Study Group*.

Notes on the meetings, copies of materials that have been distributed, references to articles handed in and study notes contributed by those in the group are on file. They are available for perusal, and copies of anything in particular are available upon request.

Areas of interest broadened, and topics for research multiplied. Archaeologists are digging up new things. Related magazines and quarterlies are filled with exciting articles. To accommodate the enlarged scope, and to appeal to a wider expanse of personal interests, the name and performance of the Study Group was changed as of January 10, 1996. The name now stands, *Egypt and the Ancient Records Study Group*, meeting on the 3rd Thursday of the month at 7pm in the executive boardroom at the Denver Museum of Natural History.

"Egyptian Records" tell what Egyptians say about Egypt and the Egyptians, as they want it told. "Records of the Neighbors" sometimes see Egypt and the Egyptians in a different light. The contrasts can be most enlightening!

Our rule of thumb is very simple: examine the records of any peoples mentioned by Egypt, and examine the records of any peoples who mention Egypt. By "records" we include inscriptions, manuscripts, monuments, stelae, reliefs, scarabs, tablets, tokens and the like: what Egypt says about them, and what they say about Egypt. This of course includes the Biblical record, so we have not departed from where we started.

*Charles Cook is the Facilitator of the Egypt and the Ancient Records Study Group*

### Editor's Notes

On page 8 of this issue, you will find the first installment of a fascinating article by Study Group member Robert Bigelow - which he is at pains to point out is not what is expected of every member of the Egypt and the Ancient Records Study Group!

Like the other ESS Study Groups, the Egypt and the Ancient Records Study Group welcomes anyone who is interested in its area of study, however casually. There's no lifetime commitment, no scary or humiliating initiation rituals (at least, that's what they *claim* - ed.) - so just show up and see if you like it!

## THEY WROTE IT - WHY NOT READ IT?

### Study Group Facilitators!

*We would love to bring the activities and achievements of your Study Group to the whole of the ESS membership! Please contact any member of the Publications Committee and let us spread your fame!*



# Egyptian Diplomacy in the Amarna Era

## "Dramatis Personae": Friends, Foes, Rivals and Dependents

by Robert C. Bigelow

### *About the Author*

*Robert Bigelow has long had an interest in the Middle East. His interest in archaeology of the region began in earnest when he and his wife Jane visited Egypt several years ago. More recently they visited two Indus Valley dig sites while on a trip to India.*

### Introduction

This paper represents the current status of an ongoing project to bring together information about the Ancient Middle East as it affected Egypt. It was originally inspired by Raymond Cohen's paper 'On Diplomacy in the Ancient Near East' which was published in *Diplomacy and Statecraft* magazine. As I read Cohen's excellent article, I found myself intrigued and puzzled by many names, places, and people he mentioned and began researching them. The result was the first version of this paper that was originally presented to the ESS Ancient Records Study Group about two years ago. This incarnation of the paper will be published here in two parts. This first part discusses diplomatic activities and describes many of the states Egypt dealt with during the Amarna period. The second part, in the next issue, will describe some of the major cities of the area and will present conclusions.

### Diplomacy

Raymond Cohen's article examines the diplomatic context revealed by the Amarna letters and finds it to be strikingly reminiscent of the diplomacy engaged in by the Italian City States during the Renaissance, circa 1400 AD. For international relations specialists, this is quite important because it has been commonly believed that the Greeks and Medieval Italians, in essence, invented diplomacy. Yet, Cohen says "It should rapidly become clear that the surviving correspondence [the Amarna Letters] provides incontestable evidence of the existence of a sophisticated and effective mechanism for the management of international relations dating from at least 1000 years before Thucydides and 2000 years before Machiavelli."

That classic diplomacy could have emerged circa 1350 BCE<sup>1</sup> is hardly surprising because conditions in most of Mesopotamia, The Levant, and Anatolia, strongly resembled those in Italy almost 2600 years later. Anatolia, Syria, The Cannanite coast, and the land between the Tigris and the Euphrates (Mesopotamia) was filled with strong cities and city based States (Kingdoms or Empires) that vied with one another for economic and political advantage. Within these city-states were factions, clans and families that competed and feuded with one another for supremacy and enlisted the aid of outside political and military powers to aid them in their internal struggles. The most fundamental cause of this strife was economic. Most of these States lived or died by trade and tribute.

When one State was ascendant and extended its control over others, it did so by methods that all have direct analogues in more recent times. Direct military conquest was always possible, as with Tutmoses III in Cannan and Syria, but subtle pressure often seems to have been sufficient. A conquered subordinate area might be directly annexed and given a princely ruler who was related by blood to the royal family. This was often done to retain control of strong, strategic cities. Some states became vassals whose native (or at least existing) kings continued to rule but were forbidden to have any diplomatic contact with other major powers. Still other states were

protectorates at least in theory even though they might be vassals in fact. Genuine alliances between equals were less common but did happen, especially if a third party threatened both.

When one state became dominant and alarmed the others, those outside tried to contain it or bring it down either by direct military confrontation or by undermining its tributary or subordinate minor powers by intrigue. Some states used subject powers as buffers against the expansion of others. All this resembles the Italian City states (with their Medici, Borgia, and Sforza families), feuding amongst themselves and conspiring with the French or with the Vatican; Machiavelli would have been right at home. Given the similarities, perhaps it should not surprise us that people in the Near East 2nd Millennium BCE employed diplomatic practices we think of as modern, but it is very impressive that they developed and refined those practices so thoroughly that we can easily recognize them as a full-fledged diplomatic system. The major players exchanged diplomatic ambassadors whose safety and immunity they guaranteed. They made treaties, regulated trade and tried to put down piracy<sup>2</sup>. The players needed good-faith negotiations, "truth and accuracy, credibility sanctity of agreements...unhindered communication and reciprocity"

Both Cohen and O. R. Gurney<sup>3</sup> make the point that appearances counted among the various states and there were efforts to put an appropriate "spin" on how other States interpreted ones own actions. Rulers gained prestige by outdoing each in elaborate and expensive gift exchanges. Egypt, the most wealthy, always won and set the standards for inclusion in the exclusive "family" of rulers who addressed each other as "brother". Any diminution in the quality or size of the gifts from Egypt, was an implied snub that showed the recipient wasn't entirely respected and might encourage his enemies. There may have been some hope that war was unthinkable between Kings who were "brothers."<sup>4</sup> The Victorians would have instantly understood the system.

Who then were these players? Some states and areas, such as Syria, Mesopotamia, Iraq, Babylon and Egypt herself still exist and are familiar. Others such as Ugarit, Alashiya, Arzawa and Mittani disappeared and are known only from archaeological research. In what follows, some 14 century BCE groups are identified as Indo-European or as Semitic mostly on the basis of linguistic evidence. Political identity, cultural identity and ethnic or linguistic identity often did not overlap in the Middle East then or now. For a modern example, most of the Kurdish people in northwest Iraq, western Iran, and Eastern Turkey are linguistically Kurdish, culturally Islamic, and politically of their respective countries however, others are ethnically Kurdish but speak Arabic, Farsi (Iranian) or Turkish and some profess political affiliation to a Kurdish nation that today does not exist! In the ancient Middle East we rarely know ethnicity, infer language from cognates to other similar, sometimes modern languages and have to rely on documents such as the Amarna letters to deduce the politics of the day.

To begin with, there are the "major powers", Cohen's "Principal actors"<sup>5</sup> namely Egypt, Mittani, The Hittites, Kassite Babylonia, Assyria and Elam who were more or less in control of large swaths of territory. Around them were clustered minor powers such as Ur, Carchemish, the Amurru as well as those cited earlier as probably



unfamiliar. This summary is partly in historic order and partly in geographic from west to east and along the eastern coast of the Mediterranean Sea. Major actors are described before minor ones. It is worth noting the designations "major" and "minor" apply to the Amarna period. Move in time two or three hundred years in either direction from 1350 BCE and the whole situation changes. There was one other major power in the region, the Indus Valley or Harappan Civilization. It is not discussed here for two reasons: First, although the Indus Valley peoples apparently traded widely, there is almost no evidence they were ever in contact with Egypt. Second, their cities had died out several hundred years before the Amarna Era. Indirect contact may have occurred via southern Mesopotamia so it is possible that the Old Kingdom knew of them, but if so, there is no apparent record of it. There is a possible connection with the Hurrian people (q.v.)

## THE MAJOR PLAYERS

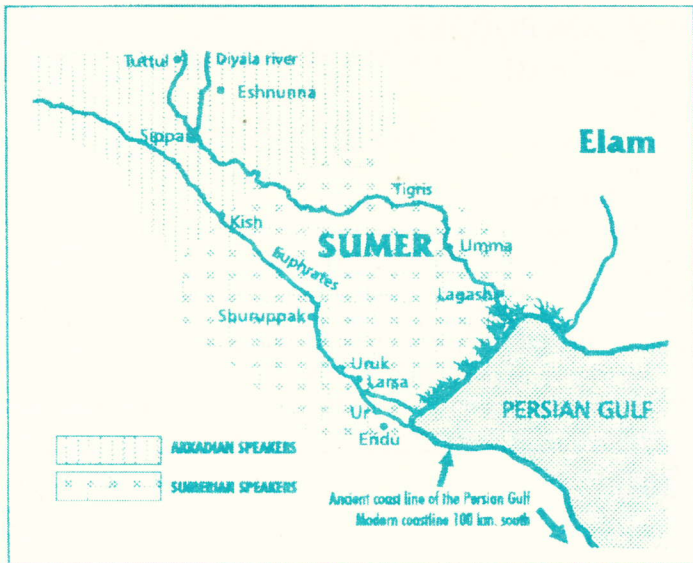
### Sumerians and Akkadians

Although they play no direct role in the Amarna letters, these two peoples are important for their contributions to written language. The Sumerians dwelt in lower Mesopotamia. They flourished between 3000 and 2350 BCE developing a culture that was adopted by many peoples after them, particularly the Akkadians and Babylonians. The Sumerians developed Cuneiform writing and taught it to the Akkadians who were possibly the first Semitic people to move into Mesopotamia, just north of Sumeria. According to Chadwick: "The Akkadians were Semitic speakers and spoke a language related to modern Hebrew and Arabic, while the Sumerians spoke a language unrelated to any of the other languages of the Near East. Akkadian is the oldest Semitic language and differs from



Fig. 1  
Derived from Chadwick (note 4). Capital cities of the Amarna period are in italics





**Fig. 2 Sumerian and Akkadian Speakers.**  
 After Chadwick, *op. cit.* p. 59

Sumerian in structure, grammar, and syntax. Akkadian is to Semitic languages what Latin is to Romance languages such as French, Spanish, and Italian<sup>16</sup>. In 2350 BCE, the Akkadians, led by Sargon seized political power and for about 150 years Akkad (his capital city) was the leading power in the area, dominating Ur, Uruk, Eridu, and other nearby cities. They borrowed much of their culture and some of their language from the Sumerians Both Assyrians and Babylonians wrote dialects of Akkadian in Cuneiform characters. So pervasive was Akkadian writing that ten centuries later, diplomatic exchanges were still written in Akkadian and that is why Akkadian writing shows up in the Amarna Letters. Sumerian, Akkadian, Assyrian and Babylonian continued to be written and presumably spoken in 14th Century BCE Mesopotamia.

**Babylonia**

Perhaps the classic example of a Mesopotamian state, Babylonia existed in one form or another from the time of Hammurabi (about 1792-1750 BCE)<sup>17</sup> until it was taken by the Persians in the mid 600s . It was the inheritor of The Sumerian-Akkadian culture including Cuneiform writing, Babylonia was dominant in at least three major periods; the Amorite dynasty of Hammurabi, which ended in 1595 BCE when the Hittites sacked the capital, Babylon; the Kassite Kingdoms from about 1406-1150 BCE, and the Neo-Babylonian Empire in the 626-562 BCE<sup>18</sup>. In the Amarna period, the country was ruled by Kassite kings who corresponded with the Amarna Pharaohs



**Fig. 3 Babylonia.**  
 Alter Microsoft Encarta 97.

as equals. The Babylonians were at least nominally allied with both the Egyptians and the Hittites by dynastic marriages. The Babylonians were most often in conflict with Assyria and Elam and probably hoped to use an Egyptian connection against those States. Eventually, Babylonia was absorbed into the Assyrian Empire and then by the Persians.

**Egypt**

Despite the religious upheavals of the Amarna period, Egypt was arguably the most powerful player in the region; under Thutmoses III, they definitely were. Under him, Egypt controlled the Cannanite coast, Syria, and even crossed the Euphrates river into Mittani lands.<sup>19</sup> By the end of the Amarna period, the Egyptians had lost control of Syria and parts of modern Lebanon to their principal rivals, the Hittites through Akhenaten's ineptitude or neglect<sup>20</sup>

**The Hittites**

On linguistic evidence, the Hittites were a mixture of Indo-European and native Hatti people centered in North central Anatolia (now Asiatic Turkey) who wrote in Cuneiform symbols and sometimes Luwian Hieroglyphs (See Arzawa, below). The Hittites were motivated by the need to trade, and especially to acquire copper and tin, the basic constituents of bronze. Copper they mined or got from



**Fig. 4 Egypt vs. the Hittites in the Amarna Period.** Dark shading shows the estimated extent of the Hittite Empire near the end of the Amarna period; light shading shows territory taken from Egypt or its vassal states during the Amarna period.



Alyshia (Cyprus). They either traded with the Assyrians for tin or mined it. An ancient tin mine has been found in the Taurus Mountains at Kestel near Goltepe<sup>11</sup> (Fig. 5). The mine was active from perhaps 2780 to 1840 BCE when it ceased being mined. Neither the Old Hittite Empire (from ca. 1680 BCE) nor the New Hittite Empire (from ca. 1450 BCE) got any tin from the Kestel mine; and by the time of the Amarna letters, this mine had been closed for about 500 years. However, there could well have been other tin mines in the region; it is geologically unusual for a rich mineral deposit to exist in isolation.

The Hittites traded with the Assyrians until around 1780 BCE when invading Aryan barbarians, called Hurrians, seized lands in the upper Euphrates area, cut the trade routes, and menaced the principal Hittite copper mining area that lay in the Taurus Mountains. From that time on, the Hittites foreign policy was to protect trade routes and keep them open, by force if necessary. By the Amarna period, the Hittites had built an empire and were the dominant power competing with Egypt. The Hittite capital was Hattusis or Hattusha (near Bogazkoy, Turkey) from which they ruled most of central Turkey as far east as Carchemesh. Hatti and Egypt dominated the Syrian and Canaanite city states. King Suppiluliumas ascended the throne in 1380 and inaugurated Hatti's greatest period. He managed to subjugate the Hurrian kingdom of Mittani, take Carchemish, and annex some of Egypt's vassal states. After his death in 1346, his son, Mursilis took over and, among other accomplishments, annexed Arzawa. Scholars disagree about the extent of Hittite control along the Syrian and Canaanite coasts but it appears that the Hittites ruled most of Syria and south into Canaan perhaps as far as Tyre by the end of the Amarna period<sup>12</sup>.

One of the most astounding stories to come out of the Amarna Letters concerns King Suppiluliumas and Queen Ankhnesenamun, the widow of Tutankhamun. The widow wrote asking Suppiluliumas to send one of his sons to marry her! He was so incredulous, he sent a messenger back to Egypt to confirm that he was not being deceived. The queen wrote back: "Why do you say 'They are deceiving me'? If I had a son, would I write to a foreigner to publish my distress and that of my country? You have insulted me in speaking thus. He who was my husband is dead and I have no son. I will never take one of my subjects and marry him. I have written to no one but you.

Everyone says you have many sons; give me one of them that he may become my husband"<sup>13</sup>.

A son, named Zannanza, was dispatched to Egypt, but was put to death, probably by the Queen's grandfather, an Egyptian named Ai (or Aye) who became the next King of Egypt and possibly did marry the Queen. An Egyptian-Hittite union would have completely realigned Middle East politics and would almost certainly have halted subsequent Assyrian expansion. Instead, an embittered Suppiluliumas attacked the remaining Egyptian vassals in Syria. The denouement of their rivalry came 75 years later at Qadesh where Ramses II narrowly escaped the Hittite chariots. Eventually the Hittites, Arzawa, Syria, and Canaan fell to the "Sea Peoples" others of whom raided Egypt about 1200 BCE.

### Arzawa

The Kingdom of Arzawa was almost certainly composed of people closely related to the Hittites. Their language, Luwian (pronounced "loovian")<sup>14</sup> is a close relative of Hittite that was written in hieroglyphs that are distinctly different from Egyptian hieroglyphs. The Hittites also used Luwian hieroglyphs on some of their monuments. The Luwians may have migrated into SW Turkey at a later date than the Hittites, possibly from the Balkans and may have brought their hieroglyphic writing with them. Located in southwestern Anatolia, Arzawa was surrounded by the Hittite Kingdom on their northern and eastern borders and the Mediterranean Sea to the south. They are mentioned by name in the Amarna letters and usually sought alliances with Egypt. They were almost always at war with their Hittite neighbors, when they weren't actually under Hittite domination. There may have been other "ethnically Hittite" kingdoms as well, but we have little but names of dialects such as Palaic. The connection of "Proto-Luwians" to Greece is another story entirely.<sup>15</sup>

### Mitanni

Mitanni was the Hurrian kingdom known as Hanigalbat or Naharina ("River Land" in Egyptian)<sup>16</sup>. We know less about Mittani than we do of other major powers because its capital city, Wassukkani, has never been found. They were ethnically Hurrian people; Indo-Europeans who settled in and around the northwestern Mesopotamia and northern Syria.

The Hurrians may have developed the light chariot with spoked

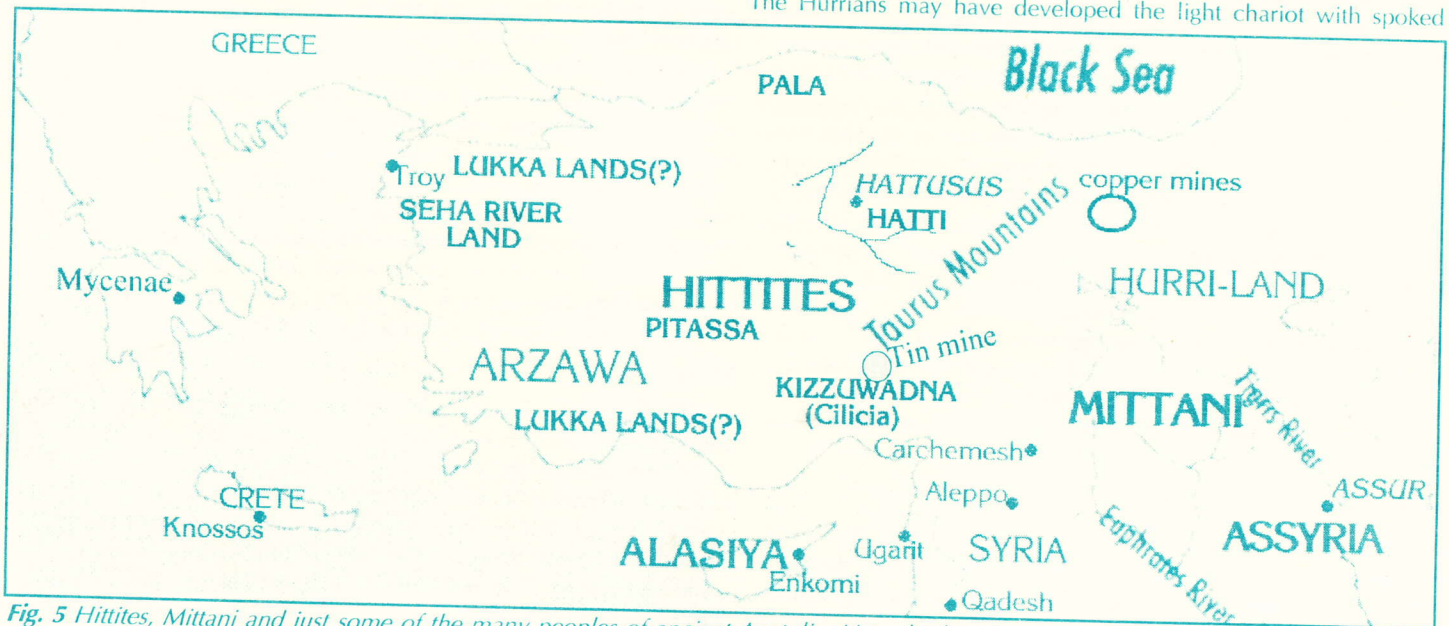


Fig. 5 Hittites, Mittani and just some of the many peoples of ancient Anatolia. Note the location of copper and tin mines on the border between Hatti and Hurrian dominated areas. Copper also came from Alashya and northern Greece (not shown). Lukka lands have not been unambiguously located; the Lukka are described in ancient records as notorious pirates.





Fig. 6 The Mesopotamian powers in the Amarna period.

wheels and "...its use as a platform for firing the composite bow and the development of scale armor for men and horses as a counter to it."<sup>10</sup> Note that the time the Hurrians seized control of the upper Euphrates region of Mesopotamia and cut off Anatolian-Assyrian trade (ca. 1780 BCE) is nearly coincident with the closure of the Kestel mine (ca. 1840 BCE) and that the Hurrian (Mittani) area of control is close to the copper and tin mine sites. The Mitanni Kingdom lasted from about 1500-1350 BCE. It was ruled by Kings with Aryan names who also worshiped Indian deities such as Mitra, Varuna and Indra which indicates that they may have migrated from India or been related to the Aryan people who entered India between 2000 and 1500 BCE<sup>11</sup>. The Hurrians also appear about the time the Indus Valley civilization disappears<sup>12</sup>. All these coincidences may be fortuitous. The Mittani were rivals of the Hittites whom they faced across their western frontier and of the Assyrians southeast of them. However, another Hurrian group, in what was known as "Hurri-Land" allied themselves with the Hittites, presumably against the Mittani. Under King Tushratta, the Mittani reopened an alliance with Amarna Egypt as a counterweight to the Hittites. During an earlier period of conflicts with the Hittites, a Mittani King sought and got an alliance with Amenophis II and this was, as Gurney says, "confirmed in due course by a diplomatic marriage"<sup>13</sup> Presumably a royal Mittanian daughter went to Egypt. The Amarna-period Egyptians were probably not as eager for the Tushratta alliance because the Mittani were becoming weaker and indeed were overrun and made vassals by Suppiluliumas. Later, that vassal state was crushed by the Assyrians.<sup>14</sup>

### The Assyrians

According to the Assyrians, the Mittani had it coming. The emergence of the Hurrians between Assur and Anatolia cut off the Hatti trade and the Assyrians suffered. First the Babylonians (under Hammurabi) and then the Mittani conquered the Assyrians. Among the first records we have concerning Assyrians are of traders from Assur founding merchant colonies in Anatolia early as the third mil-

lennium BCE. "The Assyrians clearly wanted silver gold and copper, and what they gave in exchange was woolen cloth, made-up clothing of various types and a metal which despite much argument is almost certainly tin rather than lead."<sup>15</sup> This has been the standard explanation for the Assyrian merchant colonies in Anatolia; however, the discovery of the Kestel mine challenges that interpretation. During the Amarna period, as the Mittani Kingdom declined, the Assyrians expanded looking for revenge, booty, and domination. The Old Assyrian Empire was the first in the Middle East to feature an imperial political structure with centralized government<sup>16</sup>. For them it was a policy of "Expand or Die" and they did both, in that order. Already in the Amarna period, we see them addressing the Egyptian Pharaoh without the usual flattering phrases that other "Great Kings" employ, although they did employ them later<sup>17</sup>. The Assyrians developed war to a fine art and boasted of their victories and cruelties. They inaugurated a custom of deporting whole captive populations to far distant parts of their empire in order to break the captives will to resist. That was the fate of the Elamites whose cities were then systematically destroyed and never rose again. The Assyrian war machine required an ever expanding influx of captives and loot. They conquered Egypt herself up as far as Thebes (663 BCE) and then, having expanded far beyond their capacity to govern, their empire violently collapsed, ending in 609 BCE.<sup>18</sup>

### Elam

The Elamites were probably an Indo-European people who were in southwestern Persia as early as Sumerian times. They are described as "a federation of the plains of Khuzistan and the adjacent highlands"<sup>19</sup> - in modern terms, southwestern Iran. Their capitol at Susa (Telloh) has yielded records in Akkadian and in an undeciphered language written in Proto-Elamite hieroglyphic script possibly related to Dravidian<sup>20</sup>. The Akkadians subjugated the Elamites in about 2300 BCE and gradually Akkadian supplanted Proto-Elamite in their writings. The Elamites both fought and traded with the nearby Mesopotamian states. They were an independent political entity and

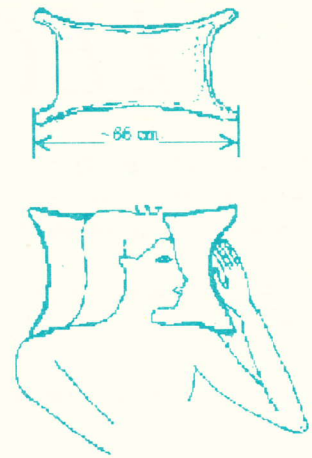


may have corresponded with Egypt during Amarna period but it is difficult to see how they could have interacted with Egypt. As noted above they were ultimately destroyed by the Assyrians.

## Alasiya

A more or less independent Kingdom situated on the island of Cyprus in the Mediterranean, 100 miles off the west coast of Syria, Alasiya was trading partner of Hatti, Egypt, and Ugarit on the Syrian coast. Alasiya was famous for its copper exports which were shipped as large ingots in a characteristic ox-hide shape. An illustration on the walls of the tomb of Rekhmire at Thebes shows a what is probably an Alasiyan man carrying one of the ingots". The ingots, were "rectangular slabs of around 20 kg weight having projections at the corners for ease of handling."<sup>11</sup> Because of their copper, the Hittites tried to control Alasiya and claimed at one point to have made it into a vassal state. The Hittites probably raided and perhaps stayed briefly. Most of the information about Alasiya is known from archaeology rather than from written records. They appear to have been prosperous in the 14th Century BCE. According to diplomatic

records, they certainly traded with Egypt. They sent copper, grain (possibly), timber, perfumed oil, and built ships for Egypt. They transshipped elephant ivory and boxwood between Syria and Egypt. In exchange they imported "fine furniture, chariots, horses, linen, ebony, oil, silver, ivory and gold."... "Teams of horses were frequently exchanged between Alasiyan and Egyptian rulers, probably because these were the gifts most prized, and so highest rated, in the competitive game of giving for glory."<sup>12</sup>



**Fig. 7** Alasiya copper ingots in the characteristic "ox-hide" style; weight about 20kg (44 lbs).

## NOTES

1. Cohen, Raymond; "On Diplomacy in the Ancient Near East: The Amarna Letters" *Diplomacy and Statecraft* Vol 7 No.2 (July 1996) Frank Cass Pub. London, pp 245-270
2. Cohen, *ibid* p247
3. BCE means "Before the Common Era" and is identical with "BC" but without the religious context. To be consistent, AD should really be rendered CE as well.
4. Cohen, *ibid* p247
5. Gurney, O. R., "The Hittites", 2nd Ed. 1952, Penguin Books Ltd. Baltimore, MD, p72 et. seq. While Gurney describes the methods of the Hittite King, Sippiluliumas, and his sons, it is quite clear that from Cohen that everyone played the game the same way.
6. There is one slightly obscure reference in Cohen *ibid* p265, to the "Nicky-Willy relationship" between the Kaiser and the Tzar, just before World War I. As all the major Powers of Europe began to mobilize, the two Emperors, who were related by blood and marriage, exchanged a desperate series of personal telegrams to try to stop the war. But it was too late. The Generals, not the Emperors of each nation were already in charge and no-one dared not to mobilize for fear of the others. The Kaiser was tied to Austria and the Tzar to Serbia, and so the war rolled on inevitably.
7. Cohen; *ibid* p248
8. Chadwick, Robert; "First Civilizations: Ancient Mesopotamia and Ancient Egypt", 1996, Les Editions Camps Floury & Robert Chadic, Quebec, p54
9. Chadwick *ibid* p54 "Semitic languages can be divided into the following major groups:
  1. Akkadian, which probably appeared in Mesopotamia in the fourth millennium B.C.
  2. The West Semitic languages, including Amorite, Canaanite, Phoenician, and Hebrew, which first appeared during the third and second millennia B.C.
  3. Aramaic, which appeared in the 12th century B.C. and was eventually spoken over most of the Near East, replacing Akkadian and cuneiform writing.
  4. Nabatean a pre-Islamic form of Arabic which appeared in the second century B.C..
  5. Arabic, which has been the dominant language of the Near East since the seventh century A.D."
10. Sherratt, Andrew, (Ed.) "Cambridge Encyclopedia of Archeology", 1980, Cambridge Univ Press, New York City, p126
11. Microsoft (Ed.) "Microsoft Encarta 97, CD-ROM", 1996, Microsoft Corp, Redmond WA
12. Chadwick *ibid* p187.
13. Gurney *ibid* pp22-25. Chadwick *ibid* P195, excuses Akhenaten from the charge of abandoning his dependent states but acknowledges blunders and "costly political setbacks" by the Heretic King. (pp 197-198)
14. Yener, Aslihan. <http://asmar.uchicago.edu/OI/PROJ/GOL/Goltepe.html>. I am indebted to Dr. Emily Teeter of the Oriental Institute, University of Chicago for pointing out this series of papers.
15. See 10
16. Gurney, *ibid* p 31
17. Dr. Emily Teeter informed me "Luwian" is a German spelling and provided the pronunciation (private communication).
18. Macqueen, J. G., "The Hittites and their contemporaries in Asia Minor", 1975, Westview Press, Boulder CO, Chapter II, gives a fairly complete overview of the Luwians and their possible connections to Greece and Troy.
19. Gurney, *ibid* p27
20. Sherratt; *ibid* p125
21. Lal, B. B., "The Earliest Civilization of South Asia", 1997, Aryan Books International, New Delhi. Appendix, p280 et seq. Includes a discussion of the possible origins of the Hurrians.
22. Thapar, B. K. "The Harappan Civilization: Some Reflections on its Environments and Resources and Their Exploitation" in Possehl, G. L. Ed., "Harappan Civilization, a Recent Perspective, 2nd Revised Ed.", 1993, Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi, p4, Note Harappan = Indus Valley Civilization. The diagram shows 6 major cities disappearing about 1700 BCE with others lasting until about 1500 BCE.
23. Gurney; *ibid*
24. Macqueen, *ibid* pp45-46 gives a fairly detailed look at the Hittite conflicts with their neighbors
25. Macqueen, *ibid* p19
26. Sherratt; *ibid* p186. Sherratt discounts the Akkadian Empire which he says (page 121) lacked the "organizational characteristics of later empires"
27. Cohen, *ibid* p253
28. Chadwick, *ibid* p95, analyzes the Assyrians expansionist syndrome.
29. Sherratt, *ibid* p123
30. Sherratt, *ibid*. Presumably he means the Indus Valley Civilization with whom the Elamites were definitely in contact.
31. Sandars, N. K. "The Sea Peoples", 1978, Thames and Hudson Ltd. London, p42.
32. Trump, D. H., "The Pre-History of the Mediterranean", 1980, Yale Univ. Press, New Haven and London, p194.



# LECTURE REPORTS

## **THE EGYPTIAN ARTIST**

Presented by Alice Gemmell  
ESS Meeting, January 19th 1999

Art in Egypt stretches back to the predynastic period, with animal petroglyphs at sacred places and early designs on pottery. The Narmer palette is the first piece to use registration - the horizontal bands of decoration that set the style for subsequent ancient Egyptian art.

Artists in ancient Egypt worked for patronage - they were professional artisans rather than producing "art for art's sake." On large projects such as tombs and temples, artists were housed near the site with their families, and paid in goods according to the size of their family. They worked a ten-day week, with eight days' work and two days' rest.

An artist's career began early - as soon as artistic talent was recognized. Apprentice artists practiced their drawing technique on flakes of limestone or potsherds (ostraca, from which our publication takes its name - ed.); many examples have been found, with some showing corrections by the master. As well as drawing, an apprentice learned plastering, working with a team of plasterers on a variety of surfaces, including tombs and temples. Slaves made the plaster itself - the apprentice artist learned only the technique of applying it to produce a good surface for decoration. The fresco technique, of applying color to wet plaster, was not used; instead, tempera colors were applied to dry plaster.

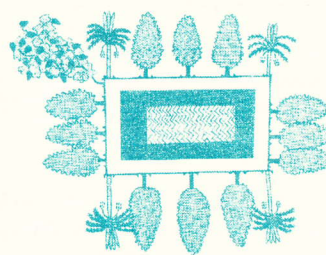
The next stage in an apprenticeship was to learn the color palette. The ancient Egyptians used mineral colors, finely ground. They produced long-lasting and brilliant colors, as is well attested by the freshness of many tomb paintings even today. The standard palette consisted turquoise, traded from Sudan; lapis lazuli traded from Afghanistan; charcoal and lamp black; green malachite; blue faience and glass frit (which were less stable than other colors); and yellow and red ocher (the red being made from recycled pottery). In the New Kingdom, yellow sulfide of arsenic was traded from Persia, but was very toxic.

These colors were used in a number of media. Egg tempera traces have been found on coffins, and acacia sap and animal-bone size in some tombs. Beeswax was used as a varnish. The colors containing iron and copper did not suspend well in a water-based medium without a catalyst; today denatured alcohol is used, but in ancient Egypt, home-brewed beer was found to be satisfactory.

Aside from colors, the ancient Egyptian artist's equipment consisted of a grinding palette and pestle, shells or small bowls for mixing, a color palette, reed pens and brushes, and palm twine for marking the surface to be painted.

Proportions were governed by a rigid grid system, which changed only once in the entire history of ancient Egypt. String snap-lines were used to put iron oxide or ocher lines on

the surface to be painted. Preliminary drawings were done in red, and corrected by overpainting in black. The color fill was then applied, followed by a final touch-up and the covering of the grid-lines. No perspective was used, just rigid proportion reflecting an idealized perfection. During the Amarna period, art became more fluid and less idealized, but the adherence to two-dimensional scenes with no perspective remained. This was perhaps the most lasting legacy of Akhenaten; even after the old religion was restored under Tutankhamun, the fluid figures and animated poses of the Amarna period remained - although the figures themselves reflected the original idealized forms of earlier periods.



## **SACRED GROVES**

Presented by Don Hughes  
ESS Meeting, February 16th 1999.

Throughout the world, there is a long tradition of topographic features becoming regarded as sacred. Sacred groves are still used as such in India, and in some parts of Africa. In the ancient world, they were known in both Persia and Greece, and were commonly associated with temples. On the stony ground of Athens' Acropolis, pits were dug alongside the Parthenon, for planting trees.

Trees were an important part of ancient Egyptian religion. At the time of a coronation, it was believed that the deities Thoth and Seshat wrote the new Pharaoh's name on the leaves of the sacred ished tree (called perseia by the Greeks, is was a fruit tree, similar to the pear). Palms and pomegranates were also held as sacred.

No ancient Egyptian temple was complete without a sacred pool and a sacred grove - a temple without trees would have been unthinkable. Ramses III donated gardens to many temples., and according to tomb paintings, the temple of Aten at Amarna had many trees arranged around a sacred pool. The columns in hypostyle halls are commonly decorated in plant forms, and it has been suggested that they represent sacred groves within the temple building.

Gardens were also associated with palaces and gardens. "Paradises" were associated with most villages in the Ramessid and Ptolomaic periods, occupying from 1/2% to 20% of the village's land. The word "paradise" is linguistically derived from a term meaning "a wall around," and these may be the remnants of more ancient sacred groves.



## THE ART AND ARCHITECTURE OF AMARNA

Presented by Floyd Chapman  
ESS Meeting, March 16th 1999

Floyd Chapman treated the ESS to a new perspective on the art and architecture of the Amarna period. Although it seems to have appeared out of nowhere, Floyd showed us how the stage was set for the Amarna "phenomenon."

Tuthmosis III, stepson and ward of Hatshepsut, came to power circa 1482 BCE. He extended the Egyptian empire and amassed great wealth. Part of his success lay in his treatment of conquered subjects. He treated them humanely and allowed royal families to remain on their thrones. However, he took their crown princes back to Egypt to raise them as his own, thereby securing the princes' allegiance and "Egyptianizing" them. His grandson, Amenhotep III, inherited unsurpassed wealth from his politically savvy grandfather. During his reign, the arts flourished as never before, luxury goods without equal were produced and he undertook grand projects like the construction of a temple to Amen-Re at Luxor. He established the cult of the solar disk. Perhaps the huge cushion of wealth gave Amenhotep the confidence to deify himself as the Living Aten during his lifetime. The achievement of godhood in life, rather than after death, was unprecedented. Forever after, ancient Egyptians harkened back to the glory years of Amenhotep III.

Floyd's description of temple doors dating back to Amenhotep III's reign brought home the artistry and opulence of the time. The doors, made of cedars of Lebanon, stood 30 feet high and were encased in gold sheets and inlaid with hundreds of pounds of lapis lazuli. They must have been dazzling!

During both their reigns, the age-old iconography and conventions were preserved. For example, a typical temple consisted of huge pylons (symbolizing the horizon), forecourt, hypostyle hall, and finally the holy of holies where images of local gods were housed. Commoners could venture only as far as the forecourt; only the purest of priests and the Pharaoh could enter the holy of holies. The way the roof descended while the floor rose up to meet it, as one proceeded through the temple, echoes the origin myth where the land rose from the sea of chaos to meet the heavens.

During the reign of Amenhotep III, priests became a very powerful force. 85,000 people served the Karnak complex and the priests controlled a quarter of all Egyptian land. Not surprisingly, this concerned Amenhotep.

Akhenaten, Amenhotep III's son, regained power by outlawing the orthodox cult and religion when he ascended the throne. He sealed temples and expelled the priests. He created a monotheistic religion based on the Aten, with himself as the prophet of the Aten. The Aten was represented as a solar disk with rays terminating as hands, and with associated serpent and ankh. Aten was shown in wallpaintings bathing the earth in its presence, and blessing the Pharaoh and his family.

Atenism was a reaction against the established religion. Instead of being dark and mysterious, his temples were open

to the sun and filled with light. He relocated Egypt's center to El-Amarna, halfway between Cairo and Luxor, on the east side of the Nile and called his new city Akhetaten, meaning "the horizon of the Aten". The enormous site encompassed 13 square miles and was only occupied for 17 years before being abandoned - and being cannibalized for its building material by Akhenaten's successor, Horemheb.

The art of Amarna reflects the rejection of the orthodox religion. Many scenes depict nature, which served to replace the old iconography and remind the viewer that all is the handiwork of the supreme creator, the Aten. Amarna artists were given free rein. They experimented with pastel hues and a lively, naturalistic style. The grandiose architecture of this time also embraced nature. For himself and his family, Akhenaten "created heaven on earth." The palace complexes included gardens, aviaries, gazelles, reflecting pools and aviaries. Floyd took us to the North Palace, once the residence of Akhenaten's oldest daughter. The palace had a deep reflecting pool, courtyards, gardens, a balcony from which to enjoy the domestic scenery and murals. Archeologists in the 1920s unearthed sections of the painted walls from the throne room. Although they no longer exist, Floyd showed an artist's reconstruction of a fragmented portion of the throne room wall, possibly part of an aviary. The scene, of song birds amidst foliage, was breathtaking.

I left Floyd's presentation with an enhanced appreciation for the magnificence of Egyptian art and architecture from Amenhotep III's and Akhenaten's reigns. The architectural relics we see today in Egypt are pale, denuded remnants of their former selves and it takes a great leap of the imagination to mentally "color them in". Hopefully, Floyd's computer graphic reconstructions of Amarna art and architecture - which he promised to share with us in the future - will help our imaginations fill in the blanks.

*Report by Judy Greenfield*



### **Volunteers Wanted!**

*We need people to help with this section of the Ostrakon. The publications committee would love to hear from anyone who is interested in writing brief reports on ESS lectures and other activities. You don't have to commit yourself to covering every single lecture - once or twice a year would be fine. If you are interested, please contact any member of the publications committee.*



# The Electric Papyrus

## Egyptology in the New Media



Image © Nigel Strudwick, 1994-1998. Used with permission.

### Exhumed

by BMG Interactive

*Exhumed* (also released under the title *Powerslave*) is a fast-action, run-and-shoot computer game of the same genre as *Doom*, *Quake*, *Unreal*, *Half-Life* and many others.

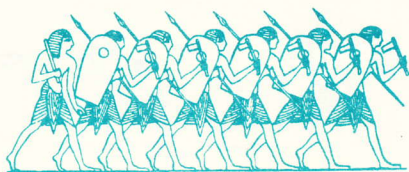
You play the role of an Indiana Jones style adventurer fighting the minions of evil gods so that the spirit of the Pharaoh Ramses can rest in peace. Armed with pistols, machine guns and grenades, you make your way through a series of three-dimensional, Egyptian-inspired complexes, fighting a range of enemies from poisonous spiders to mummies and Anubis-like dog-headed creatures. Along the way, you can run over healing plants to replenish your health, and pick up new weapons, ammunition, as well as potions and artifacts that give you magical powers.



Image © Ambertec

The game is obviously designed to entertain rather than educate (and we hope to include reviews of educational CD-ROMs in future columns), but the free demo version, downloadable from the Web address above, provides light amusement, and might even induce young relatives to concede that ancient Egypt can be cool!

Review by Graeme Davis



### Become a Cyberscribe!

If you've seen a Web site, CD-ROM, video, laserdisc, DVD or other electronic publication that you think would be of interest to fellow ESS members, the Electric Papyrus needs you! Send a brief review - as long or as short as you like - by email to Graeme Davis at [graemed@vr1.com](mailto:graemed@vr1.com), or type it up and hand it to any publications committee member at an ESS meeting.

### Denver Museum of Natural History

<http://www.dmnh.org>

The DMNH Web site is large and comprehensive, and while it is clearly aimed at would-be museum visitors rather than *Ostrakon* readers, it can be a good source of up-to-date news on coming attractions (such as the IMAX *Mysteries of Egypt* movie scheduled for June 11-October 7, 1999, which was advertised on the Web site before the ESS knew anything about it!).

The site is very slick, easy to use and well laid out, and has won awards from the Colorado Chapter of the Public Relations Society of America and the Denver Advertising Federation, as well as being named Best Educational Web Site by *Westword* and one of 100 Great Colorado Web Sites by the *Denver Rocky Mountain News*.

What really sets it apart from many other museum Web sites, though, is the depth of information it offers. Details of opening hours, current exhibitions and coming attractions are to be expected, but the coverage of the Museum's research projects and educational programs is a definite plus.

There are a couple of engaging little cyber-toys, as well. One is an online visit planner which lets the user answer a few questions about what they want to see, and generates a personalized itinerary and a coupon - not to mention providing the Museum's Marketing department with priceless information about what the biggest draws are among the Museum's exhibits (no word yet on how popular the *Egyptian Mummies* exhibit is - ed).

The other, called *Adventure Central*, is changed periodically to reflect current exhibits. At the time of writing, it was based on the *Cruising the Fossil Freeway* exhibit, and offered some amusing little activities intended to pique interest in the exhibit itself.

Review by Graeme Davis

### Volunteers Wanted!

Your publications committee needs volunteers to help with the *Ostrakon*. Particularly needed are short reports on the ESS lectures each month. If you are willing to help, please contact Graeme Davis at (303) 422-5342 or [graemed@vr1.com](mailto:graemed@vr1.com). Thanks!



**HOUSE OF SCROLLS**  
will return in the next issue