The Environment and Culture of the Nile
by Dr. J. Donald Hughes

The Obelisk: Sun Symbol of Ancient Egypt
by Mary Pratchett

Update on 3D CT Scan on DMNH Mummy
by Dr. Robert Pickering

House of Scrolls (Book Reviews)

Speakers' Bureau
The way the Egyptians adapted to their ecological setting is one of the most interesting aspects of their history. Some textbooks remark upon the stability of Egyptian culture through the centuries in a pejorative tone, attributing lack of change to traditionalism and absence of creative thought among a people that was "insular and self-satisfied." But that is unfair; the stability of Egyptian civilization was the positive result of the sustainability of Egypt's ecological relationships. As Karl Butzer said, "Major segments of ancient Egyptian history may be unintelligible without recourse to an ecological perspective." The ecological attitudes and practices of the Egyptians were rooted in a world view that affirmed the sacred values of nature.

Egypt, although one of the first societies to develop cities, remained agrarian rather than urban. As Adolf Erman stated, "Agriculture is the foundation of Egyptian civilization," and we must look at it in order to understand ecological relationships. The sustainability of agriculture was provided by the annual flood of the Nile, which deposited fertile soil. Herodotus, observing that the soil was formed of river sediment, pronounced Egypt the "gift of the Nile." An inscription says the Nile "supplies all the people with nourishment and food." Their environment encouraged Egyptians to think of processes of nature as operating in predictable cycles. The climate was mild, without freezing temperatures. Though little rain fell, the river flooded regularly each year, supplying the necessary water. The only fertile land was that watered by the river, both in Upper and Lower Egypt.

Of all the world's great rivers used in early times for flood agriculture, the Nile was most regular, but not totally predictable. Disasters occurred when a high Nile flood washed away irrigation works and villages, or when a low Nile failed to water or fertilize the black land adequately. Then Egypt suffered, partly due to rebels or invaders who took advantage of weakness caused by flood and famine. But traditional patterns, including environmental relationships, reassured themselves. John Wilson said, "The Nile never refused its great task of revivification... True, the Nile might fall short of its full bounty for years of famine, but it never ceased altogether, and ultimately it always came back with full prodigality."

The natural regime of the Nile provided the environmental insulation for a sustainable society. But the river alone could not assure sustainability. For that, the efforts of the Egyptians were needed. To see why these occurred, we must examine the Egyptian world view. Egyptian religion held as sacred the forces of nature that assured sustainability and urged people to cooperate with them. The world was a place of system and regularity - qualities attributed to Ma'at, goddess of balance. But she was more than a goddess; she was cosmic consciousness. She embodied order that harmonized what appeared to be opposites. Gods and pharaohs alike were expected to act in accord with her principles, so that she was implicitly recognized as the basis of civilization. Many creation myths embody the idea that the world is the expression of creators that acted in congruence with the harmony Ma'at represents.

The orderly movements of the heavens were evident to Egyptians, whose sky was seldom clouded. Isis' star announced the flood. As above, so below: the sky goddess Nut arched her body above her fertile consort, Geb (the Earth god) in perfect balance. The principle was a balance of roles, not the dominance of either.

The land was a god, and therefore sacred. Osiris embodies vegetation. The cycle of
flood, planting, harvest, and fallow was expressed as his birth, growth, death, dismemberment, burial, and resurrection; every event of the agricultural year repeated an event in his life. Hapy was god of the Nile. Bringer of fertility, although male, he was portrayed with breasts to show his power to nurture. He was called "Father of the Gods" because they depended on the Nile for offerings and existence. According to myth, Hapy suckled Osiris, helping to resurrect him just as vegetation relies on the Nile flood. When the Nile rose to an appropriate level, people rejoiced at the advent of the god. A pyramid text exulted, "They tremble, that behold the Nile in full flood. The fields laugh and the riverbanks overflowed. The gods' offerings descend, the visage of the people is bright, and the heart of the gods rejoices."

The sacred sciences of astronomy and records were marshalled to ensure dependable relationship to the environment. Geometry, necessary to reestablish field boundaries after the flood had swept away markers, was a hallowed occupation invented by the god, Thoth. Temples were located by geomancy and oriented to the revolutions of the sun and stars. Papyri containing these branches of knowledge were kept by scribes in the House of Life. Irrigation was a form of sacred technology practiced by the pharaoh and the gods themselves and irrigation projects were commemorated as good works. The Scorpion-King Mace Head shows the king digging a canal, and "Canal-digger" was an important administrative title under the pharaoh. Canal building was a major occupation in the world beyond death. Recent research has discovered that most irrigation work was supervised by local officials in the nomes. Burton thinks the nomes developed as local irrigation units: "These nomes, as basic territorial entities, originally had socioeconomic as well as ecological overtones, but then became increasingly administrative in nature."

In spite of Egypt's remarkable sustainability, environmental problems appeared. One of these, famine, was a result of the Egyptians' success in producing the ancient world's most reliable food supply. The most dependable system will fail with overpopulation. When population increased to a level that required a year of good harvest, any abnormally low harvest would bring the danger of famine. The causeway of Unas at Saqqara shows starving people with their ribs prominently visible. Officials tried to even out fluctuations of supply and demand by storing surplus in good years to distribute when harvests failed. The storechambers of the Ramesseum could hold 590,000 cu. ft of grain, enough to support 3,400 families for a year. With such reserves, Egypt remained the breadbasket of the ancient world as one of the few countries that usually exported grain.

The Egyptians' joy in their environment can be sensed in pictures of activities such as plowing and hunting. But these portrayals show no realization of damage to nature. For them, Earth was unchanging; but changes, some destructive, were nonetheless occurring.

Salinization, the accumulation of salts in the soil as water evaporates, is a danger wherever irrigation is practiced in dry climates. In extreme cases, plants cannot grow in salinized soil. Although the flood helped leach salt from the soil, salinization occurred in irrigated areas above flood line, and in The Faiyum, below sea level.

Deforestation was a major problem. Although over 90% of Egypt's area is desert, trees abounded in the watered land. Valley margins supported a rich evergreen forest. This changed with cultivation: tomb paintings show trees cut to clear land. Grazing of domestic animals depleted the vegetation. Nothing deforests a dry land more efficiently than cutting trees followed by the grazing of goats, which destroy the young trees before the forest can reestablish itself. The Egyptians lacked tall, straight trees as is evidenced by the intensified import of cedar, juniper, fir, and pine. In the New Kingdom, the timber-producing area was conquered by the Egyptians.

The ecology of the Nile wetlands was very fragile and the habitats of wild animals, birds, and aquatic creatures living there gradually shrank. Eventually, "the almost total
disappearance of large game from the valley, with increasing importation of captured animals for symbolic hunts by the nobility, argues for eradication of the natural vegetation. Even papyrus, a once common plant in Egypt, became less prevalent.

With the destruction of vegetation, grazing of domestic animals, overhunting, and climatic change, came the loss of animal species from the Nile region. Deification of wild animals did not spare them from the hunt nor did it prevent habitat destruction. In Pre-dynastic times, as petroglyphs attest, Egypt supported a variety of species as rich as that now found in East Africa. But as early as the Old Kingdom, many species were missing or reduced in numbers north of the First Cataract. Some depletion was due to climatic change (the Sahara began reaching its present aridity well into the Old Kingdom). But some was also due to deliberate destruction: Amenhotep III boasted that he killed 102 lions with his own hand. The numbers of birds were once astonishing in Egypt, a 'land of whirring wings,' but their abundance was reduced by overhunting and drainage of the marshlands. Some waterfowl became part of temple flocks while others were prepared as offerings. Inscriptions at Medinet Habu say Ramses III gave 426,395 birds to temples, including 9,350 per year to Amun at Thebes. A similar fate awaited the Nile fish, though some were protected in sacred lakes.

Environmentally, Egypt at the end of the ancient period was much changed, but still productive. The Nile still brought its annual floods, with sufficient water and sediment (in most years) to guarantee good crops. Grain, flax, and papyrus were usually abundant enough to meet Egypt's needs and be exported. Egypt was in most respects self-sufficient as a result of the life-giving Nile, endowing Egyptians with a sense of contentment - not to be mistaken for stagnation. The Egyptians' relationship to the land was governed by sacred principles that derived from Ma'at, the universal order that controlled the pharaoh and even the gods themselves. Although Egypt did not lack in environmental problems such as loss of vegetation and wildlife, this reverence for the land and its denizens helped mitigate some of the damage to the environment. The modern world could learn a poignant lesson in ecology from the great society of ancient Egypt.

NOTES

4 Herodotus, Histories 2. 5.
7 Butzer, 51-56.
11 Butzer, 105; see also Hoffman, 30-32.
13 Butzer, 25.
14 Butzer, 86-87.
15 Butzer, 26-27.
17 Isaiah 18:1.
18 Kees, 93-94.
The Obelisk: Sun Symbol of Ancient Egypt

By Mary Pratchett

ABOUT THE AUTHOR: Mary Pratchett lived in Mexico and South America for over 21 years. She is a research volunteer at both the DMNH and the Denver Art Museum where she is working with Pre-Columbian artifacts.

Egyptian obelisks have been a source of wonder and amazement for centuries to all who have seen them. Knowing that these magnificent soaring monuments were quarried, decorated, and transported using only the primitive means available is astonishing and indicative of the intense dedication of the ancient Egyptians to their sun gods.

Although no records have survived detailing how the obelisks were made, the ingenuity and engineering techniques must have been highly imaginative and wonderfully inventive. References in certain papyri address some aspects of the work involved, but there is no clear explanation of the complete methodology used to construct these massive structures.

The search for the meaning of these striking and elegant monuments begins at the very roots of the ancient Egyptian civilization. Therein is the reason why this particular form was used to express the ancient Egyptians' strong devotion to their powerful sun gods.

According to one belief, the first mound, or beginning of life, which arose from the primordial slime (or the waters of chaos) was the pyramidal form. These mounds or stones were known as ben or benben, and were believed to have existed in Heliopolis (the ancient center of worship of the sun gods, Atum and Re-Herakhty) from the beginning of time. Scholars think Heliopolis was the location where the benben stone was elevated on a pedestal, or pillar, to form the obelisk, and there it was possibly first worshiped as a cult object. These benben stones also were believed to have been associated with the benu bird, or phoenix, which was thought to live on top of the benben stone. This bird, which begot itself, was believed to have come from the east to live for 500 years at Heliopolis, after which time it returned to the east to be interred by a young benu bird. The young benu would then return to take its place in Heliopolis. Another version of this belief states that the benu bird revived itself, rather than being replaced, and was then considered to be linked to the god of the dead, Osiris.

Although little information remains on its beginnings, a powerful sun cult emerged in Heliopolis that subsequently dominated Egyptian civilization and its most important symbol was the obelisk.

The pyramidions (the capstones) of the obelisk were considered to be of the greatest importance and during the Eighteenth Dynasty were often covered in gold. Gold was an extremely precious metal; it resembled the sun's rays and therefore, was beloved by the gods. The sight of these wonderful monuments piercing the sky and shining with gold must have been stunning.

Even though the obelisk, or some form of it, appears to have been erected much earlier, the well known monuments date from about 2000 B.C. The Fifth Dynasty kings passionately worshiped their sun gods, and may have been the first to erect them in pairs in front of their temples. Obelisks were raised for various reasons: to show close relationships with deities, to commemorate events, and for jubilees. They carried the names of their makers and the deities they worshiped and were meant to last through all time, bringing immortality to both.

Besides the great monolithic structures so well known to the world, small or obeliskoid objects were at times placed in front of tombs. These smaller objects were inscribed on only one side with the name and main title of the owner of the tomb. Wooden obelisks were found with shawabti in some tombs. The obelisk's connection with the god of the dead would explain their appearance in these instances.

During different periods, in addition to being
solar symbols, obelisks were considered to be the actual dwelling places of the gods. An inscription in the Temple of Amun-Re at Karnak lists new offerings and feasts for the four obelisks erected by Tuthmosis III as if they were gods and defines the amount and the nature of the offerings. Another example is an illustration in the Book of the Dead depicting a priest making an offering to two obelisks in which dwell Re-Herakhty.

The obelisks were placed in definite patterns. The two monuments which Ramses II constructed at the temple of Luxor are typical examples. On the eastern obelisk is inscribed "beloved of Herakhty" who was the god of the rising sun; on the other is engraved, "beloved of Atum," the god of the setting sun. The two obelisks of Heliopolis erected by Tuthmosis III, which are now in New York and London, also follow this principle. The New York obelisk mentions Herakhty; the one in London has a reference to Atum. Following the Luxor precedent, the obvious deduction is that the New York obelisk to Herakhty stood on the east side of the entrance to the temple in Heliopolis; the London obelisk stood on the west side.

The correct placement of the faces of these monuments also had a distinct pattern. The direction faced by the hieroglyphic writing (which almost always faces toward the beginning of the text) indicates the proper orientation of the faces of the obelisks. The obelisks usually have a dedication engraved on the front, and these hieroglyphs, along with those on the back, face toward the entrance to the temple. The writing on the sides faces toward the front.

Clearly there could only be one true orientation for a pair of obelisks on either side of an entranceway because of the direction of the hieroglyphic writing and the pattern followed by honoring the gods of the rising and setting suns.

The ancient Egyptians were concerned with expressing themselves artistically and architecturally in forms that would last forever, for the eternal glorification of their gods and the immortality of their kings. The obelisk, one of their finest creations, which seems to reach from the earth to the heavens, will probably be in the architectural inventory until the end of time.

BIBLIOGRAPHY


UPDATE ON 3D CT SCAN ON ONE OF DMNH'S MUMMIES

By

Dr. Robert Pickering

ABOUT THE AUTHOR: Dr. Robert Pickering, who received his Ph.D. from Northwestern University in Evanston, Illinois, in 1984, has done archaeological field work in the U.S., Mexico, and in the Pacific. He is the head of the Anthropology Dept. for the DMNH and the staff liaison for the ESS.

Information continues to build from different kinds of analysis on the mummy scanned at the Medical Center on July 27. The results will be a very detailed biological picture of the mummy and a new mystery to be solved.

First, the biological information... The Toshiba CT Scan unit represents the newest generation of 3D CT technology and has produced incredibly detailed images. In early September, I met with radiologists Dr. Michael Manco-Johreson, Jan Durham, Ed Hendrick, and David Rubinstein, and medical engineer, Dr. Vic Spitzer, to review the CT films. We examined all of the two-dimensional CT images to identify anatomical structures, looking for evidence of pathology and interpretive aspects of the mumification process.

The detail visible in the scans is truly incredible! As mentioned in an earlier newsletter, I said that you could count the number of layers of linen wrapping around the mummy. It may also be possible to reconstruct how the mummy was wrapped with linen; it may also be possible to reproduce the technique of wrapping the bundles of internal organs. From an anatomical perspective, the detail is also excellent. Clearly visible in the skull are the auditory ossicles or, in the vernacular, the small bones (less than two millimeters in length) of the inner ear. Portions of the desiccated aorta and portions of other blood vessels and nerves can also be seen. Even with this high degree of detail, no major pathologies were observed. Therefore, cause of death is still elusive, but studies continue.

Color photos of the sarcophagus have been sent to Frank Yurco, the consulting Egyptologist from the Oriental Institute. Just a few days ago, Frank and I talked by phone and he gave me the following information: stylistically, the coffin is characteristic of the 19th or 20th Dynasties, or from 1314 to 1085 B.C. Of course, the Ramses volunteer will recognize that this coffin represents the Ramesside periods. Frank and I concur that the coffin is not well made or well painted. The images and hieroglyphics appear poorly formed and quickly painted. Therefore, the person for whom the sarcophagus was made was probably from the middle or lower middle class. The name on the coffin is "Mos" or, as it would later become, Moses. Frank says that this is a common man's name during the Ramesside periods. Let me emphasize, this name is for a male. The mummy is definitely female.

From the discrepancy between the size of the mummy and the interior dimensions of the sarcophagus, I had early doubts about the mummy and sarcophagus actually going together. Frank's translation would seem to make it clear that the two do not go together. So, there is a new mystery to explore. Who is this mummy and when was the switch made? It may be impossible to answer the first question, but there are clues to the second. The mummy bundle is complete and has never been damaged by looters looking for gold and ornaments. Had the bundle been opened, looters would certainly have taken the gold foil covering on the left side of the abdomen and on the chest. The heart scarab and amulets would also have been taken. Yurco doubts that the switch was made during the late 19th century when many antiquity dealers were putting good mummies in good coffins to increase sales to European and American tourists. Rather, Frank suggests that the switch may have occurred shortly after the mumification of the sarcophagus' current occupant. As always, more research will follow.

The last area of research concerns the facial reconstruction. A full set of the two
dimensional CT images shot at one millimeter intervals have been sent to Ray Evenlouse, medical illustrator and facial reconstructionist, at the University of Illinois, Chicago. Over the next few months, he will be projecting these images onto foamcore, cutting out each individual image and stacking them into a solid skull. Once that laborious task is complete, he can then begin building a face for the mummy.

The work already done on "Mos" has already attracted the special talents of a wide variety of researchers. Yet, the process is really just beginning.

**HOUSE OF SCROLLS**

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**BOOK REVIEWS**

**PHARAOH'S PEOPLE: SCENES FROM LIFE IN IMPERIAL EGYPT**
by T. G. H. James, University of Chicago Press, 1984. 282 pp. Illustrated. $12.95
Denver Public Library System: 932.014 J236ph.

**ABOUT THE REVIEWER:** Evan Mitchell is a second generation Coloradan and has a Communications/Theater degree from the University of Colorado at Denver. As hobbies, he appears on stage in local theaters and pursues his interest in Egypt.

If you are looking for a book about ancient Egypt but don’t want another up-and-down-the-Nile-with-lots-of-pretty-photos-book," or another chronological history that gives you "the big picture", I would like to recommend this book by T. G. H. James, keeper of Egyptian antiquities at the British Museum.

James has written an eminently readable collection of essays about life during the mid-Eighteenth Dynasty. Even if you happen to be an avid reader of books about ancient Egypt, you are not likely to be bored with this book about daily life from over 30 centuries ago.

As the author states in his preface, "My hope has been that the flavour of life in imperial Egypt might be tasted, and that the taste will not be wholly misleading, too spiced by imagination, or sweetened by sentimentality...In this series of essays my eyes have been sighted low to catch rare glimpses of the humble going about their business; but they have not always managed to avoid sweeping up occasionally to gaze at the not-so-humble." Most of the texts that are referenced in this book have been newly translated by the author. James includes line drawings from tomb paintings as illustrations. This technique works very well when coupled with his clear explanations of the actions and implements depicted.

In his first essay, the author discusses the validity of the written record. How much of a pharaoh's bombastic temple inscription can be taken as fact? More than you might think at first glance. How much can you learn about one of the nobles from what was written on his public inscriptions? Far less then you would expect, unless the inscription was written at a place remote from the center of government. The "not-so-humble" appear, as they always do with bureaucracy that shaped the society. Could the average person hope for justice? In a society without a written legal code, how were things decided? Who decided them? Was the decision irrevocable? These questions, to name a few, are answered in the essays Duties of the Vizier and Justice For All.

We usually think of scribes as government officials collecting taxes, counting treasure, or writing down the words of the mighty. But if you could not write, and you wanted to send someone a letter, how did you have it written and sent? If you were fortunate enough to
receive scribal training, what was it like? As a student scribe, what did you write with, on, and about? The author devotes two essays to the scribe: Literacy and Status and The Scribe in Action.

Egypt’s true wealth was in the abundance of food it produced. The vast quantities were enough to support large classes of people who did not have to work the land. Almost all the tomb paintings show the owner and his family working in the fields of the next life, even though the "not-so-humble" probably had never picked up a hoe. What was the life of a farmer or peasant like? Was it as repulsive as scribal students were taught?

Craftsmen in Metal and Wood takes the reader into the temple workshops. How did craftsmen get a straw fire hot enough to melt metals? How did they handle gold (which melts at 1063 degrees C) with bronze tongs (that melt at 1030 degrees C)?

A Desirable Residence looks at the layout of a typical Egyptian house. Where did they eat, cook, and sleep? And, WHERE WAS THE BATHROOM?

The author’s final essay deals with domestic economy. The essay is not a study of gross national product or economic indicators, but a look at the complex way that a barter economy works. How do you buy the things you need or want, when currency does not exist?

If any of this sounds interesting, I recommend that PHARAOH’S PEOPLE be added to your list of "ought to read" books.


About the Reviewer: Barb Fenton is also a second generation Coloradan. Her hobbies are hiking and photography.

Professor Geoffrey Martin has recorded his expedition’s ten-year experiences at Saqqara in his recently published book, The Hidden Tombs of Memphis. Martin describes his book as "unashamedly a detective story, a search for clues to unravel the lost history of Memphis in the time of Tutankhamun and his five immediate successors." The Cambridge-educated Egyptologist credits success in the field, not to luck, but to "careful detective work and looking for clues on the ground." Martin and his colleagues proved to be admirable sleuths with the discoveries of the tombs of Maya, Horemheb, Princess Tia, and other New Kingdom notables.

In his richly illustrated book, Martin describes how the joint expedition was formed and how the Anglo/Dutch team discovered the answers to many of the secrets of the New Kingdom held captive through the centuries in the cemeteries of Saqqara. However, as Colin Renfrew writes in his introduction to Martin’s book, one senses that Martin’s dedication to scholarship and his determined spirit were the lifeblood of the expedition. Renfrew summarizes the results of the project as follows: "perhaps most fascinating of all is the ability of Egyptology to bring forward not just
lost cities and wonderful works of art, but to introduce us to named individuals. We come face to face with real people forgotten for nearly 4000 years, but brought to light again through careful research and systematic excavation."

Martin makes an eloquent introduction to some of ancient Egypt's most dramatic aristocrats. The Hidden Tombs of Memphis may be ordered through the DMNH Museum Shop.

SPEAKER'S BUREAU

The Speaker's Bureau is a unique opportunity for ESS members to go into the community to share knowledge about Egypt. Requests for informative programs come from schools (at all grade levels), as well as adult groups and organizations. Any member is invited to submit an application to give lectures (either with or without slides), costumed presentations, storytelling sessions, or any other method of communication.

For further information, please call Evan Mitchell at 757-1704.

To submit articles or for questions please call Barbara Fenton at 778-8178.