

# A Mummy's Life

State-of-the-art scanning reveals there's more to this priestess than just a pretty face

by ETI BONN-MULLER

**A**ROUND 800 B.C., a wealthy Egyptian priestess named Meresamun served the god Amun in the monumental Temple of Karnak at Thebes. Her primary duties were to play percussion, string, and wind instruments that pleased and soothed him, and to sing hymns that praised his name. When she died, her body was mummified and sealed in a skintight coffin of cartonnage (layers of linen and plaster), which had been lavishly painted with her idealized likeness and images to ensure a successful journey to the afterlife. Among other motifs, there are garlands of flowers, a reference to regeneration; a sun disk hovering above a falcon, both symbols of rebirth; the four sons of the god Horus, protectors of the viscera that were removed from her body; and two jackals representing the god Wepwawet, "opener of the way" to the necropolis.

The mummy was purchased in 1920 by University of Chicago archaeologist James Henry Breasted and has been in the Oriental Institute Museum's collection ever since. The fragile coffin was never opened and the body never unwrapped because generations of curious curators couldn't bring themselves to destroy the beautiful decorations. But recent analysis on a state-of-the-art CT (computed tomography) scanner is now allowing experts to examine Meresamun as never before. The results of the study, along with ground-breaking research on the role of priestess-musicians in the temple and at home, are the subjects of the museum's current exhibition, *The Life of Meresamun: A Temple Singer in Ancient Egypt*.



**L**AST SEPTEMBER, EGYPTOLOGIST EMILY Teeter, curator of the exhibition, and a team of conservators placed Meresamun's coffin, secured by foam wedges and linen straps, into a rectangular wooden crate. On the outside, the exhibition designers had painted black *wedjat* eyes, protective symbols often depicted on ancient Egyptian coffins, believed to allow the mummy to see out. "We didn't want her to feel boxed up," says Teeter, a slender woman with a silvery bob. Then they loaded the mummy into a truck and drove across campus to the University of Chicago Hospital's emergency room. They placed the crate on a gurney and wheeled it into the CT suite, where physicians routinely take X-ray cross sections of tissue to diagnose cancer, cardiovascular disease, and other medical conditions.

This was not, however, Meresamun's first trip to the ER. In 1991, she had been scanned from head to toe on an excruciatingly slow "one-slice" CT machine that acquired only one cross section per second—and required several more seconds to convert the data into an image. The five-hour process, which included running the mummy through the machine several times, provided slightly fuzzy images, but they showed that Meresamun had a broken jaw and finger. The scans also revealed a lump in her throat, possibly a goiter, and only two small ovals of stone or faience, one covering each eye, unusual because a woman rich enough to afford such an opulent coffin should have had more amulets and jewelry.

The mummy made her second visit to the hospital last July, in advance of the exhibition. That time, Teeter wanted to determine if Meresamun had borne children. Some Egyptologists assume priestesses were celibate. "But there's absolutely no clear evidence for that," she says. "There's no word for 'virgin' in ancient Egypt and there don't seem to have been any rules against premarital sex. So how do you get nuns? It doesn't add up." She scanned the mummy with a much more advanced 64-slice machine, but hadn't even analyzed the results when a sleek Philips 256-slice iCT scanner ("i" for "intelligent") arrived for testing at the hospital in September.

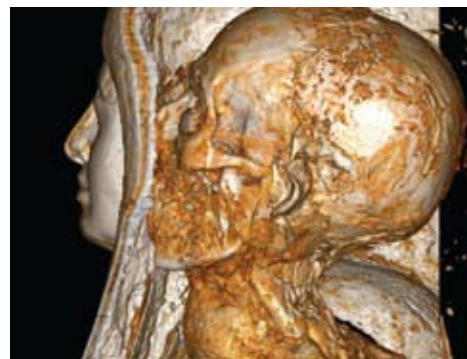
Radiologist Mike Vannier insisted Teeter bring the mummy back. Because the coffin is so delicate, though, the conservators were firmly against moving it—especially so soon after the summer scans. But Vannier explained that the hospital's new machine was far superior to anything that had ever been used on a mummy before. So Meresamun became the first patient to be scanned on it, and is still the only mummy ever subject to such advanced technology.

Nearly 40 people crammed into the hospital's CT suite to witness the historic scans: sales reps from Philips, two film crews, radiologists, nurses, security guards, and museum specialists. "Oh, my God, it was exciting for everybody!" recalls Geoff Emberling, director of the Oriental Institute Museum. "One of the best parts about it was that, by comparison with earlier generations of scanning technology, we got the images instantaneously."

The 256-slice scanner produced 100 cross sections per second, penetrating, one by one, the layers of paint, linen, and plaster that make up the cartonnage; then the innumerable linen wrappings surrounding the mummy, generously smeared with resin to waterproof the body; and finally exposing the tissue and muscle still clinging to Meresamun's bones. Instead of five hours, the head-to-toe September examination took only an hour, which included scanning the mummy several times to get ultra-high-definition shots of certain areas, such as her pelvis.



A 256-slice “iCT” scanner produced vivid images of the Egyptian priestess Meresamun without touching her exquisite coffin. First the paint and layers of linen and plaster were virtually stripped away. Then the body was revealed, showing oval-shaped amulets covering Meresamun’s eyelids and gobs of orangy resin between the bandages that tightly bind her body. Finally, a granular packing material was detected in her mouth and throat.



And the recent scans generated about 30 billion individual measurements—some 1,000 times more raw data than was available in 1991.

The process produced startling images of Meresamun: her dried, flesh-covered face squished between layers of bandages and the front of the coffin; her eyeballs shrunken but intact; her ears contorted from tightly wrapped linen; the bone behind her nose broken by the embalmers, who otherwise gingerly fished through her nasal passage to scoop out her brain. “There’s quite a big difference between looking at an unwrapped mummy and a wrapped mummy,” notes Gil Stein, director of the Oriental Institute.

**Priestesses worked in temples only a few months each year. At home, they likely had families. This birth charm with a baby’s footprint protected the child from evil.**



The digital images can now be pored over by specialists interested in Meresamun’s health and mummification. “The computer graphics that produce these images are about on the same order as a gaming console like the Nintendo Wii,” says Vannier. “We can now take the raw data from this study and make them available online, and people can study them at almost any level. I just hope others share their CT results, too. Then we can put our heads together and come up with even better ways of analyzing them.”

**A**LTHOUGH IT WILL TAKE more than a year to study the data from the autumn scans, a clearer picture of Meresamun is already starting to emerge. She stood about five feet, five inches—tall for an ancient Egyptian—and was in her late 20s or early 30s when she died. She was an attractive woman with wide-set eyes, a symmetric face, prominent cheekbones, a slight overbite, and a long neck. Befitting her family’s wealth, she was in extremely good

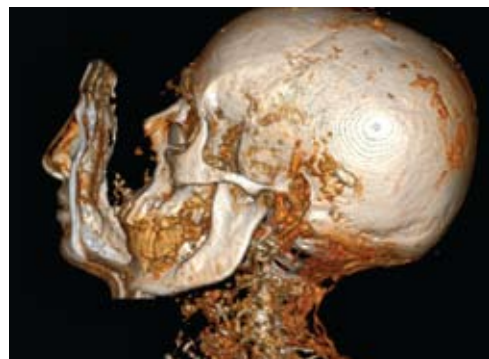
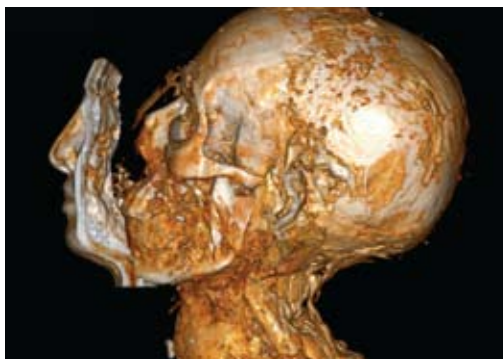
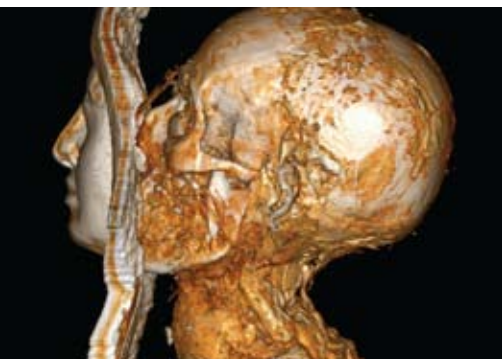
health, with a nutritious diet and an active lifestyle. She had no cavities and there were no signs of dental disease, a common killer, but the entire top layer of her tooth enamel had been worn down by the grit in Egyptian bread, made from stone-ground flour. Preliminary analysis shows that Meresamun probably did not bear children.

One intriguing find is that she had countless tiny fractures throughout her ribs and collarbones, which Vannier compares to injuries from hitting a steering wheel in a car accident. Such breaks have been seen on other recently scanned mummies, and it was assumed that they were the result of rough handling by embalmers during mummification. But the images of Meresamun are so sharp, Vannier could determine that the embalming materials (resin and linen) shoved into her chest, where her lungs and heart once were, had become brittle and cracked in the exact same places as the bones. Furthermore, he found that the bones, including the broken jaw and finger detected in 1991, had never healed. The findings indicate that the damage occurred long after death and embalming. “These types of bone breaks should now be examined in a different light,” says Teeter. “It’s not the embalmers, it’s some other trauma.” She and Vannier believe the coffin may have been dropped in antiquity.

**Egyptian women could practice religion anywhere. This pocket-size stele allowed direct contact with the gods. It was held to the ear and spoken into, like an ancient cell phone.**



Without her major organs, which were removed and stored in now-lost canopic jars, it is difficult to determine the cause of Meresamun’s death. But Vannier was able to rule out one ailment: she did *not* have a goiter, as the 1991 images had suggested. Rather, her throat had been stuffed with dense wads of packing material—the consistency of mud, soil, or sand mixed with chips of rock and some kind of binder—



that extended into her mouth and covered her bottom teeth. (Discovered throughout the body, this packing material, along with cloth of different densities and shapes, was used to plump up the corpse and make it more attractive in the afterlife.) In addition, Vannier and Teeter identified more roughly oval-shaped amulets: one at the neck and one on the chest, which were expected, and one at the back, a highly unusual place.

**D**ESPIKE THE HUBBUB SURROUNDING the scans, Teeter did not want the exhibition to be a “mummy show.” “I mean, it’s about a mummy, but I wanted to remind people that the ancient Egyptians had a very vibrant society and a very vibrant life. They loved life!” She gathered some 70 artifacts from the Oriental Institute’s holdings that date to around the same period during which Meresamun lived to illustrate what her life might have been like. A wooden harp and an ivory clapper are instruments priestesses played to entertain the gods; bird, cat, crocodile, and lizard mummies represent cults for which they created music. Faience necklaces, bronze hairpins, and tiny alabaster jars used to store cosmetics and ointments possibly reflect Meresamun’s sense of style; fertility charms show how she may have wished for a child. And papyri detail the legal rights ancient Egyptian women enjoyed, which were completely equal with men’s.

According to a hieroglyphic inscription running down her coffin, Meresamun—whose name means “Amun Loves Her”—belonged to the highest of three classes of priestess-musicians. She was thus allowed in the interior of the temple, the most sacred area where Amun, the

preeminent deity of Thebes, who was associated with the state and the king, lived. Not many priests and priestesses were permitted in this holy space, in which a statue of the god was clothed and presented food offerings, and where, according to Teeter’s new research, only two musical instruments were allowed, the *menat* and the *sistrum*.

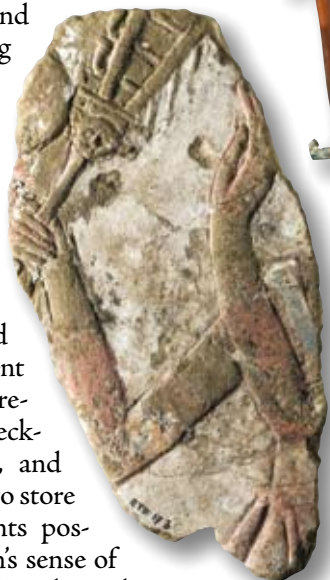
The *menat*, a beaded collar worn around the neck, would have been taken off, slung over the shoulder, and shaken to produce a soft sound, like a gently played maraca. The *sistrum*, a handheld bronze rattle with disks that clinked against each other, produced a noise the ancient Egyptians associated with plucking papyri from a marsh, a

mythological ritual sacred to the goddess Hathor, mistress of dance and music. “There’s something about the *sistrum* being the interface between a woman and the deity,” says Teeter, who studied hundreds of depictions of priestess-musicians on the walls of Theban tombs and temples. When priestesses exited the temple, she found, they began using a much wider range of instruments, including round-frame drums, lutes, and side-blown flutes.

“It’s astounding how much we can reconstruct about Meresamun’s career and lifestyle using a combination of old-fashioned Egyptology and the latest imaging technology. We’re able to see her so clearly now,” says Teeter. “And we have such a huge data set that those who look at it are going to start reevaluating their own interpretations of mummies.” ■

The show is at the Oriental Institute Museum through December 6. Visit [www.archaeology.org](http://www.archaeology.org) for more on Meresamun and priestesses in ancient Egypt. See [oi.uchicago.edu/museum](http://oi.uchicago.edu/museum) for a virtual unwrapping of the mummy and a free PDF of the exhibition catalogue.

Eti Bonn-Muller is managing editor at **ARCHAEOLOGY**.



**Generations of priestess-musicians were trained by their mothers to play the *sistrum*, a bronze rattle (shown here with its disks missing). This example depicts the head of Hathor, a goddess associated with women, love, dance, and music. The wall painting at left shows how it was shaken.**