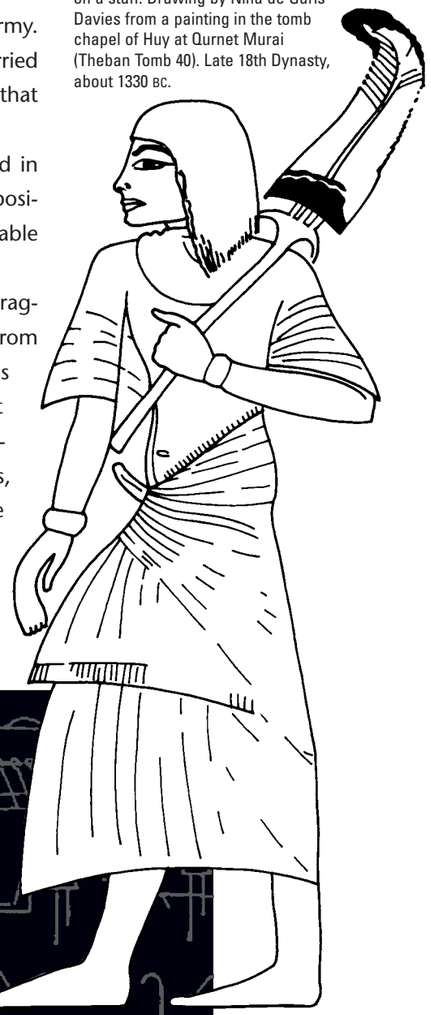
READING THE HIEROGLYPHS (3):

Priestly duties would not occupy all of Nesperennub's time. Many priests also held secular offices alongside their religious functions. These were often posts in the administration or even in the army. Nesperennub was no exception, but because coffins often carried predominantly religious titles it is only from the Karnak inscription that we learn that he was 'Fan-bearer on the right hand of the king'.

The fanbearers attended on the king on formal occasions and in processions. Despite its rather menial sound, it was a privileged position. Fanbearers had direct access to the pharaoh, and might be able to exert an influence over royal policy.

At the time in which Nesperennub lived, Egypt was politically fragmented. The main royal line, the Twenty-second Dynasty, ruled from Tanis in the Delta, but the territory controlled by these pharaohs had shrunk over the years as local rulers in various parts of Egypt became virtually independent. By the eighth century BC, the country had become a patchwork of states, some ruled by petty kings, others by chiefs of Libyan tribes – indeed almost all the rulers were of Libyan extraction at this period. Thebes was the centre of one of these states. The powerful officials there resisted the imposition of authority from the north, and periods of civil war had even occurred, with rival factions competing for control. The



BELOW A fan-bearer holding the emblem of his office, a single ostrich-feather mounted on a staff. Drawing by Nina de Garis Davies from a painting in the tomb chapel of Huy at Qurnet Murai (Theban Tomb 40). Late 18th Dynasty, about 1330 BC.

Nesperennub's family-tree, as reconstructed from two different sources: A, inscription from the temple of Khons at Karnak; B, inscriptions on the coffins of Nesperennub, his father Ankhefenkhons and his wife Neskhonspakhered.

NESPERENNUB'S SECULAR ROLE AND FAMILY

post of high priest of Amun was of key importance and became the focus of bitter conflict. By the end of the ninth century BC, Thebes had thrown off allegiance to the kings at Tanis and instead recognized the authority of a line of rulers now called the Twenty-third Dynasty. The longest-reigning of these kings was Osorkon III (*c.*780 BC) and it was probably in his time that Nesperennub lived, since the inscription of his son Nebetkheper was carved in the reign of the next pharaoh, Takelot III.

Nesperennub's family

Family ties were of great importance in the everyday lives of the ancient Egyptians. Marriage, with the procreation of many children, was the aspiration of most people. Property – whether land, movable goods or lucrative offices – was passed from generation to generation, and children were expected in their turn to provide for the burial and funerary cult of their dead parents. The recording of genealogies helped to establish hereditary claims to property on earth and to priestly or official titles.

From the Karnak inscription and from the coffins of Nesperennub, Ankhefenkhons and Neskhonspakhered, an extensive genealogy can be reconstructed (p. 14). This shows that the family had been attached to the cult of Khons for centuries, and that their titles had been passed from father to son for many generations. The sources are in complete agreement about the sequence of names except at one point; Nesperennub's great-grandfather is named in the coffin texts as Shedsukhons, but in the Karnak inscription he is called Neskhons. These two names could easily be confused when written in hieroglyphs. There are two possible explanations. As this section of the Karnak inscription is heavily damaged, the name may simply have been misread by Georges Daressy, the French Egyptologist who copied and published it in the 1890s. Alternatively, one of the ancient scribes who wrote the original texts may himself have made a mistake; such confusions occur quite often in repetitive genealogical texts.

Nesperennub's wife came from another family which held office in the same temple. Her name, Neskhonspakhered, means 'She who belongs to Khons the Child', and her father was a Libation-priest of Khons, as well as a shrine-opener and temple scribe. This intermarriage of the son and daughter of two professional colleagues is an indication of the close-knit world of the priests, and the influence of the temple on their daily lives.

RIGHT Cartonnage mummy-case of Neskhonspakhered, wife of Nesperennub. Phoebe A. Hearst Museum, Berkeley, California, 6-19929. This case is decorated in a style similar to that of Nesperennub himself. Both husband and wife also possessed almost identical outer wooden coffins which were probably made in the same craftsmen's workshop.

IMAGING NESPERENNUB:

TOP Conventional X-ray of the head of Nesperennub, made in the 1960s. The cloudy image shows only that artificial eyes are present and that there is a dense object on the top of the skull (*a* pp. 38–9).

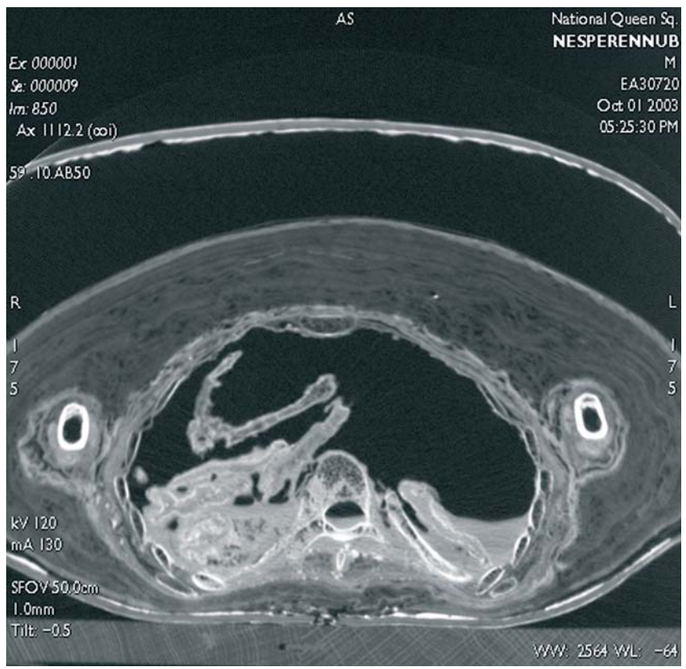
ABOVE The mummy of Nesperennub, still sealed inside its painted case, enters the CT scanner at the National Hospital for Neurology and Neurosurgery, London.

RIGHT Cross-sectional CT image of Nesperennub, looking towards the head. Bundles and strands of cloth, some of which contain the embalmed internal organs, are visible inside the chest. These are partly embedded in a fluid (probably resin) which had solidified after being poured into the body.

In 2000, a chance meeting led to an exciting collaboration between the British Museum and Silicon Graphics Inc. (SGI). SGI, a maker of powerful supercomputers, already had an impressive record in the creation and visualisation of highly complex computerized datasets; in fields as varied as the oil industry, diagnostic medicine, car design and public education projects such as planetarium presentations.

The mummy of Nesperennub was CT scanned at a London hospital, and over 1,500 cross-sectional images were obtained at 1mm intervals. Using a powerful visual supercomputer (an Onyx Infinite Reality), SGI specialists reassembled all of the image 'slices' into a single 3D 'volumetric' dataset that can be viewed and explored interactively using a technique called 'real-time volume rendering'.

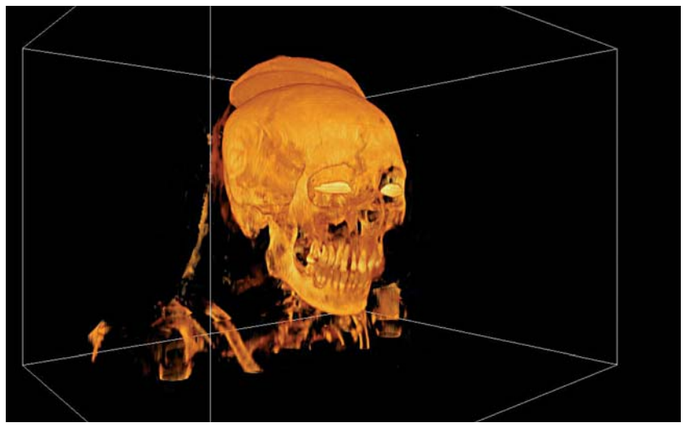
An SGI software toolset called OpenGL Volumizer allows the user to view the image from any angle, and to adjust numerous parameters such as density and opacity to display different layers and structures and to tease out fine detail buried deep in the body. A 'clipping plane', passed through any axis to remove sections of the dataset that the viewer does not wish to see, can act as a 'virtual scalpel', slicing cleanly through the body and exposing a cross-section of what is inside. Artificial lighting casts shadows that help to interpret the shape of



NEW TECHNOLOGY

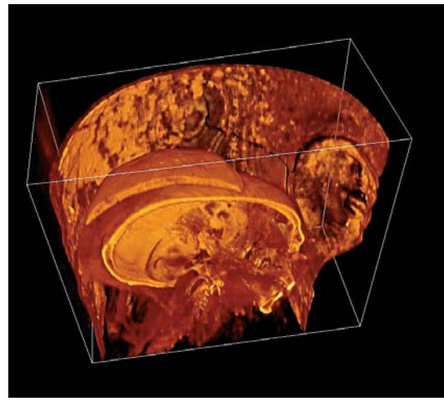
bones or objects. By changing the observer's viewpoint, the operator can fly closer to the body and even travel *inside* the data, giving the illusion of being under the wrappings and even within the body itself. The study of Nesperennub represents the first time that this technology has been applied to a complete body interactively.

All of this is executed in '3D stereo', where the computer supplies a slightly different image to the left and right eyes via a special set of glasses, displaying the mummy in true 3D. This is not just realistic, but also very useful when trying to interpret what is inside the mummy.



ABOVE A virtual reality theatre, in which 3D images can be projected on to a curved screen and manipulated using a supercomputer.

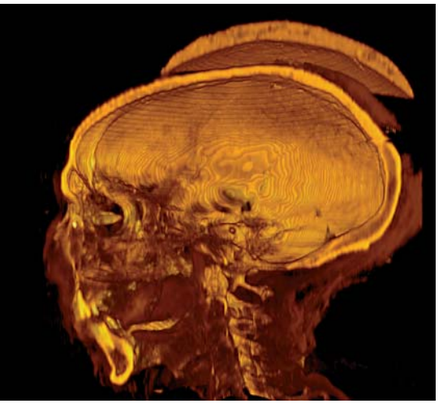
LEFT Lateral topogram, or CT scout film, showing the body of Nesperennub. The skull is positioned at a lower level than the face of the mummy-case with an empty space above. This indicates that the case was made to a standard size, rather than being built up around the mummy itself (*cf.* pp. 42–3).

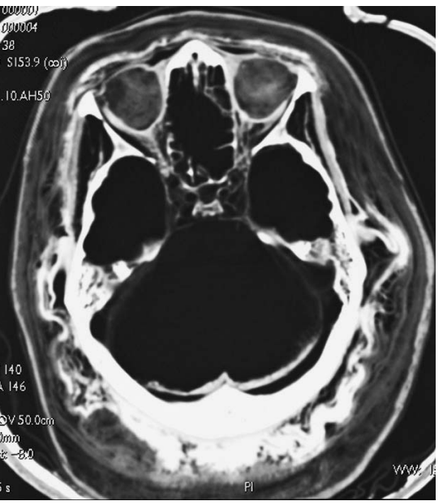


ABOVE A volume of data can be viewed from any angle on the screen. 'Clipping planes' enable a section to be cut through the block of data at any point and at any angle required.

LEFT The skeleton of Nesperennub projected in 3D stereo on the screen in a virtual reality theatre. In this image, the computer has been instructed to display only structures of relatively high density, such as stone, bone and ceramic.

MUMMIFICATION (1):





TOP A clipping plane through the centre of the skull, revealing the empty brain-case.

ABOVE CT image of the skull, showing intentional damage made to the nasal bones in order to extract the brain during mummification.

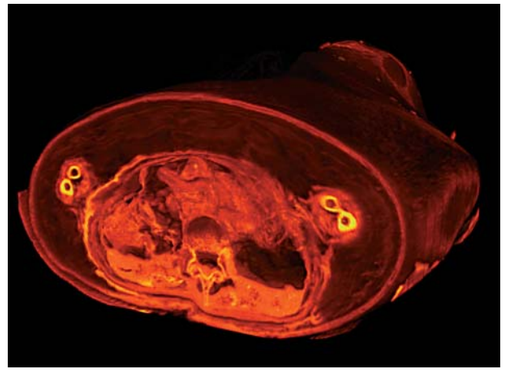
The first task which the embalmer performed was the extraction of the brain. The Greek historian Herodotus recorded that, in his day (*c.*450 BC), this was done via the nose, and examination of many mummies has confirmed this. A small chisel was used to perforate the small bones at the top of the nose, and a metal rod was inserted into the skull cavity. Using this, the brain, which would have partly liquefied already in the hot climate, was drawn in pieces down the nostril and disposed of. The scans of Nesperennub confirm that this method was followed during his mummification. Damage to the ethmoid bone at the top of the nose is visible, and all trace of the brain is gone. However, the 3D images show traces of a thin, papery substance clinging to the inside of the skull at the back of the head – these are almost certainly the remains of the meninges (or membranes that surround the brain), left behind after the process of removal.

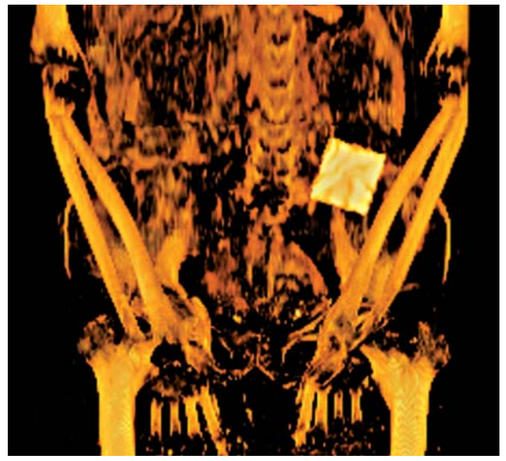
Next, the embalmer made an incision on the left side of the abdomen. Through this almost all of the internal organs were removed. The corpse was then covered with natron, a natural compound of salts, which – over a period of about forty days – absorbed all the bodily fluids. Some of the internal organs (usually the liver, lungs, stomach and intestines) were also preserved and wrapped in resin-soaked bandages. For many centuries these bundles were placed in four vessels now called canopic jars, and stored in the tomb in a special niche or close to the coffin. From *c.*1100 BC to *c.*700 BC (and often in later centuries) they were simply replaced in the body cavity, each package accompanied by a wax figurine representing one of four protective deities, the sons of Horus.

Other organs were discarded, but the heart was always given special treatment. It was regarded as the centre of the individual's being, both physically and spiritually – hence it was seen as the location of the mind and memory. It was left in its place when all the other contents of the chest were removed.

RIGHT Dummy canopic jars such as these were placed in tombs during the Third Intermediate Period, when the internal organs of the body were usually put back inside the chest. 25th Dynasty, about 700 BC. British Museum EA 9562, 9564–5.

REMOVING THE INTERNAL ORGANS





ABOVE Metal incision plate from a mummy. It bears the *wedjat*, or Eye of Horus, a common protective device which symbolically 'healed' the embalming incision.Third Intermediate Period, about 1069–664 BC. British Museum EA 8409.

RIGHT A clipping plane through the front of Nesperennub's mummy revealing the packages containing the internal organs on the right of the chest cavity.

LEFT A clipping plane through the torso, showing the arm bones and the interior of the chest. Solidified resin lies at each side of the spine, and the spaces above are filled with packing and bundles probably containing the internal organs.

CENTRE LEFT Front view of the lower abdomen showing bones and other dense material. The rectangular object lying over the left flank is a metal plate covering the incision made to extract the internal organs.

BELOW Four figurines of resin representing the Sons of Horus. Such images were placed inside the chest of the mummy to give magical protection to the internal organs. Third Intermediate Period, about 1069–664 BC. British Museum EA 15562, 15571, 15579, 15580.