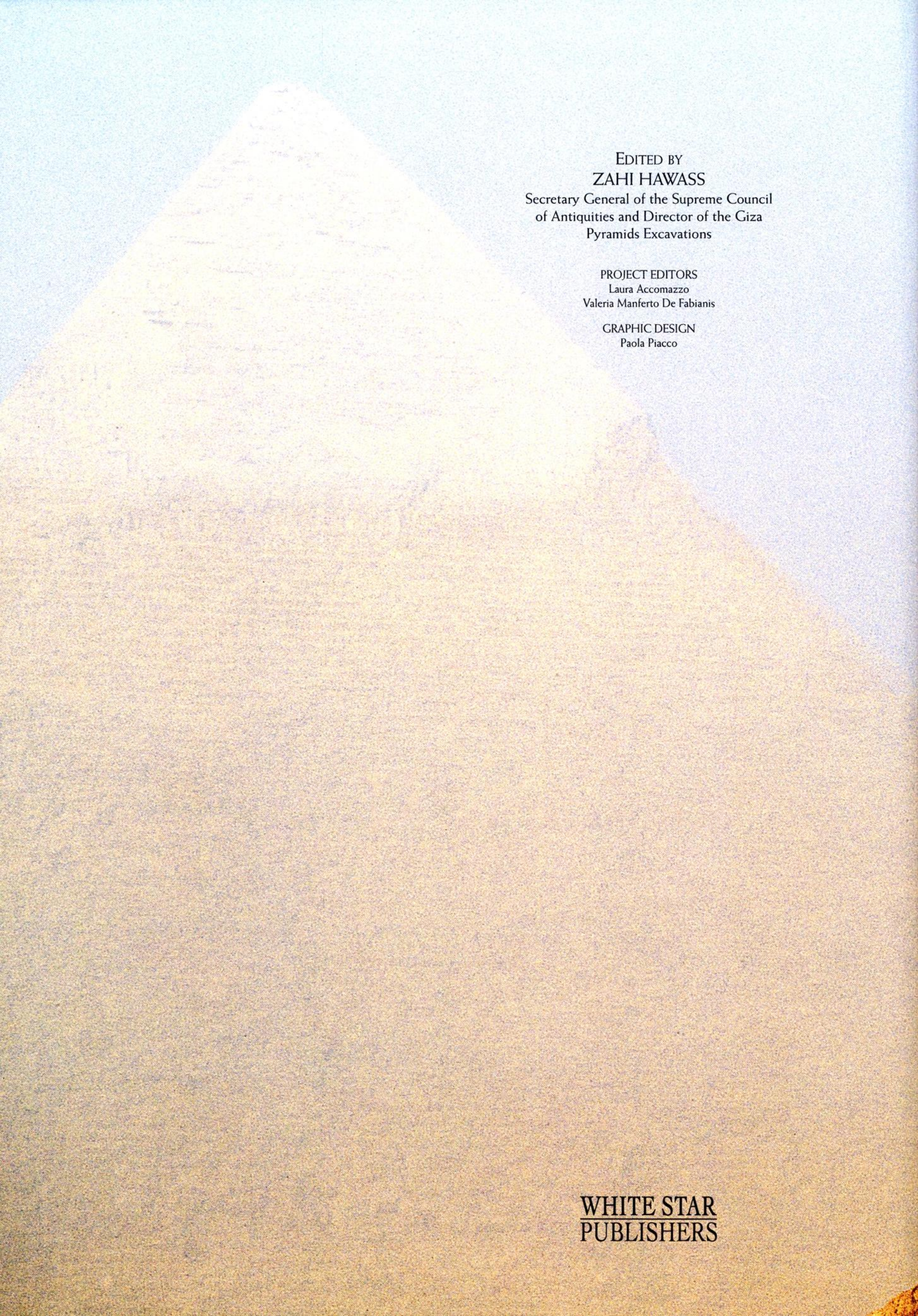


An aerial photograph of the Great Pyramids of Giza in Egypt. The pyramids are constructed from dark, weathered stone blocks, showing significant erosion and some missing sections. The Great Pyramid of Khufu is the largest and most prominent in the foreground. Behind it, the slightly smaller pyramids of Khafre and Menkaure are visible. To the left of the pyramids, a dense urban area with numerous buildings and structures is visible, contrasting the ancient monument with modern civilization. The sky is a clear, deep blue. The overall lighting suggests a bright, sunny day, casting long shadows from the pyramids onto the surrounding desert sand.

ZAHÍ HAWASS

THE TREASURES OF THE PYRAMIDS



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THE TREASURES OF THE **PYRAMIDS**





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Scene showing the 'Meidum geese',
Egyptian Museum Cairo, Old
Kingdom.

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The Satellite Pyramid of Khufu

by Zahi Hawass

In 1991, my team at Giza was working to the east of the Great Pyramid of Khufu, clearing the area as part of our site management plan. The area had been explored before by George Reisner, and by the Antiquities Department under Selim Hassan who moved many meters of sand and excavated Khufu's upper temple. After Hassan's excavations were complete, the Antiquities Department prepared the site for visitors, and in the process built a paved road running north-south along the east face of the pyramid. We decided to move this road in 1991, in order to prevent cars and buses from driving on the basalt pavement of the upper temple. During this work, we made a startling discovery: a new subsidiary pyramid, the satellite pyramid of Khufu, lay under a mound of sand at the southeast corner of the Great Pyramid.

This pyramid is located about 25.5 m southeast of the corner of Khufu's pyramid. Its ruins cover an area approximately 24 meters square. The remains include fine, Tura-quality limestone blocks from the pyramid's outer casing and perimeter foundation, some of which remained *in situ*, large blocks of cruder limestone and debris that filled the core of the pyramid, and a T-shaped substructure.

When we first found the pyramid, all that remained of the superstructure was a U-shaped block of crude masonry and debris fill that surrounded the substructure on the west, south, and east. The east and south sides had the greatest number of preserved foundation slabs and casing blocks of fine, Tura-quality limestone. On the south side of the pyramid, we found an inscription in red paint on the north side of a core block, which reads: "imy rsy gs," which is on the south [back] side.'

We recovered several blocks of the outer casing that were not in their original position. One of these was a casing block from the southeast corner, probably from the second course above the foundation platform. We found many casing blocks that had toppled out of place along the south side and lay scattered on the ground.

The original baseline, or setting line, marking the foot of the lowest course of casing blocks, is preserved on five foundation slabs on the east side and seven foundation blocks on the south side. We found no remains of the original baseline on the north side, where most of the foundation slabs were missing. We could see sockets or emplacements cut into the rock floor to

receive the individual slabs, but these do not help determine the exact position of the original pyramid baseline. On the west side, there is only one foundation block *in situ* that carried the baseline. By measuring from the preserved baseline on the east to the single block on the west, we have ascertained the original base length of the pyramid as 21.75 m.

In the debris south of the pyramid, we found a large trapezoidal piece of Tura-quality limestone with three exterior sloping faces. This formed a little more than the south half of the third course below the apex of the pyramid. It is 2.7 m long and 0.56 m thick. Exposure has coated the exterior faces with a light brown patina. The average slope of the preserved faces is 52.4 degrees. The underside of the block is flat, but the top surface was concave. This concavity was intended to receive the convex underside of the block(s) forming the second course down from the top. Here, as it narrows to the apex, the pyramid superstructure is all casing, with no fill or core material.

The block or blocks of the second course down from the top are missing, but later we found the actual apex stone of the satellite pyramid: a single piece of fine limestone. It is the second oldest pyramidion ever found; the earliest belongs to the North Pyramid of Sneferu and discovered by Rainer Stadelmann at Dahshur. The underside of the pyramidion was convex, with four triangular faces sloping outward. We know, from the decorated blocks we recently found at Abusir that the setting of the capstone atop the main pyramid was a major event, and marked the official completion of the pyramid complex.

The substructure of G 1d consists of a sloping entrance passage, approximately one meter wide, entered from the north, and leading downward for 5.35 m to a rectangular chamber, oriented east-west and measuring about eight meters by three and a half meters. We found this substructure unroofed, completely open to the sky. There is a cutting in the floor of the rectangular chamber, one meter wide, immediately in front of the opening into the chamber from the entrance passage. The walls of this chamber were cut to a depth of 2.85 m; the north and south walls slope inward slightly as they go up.

At the west end of the chamber there are four small holes, a pair each in the north and south walls

respectively. The backs of the holes are round. They are about ten meters deep, and the holes of each pair are spaced about 1.45 m apart. These appear to be sockets for wood cross-beams, perhaps for lowering or covering an object in the west end of the chamber.

Since the upper part of the burial chamber is no longer extant, and no ceiling blocks remain, the original shape of the chamber remains a mystery. There are traces of red mortar on the floor of the burial chamber and on the south side. This mortar could indicate that the chamber was originally paved with limestone.

So that visitors to Giza can get an idea of the original appearance of this pyramid, and to preserve the loose and crumbling core material, we replaced some of the fallen blocks and restored parts of the satellite pyramid with new masonry. We also reconstructed the apex of the pyramid, incorporating the pyramidion and the trapezoidal block from the third course down with newly constructed blocks.

The satellite pyramid was an important feature of the standard Old Kingdom pyramid complex, and the discovery of this pyramid is extremely important to our understanding of these structures. Many scholars believe that the subsidiary pyramid can be traced back to a mysterious structure in the first pyramid complex, that of the Third Dynasty king, Djoser, called the 'south tomb.' This is a *mastaba* that lies south of the main pyramid, and has a square burial chamber, too small to hold a body. Decorating the walls of the substructure of this tomb are images of Djoser performing rituals associated with an important royal event called the *sed* festival. Scholars are still studying this festival, but many believe that it was a sort of jubilee, celebrated for the first time after the king had been on the throne for about thirty years, and designed to symbolically rejuvenate him and renew his right to rule. I believe that this festival was held when the royal mortuary complex was completed, to celebrate the fact that the king had completed all that the gods had asked him to do.

The unfinished pyramid complex of Djoser's successor, Semerkhet, also contained a south tomb, which contained, in the passageway, the mysterious skeleton of a two-year old boy in a Third Dynasty wooden coffin. Two of the three major pyramids of Sneferu each have subsidiary pyramids associated with



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The remains of the satellite pyramid of Khufu from the south sides. Giza, Fourth Dynasty.



them that do not seem to have served as burial places for queens, but instead were connected with the cult of the king, and thus qualify as ritual pyramids.

The lack of a satellite pyramid in Khufu's complex has always been a stumbling block in the discussion of these ritual structures, and now we have filled in this gap. Khafre may have had a ritual pyramid, placed directly south of his main pyramid and on the same north-south axis. Inside this subsidiary pyramid were wooden fragments that have been reconstructed as belonging to a statue shrine; ox bones; fragments of stoppers from jars or vases, one of which reads, "The eldest royal son of his body, beloved by him, the sole friend"; and two carnelian necklaces. However, this might also be a queens' pyramid, in which case we do not have a ritual pyramid for Khafre. Menkaure does

not seem to have had a ritual pyramid; it is interesting to note that he also had no boat pits. We know he died before his complex was finished, so it may be that his ritual pyramid and boat pits were never built because of his early death.

The standard pyramid complex of the Fifth and Sixth Dynasties includes a satellite pyramid, usually located at the southeastern corner of the complex (like Khufu's). There is still a great deal of discussion among scholars about the function of these structures. Some believe that they were for the royal *ka*, one aspect of the king's soul, or to store his canopic equipment (the viscera, which were removed and packaged separately) or placenta. Others suggest that they were built to house the royal crowns, as provisional tombs to store the king's body while he was being embalmed, or as

solar symbols for the storage of offerings. I believe that the satellite pyramids were used during the *sed* festival, perhaps as a changing room where the king removed his jubilee cloak and put on the kilt and bull's tail in which he would perform his ritual dance.

I believe that Khufu originally planned to place his satellite pyramid north of the three queens' pyramids, and that the so-called 'trial passage' that lies north of the causeway was cut as the substructure of this pyramid. After Year 5 of his reign, when Khufu changed his cult and took on the role of the sun god Re, he enlarged the upper temple and abandoned the original satellite pyramid. G 1d, the new satellite pyramid, appears to have been built in a hurry near the end of Khufu's reign, or perhaps even a few days after his death.

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THE PYRAMIDS OF THE FOURTH DYNASTY
Text by Rainer Stadelmann

Born October 24, 1933 in Oettingen/Bavaria as son of a professor of classical languages, he studied Egyptology at the Universities of Munich and Heidelberg. He first visited Egypt between December 1955 and April 1956 and participate in excavations at the Sun Temple of Userkaf at Abusir. Completed his PhD in spring 1960 with a thesis on "Syrisch-Palästinensische Gottheiten in Ägypten" and became Assistant Lecturer of Egyptology at the University of Heidelberg. In 1967 he completed a second Ph.D., Habilitation, in Heidelberg with a thesis on: "Altägyptische Bauinschriften und Namen von Bauteilen" and became Assistant Professor. In April 1968 he became Scientific Director of the German Institute of Archaeology in Cairo and Honorary Professor at the University of Heidelberg. In 1989 he became First Director of the German Institute of Archaeology in Cairo. He has at Elephantine Island and the Mortuary temple of Sety I at Gurna and the Pyramids of Sneferu at Dahshur. Newest excavation and conservation work at the Temple of Amenhotep III and the Colossi of Memnon. He has published several books about the pyramids and ca. 100 scholarly articles in German, English, and French in international periodicals.

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THE QUEENS' PYRAMIDS
OF THE FOURTH DYNASTY AT GIZA
Text by Zahi Hawass

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THE SATELLITE PYRAMID OF KHUFU
Text by Zahi Hawass

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