

A WEB EXCERPT FROM
THE OSTRACON
 THE JOURNAL OF THE EGYPTIAN STUDY SOCIETY

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Publication of The Ostrakon is supported by a grant from THE PETTY FOUNDATION

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 P.O. Box 40754
 Denver, Colorado 80204-0754
 UNITED STATES OF AMERICA



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New Perspectives on the Interior of the Bent Pyramid

Charles Rigano

Although the shape of the Bent Pyramid is well known, pictures of it are readily available and the site is easily visited, this pyramid's interior is still something of a mystery. For such a significant Old Kingdom monument, the interior has received only occasional attention.

In 1839 John Perring was the first to scientifically explore the inside of the pyramid and penetrate the upper passage and Chamber. About 1882 Flinders Petrie investigated the north entry but apparently did not go any further. Abd-el-Salam Hussein spent four seasons working in the pyramid from 1946 until his death in 1949, but his notes were lost. Ahmed Fakhry spent four seasons at the site from 1951 to 1955 but most of his report deals with the exterior pyramid complex. He describes the interior in just 3-1/2 pages although he provides 13 pictures and nine drawings. In 1962 Vito Maragioglio and Celeste Rinaldi published a detailed description and large-scale drawings of the interior and exterior as part of their two-decade study of the Memphite pyramids.

I had visited the Bent Pyramid on four earlier trips. Each time I looked up at the north entrance, only 39 feet above the ground, I knew it was a climb that my age, fear, and guide would not permit. But on this trip in April 2001, there was a heavy scaffold in place and we had permission from Dr. Zahi Hawass to enter. With Andrew Bayuk and Brent Benjamin of *Guardian's Egypt* (www.guardians.net/egypt) and two inspectors, after years of anticipation, I finally had the opportunity to explore the interior. Andrew and Brent had been inside the previous year and I had seen their pictures and video. There were no lights, the dust was terrible, there were two

hard climbs, and of course there were bats – how many I did not know. Their previous experience helped us be better prepared this trip with headlamps and respirators, a couple of cameras and a lot of film, and a large clear plastic bag to change film inside. With much anticipation we climbed the scaffolding. From the top I realized how high above the ground the entrance really is and how wise my decisions had been in the previous years not to make the attempt.

A locked, heavy metal door protects the north entrance. The casing around the entrance is generally intact with the architrave virtually whole. The architrave is the largest casing block in the pyramid. Its location at the center of the north face would likely have drawn the attention of anyone who wanted to find the entrance. As with other pyramids, ancient robbers had found their way inside and removed everything of value. Just inside the entrance are holes high on either wall that Petrie proposed had held a bronze pivot which supported a hinged stone door. Since this arrangement would effectively limit the available entrance to half the passage height, I have never thought Petrie's proposal was persuasive, but Petrie did not have benefit of Fakhry's discovery that a single casing stone closed the west entrance.

Petrie; Perring; Fakhry; and Maragioglio and Rinaldi mention two inscriptions on the east and west walls just inside the entrance. We found these inscriptions and many others, some possibly ancient, some relatively modern. On the east

Figure 1: North (left) and west (right) sides of the Bent Pyramid. The 40-foot-high scaffold to the entrance is barely visible at the center of the north face. Photo by author.



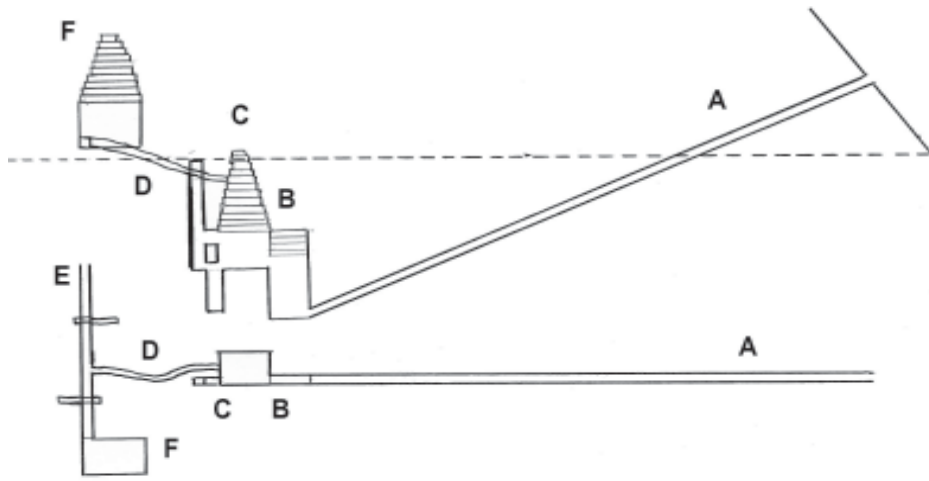


Figure 2. The internal layout as it appears today. The dashed line represents ground level. Upper drawing - looking towards the west. Lower Drawing - looking down. (A) Descending Passage, (B) Antichamber, (C) Lower Chamber, (D) Connecting Passage, (E) Upper Passage, F Upper Chamber

wall we found and photographed a scratched animal shape - reported as a lion by Fakhry and a pug-dog by Petrie. (Fakhry 1959:46; Petrie 1883:144-145) It was not executed well enough to tell what animal was intended and there was no evidence to indicate its purpose there.

Initially the descending passage floor is bare but rough and provides easy footholds. After 20 feet, old railroad tracks and ties which run the length of the passage, used in clearing the pyramid interior, provided suitable substitutes for the slatted floorboards and side railings found in most pyramids visited by tourists. The primary method for making the long, 257-foot descent was to hold onto the tracks and slide from one tie to the next. On the ascent, the ties provided a convenient surface to push against. The 26° to 28° passage inclination is typical of the major pyramids. When the pyramids were new and the inclined passage floors smooth, the passage must have been difficult to climb without assistance. Possibly the holes near the entrance held a bar to which a rope was attached that ran the length of the passage.

At the bottom of the descending passage, the floor is cut away and the railroad tracks, on wooden planks, cross a large, rough hole in the floor and emerge into the antechamber. The transition from the descending passage to the antechamber is rough and all surfaces are badly damaged. While I knew what to expect, the long, narrow, but high (3 feet 6 inches wide, 17 feet 9 inches long, 41 feet 4 inches high) antechamber with its corbeled ceiling was still a surprise. The floor was heavily littered with stones with diameters up to 1 foot. Some may have broken free from the ceiling; most were likely thrown down from the higher chambers. Maragioglio and Rinaldi reported the outline of a stair-

way on both the east and west walls. (Maragioglio and Rinaldi 1964:62) The outline was easily visible and shows short, high steps leading higher than the floor of the lower chamber above. Pink mortar still adheres to the antechamber wall.

The antechamber's far (south) end is a 22-foot-high flat bedrock wall which has been roughly tunneled into at the base. This wall has to be climbed to reach the lower chamber. An old rope ladder still hangs down from above. Fortunately, in the past few years an 18-foot-long wooden ladder has been added which hangs by ropes tied from above. The bottom of the ladder sways slightly a couple feet above the antechamber floor, the

ladder's other end falls a couple of feet short of the top of the wall. This made for an interesting climb.

The entrance to the lower chamber is in the chamber's northeast corner and matches the width of the antechamber, but rises to a surprising height of 16 feet. This narrow, high opening is topped by a damaged, upside down "V" cut into horizontally laid blocks.

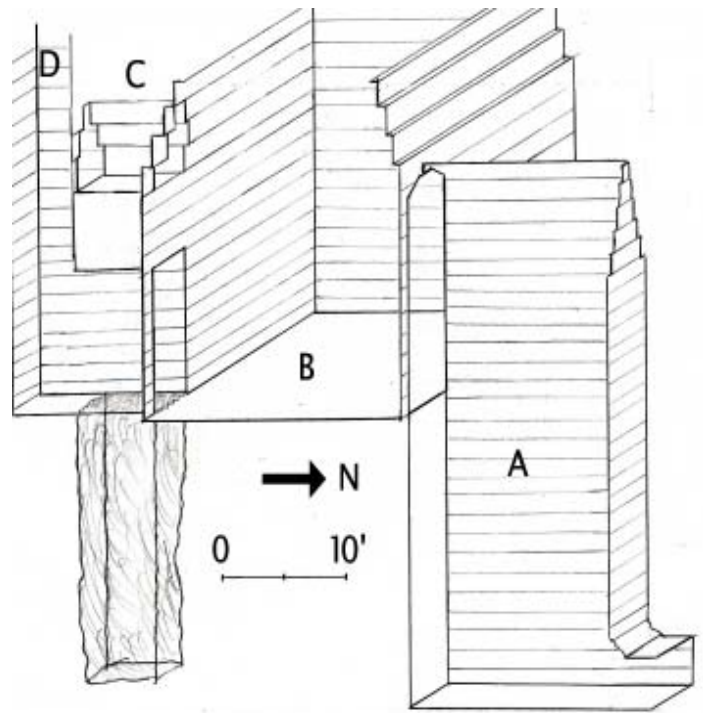


Figure 3: The descending passage enters the (A) antechamber from the bottom right. The scaffold (not shown) fills the west side of the (B) lower chamber. (C) windows, (D) chimney.

Opposite the entrance, on the south wall of the lower chamber, is a rectangular opening and short passage leading to the tall chimney. There is a squared hole in the short passage floor which workmen told Fakhry they had excavated to a depth of about 26 feet in 1948 without reaching the bottom. (Fakhry 1959:47) This hole is now completely filled with rubble. A corbeled window 18 feet above the chamber floor penetrates the wall between the chamber and the chimney and relieves the weight bearing down on the short passage ceiling.

The lower chamber measures 20 feet 8 inches by 16 feet 3 inches and rises to a 56 feet 9 inches high corbeled ceiling. The floor here is also littered with stone rubble that completely covers the surface, requiring us to walk carefully. Rubble is piled to a height of 5 feet along the south and west walls of the chamber. The chamber walls are not bedrock but are made of nicely laid limestone blocks. A section of the west wall is missing and the limestone lining can be seen to be about 1 foot thick.

Behind the lining is the bedrock surface. There are significant remains of pink plaster on the east wall of the lower chamber up to the base of the corbeled window.

High in the lower chamber's corbeled ceiling, 41 feet above the floor, the connecting passage provides access to the upper chamber and passage. To the ancient Egyptians, the entrance to this passage was likely lost in the darkness above, out of reach of the lighting methods of the day. To gain access to this passage, Hussein built a tall, heavy wooden scaffolding in the lower chamber. On this scaffolding three wooden ladders, one above the other, sit on crossbeams and are bolted to each other and to the scaffolding. I was concerned about trusting my life to a 50-year-old wooden structure. However, I was surprised (and pleased) to find the whole structure remarkably sturdy. The climb was long but there was no sensation of height since both the ceiling and floor were lost in the blackness. Arriving at the top of the ladder after climbing up 22 feet from the antechamber and an additional 41 feet from the lower chamber, I felt I must be high in the pyramid core but the opposite was true. It was hard to imagine that I was still 11 feet below ground level.

The descending passage penetrates to a depth of 74 feet below ground level. For its entire length the passage is lined with blocks – floor, walls, and ceiling. The same is true for the antechamber and the lower chamber. Unlike the Giza pyramids, which have passages cut through the bedrock, the Bent pyramid's lower substructure – descending passage, antechamber, and lower chamber – were all built of limestone blocks constructed inside a trench cut into the bedrock. This method was intended for Djedefre's pyramid at Abu Rawash, the so-called great pit

at Zawyet el-Aryan, and two smaller pyramids at Abu Sir. At these sites the open trenches can still be seen clearly, the internal structures either never having been built or removed at a later time.

I was concerned about getting through the ascending connecting passage. I expected it to be slippery and steep and I worried about slipping and falling back into the lower chamber. However, I felt secure for its full length. The passage turns several times and for most of its length neither end is visible. The passage incline varied significantly and I measured it at several places between 15° and 30°. It is generally square but not finely finished. This finish makes it appear as neither a rough robbers' tunnel nor a finely finished original passage but as an afterthought of the original builders, excavated through already laid core blocks. Since this passage was cut through core blocks, I wanted to test the proposal that the core blocks were laid inclined toward the pyramid center. Near the top of the connecting passage I measured the incline of the passage blocks and found they were laid horizontally. This point, near the central foundation only 40 feet from the pyramid center and 10 feet above ground level, may not be the best place from which to make a generalization about the construction method. However, it is the only place in the pyramid's interior where core blocks are exposed.

From the connecting passage I stepped into the east-west upper passage and savored a moment of sheer joy. The first picture I had ever seen of the pyramid's interior was taken from this vantage point, looking west toward the portcullis; I never thought I would have the opportunity to stand here. Perring had arrived at this point 162 years earlier and recorded the event on the upper passage wall immediately across from the connecting passage: "Discovered October 20, 1839."

Most of the upper passage is 5 feet 4 inches high, but since the connecting passage accesses the upper passage slightly below the original floor level, part of the upper passage floor has been removed making this passage 23 inches higher at this spot. To the immediate right (west) from the connecting passage, the full width of the upper passage floor opens into a hole 13 feet deep and 14 feet long, effectively blocking us from further exploration in this direction. The hole has finished sides of limestone blocks and apparently is part of the original construction. Fakhry found this hole, covered by flooring blocks and filled with rough, yellowish limestone blocks. At the bottom was only bedrock, with no obvious purpose for the hole. Just a few feet beyond the deep hole, the lowered portcullis is easily visible. A robbers' hole in the upper right corner of the portcullis was enlarged by

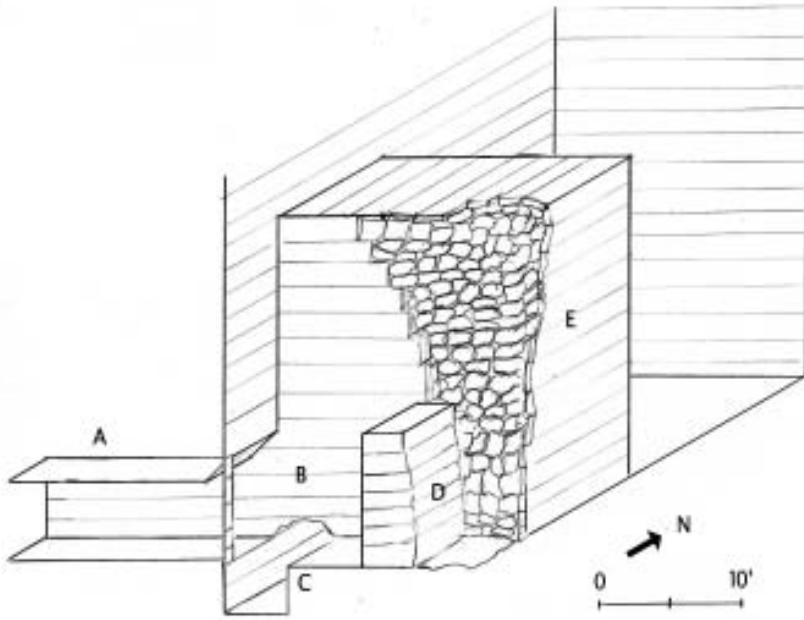


Figure 3: The upper chamber as it appears today. The cedar beams (not shown) are to the north of the massif. The Snefru cartouche is at the bottom east side of the trench immediately inside of the chamber. (A) upper passage, (B) small space, (C) cartouche, (D) short, (E) massif.

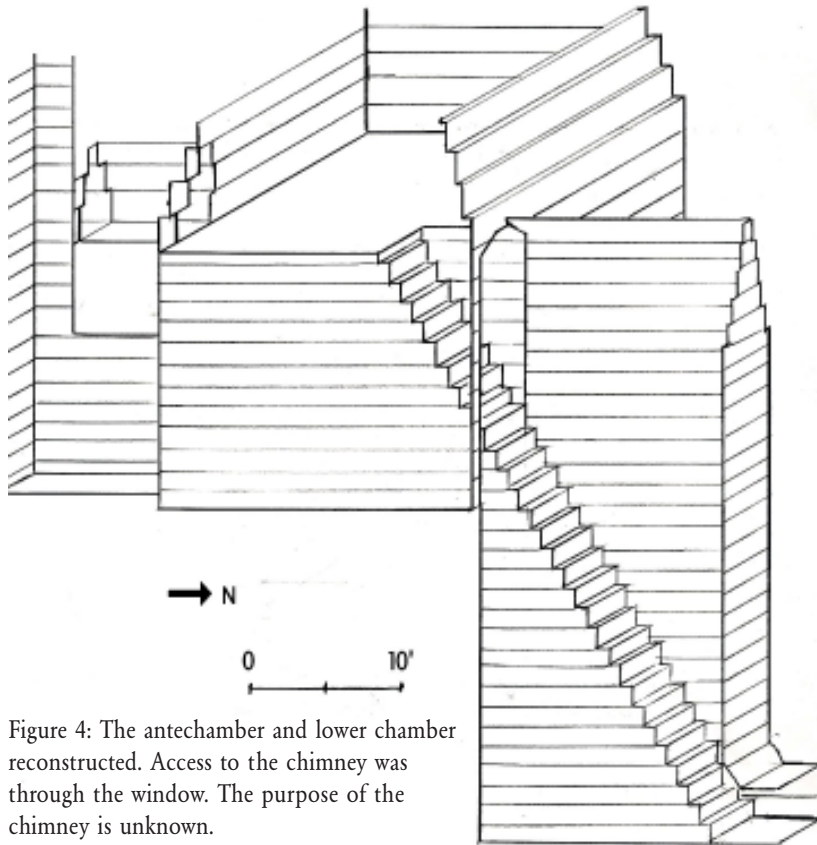


Figure 4: The antechamber and lower chamber reconstructed. Access to the chimney was through the window. The purpose of the chimney is unknown.

Hussein to a rectangular space about 3 feet high to provide easy access to the western passage and to the western entrance at its end. The portcullis was sealed with mortar around the edges on both sides indicating that the north and west entrances were both open when the portcullis was lowered. The rising western passage was originally filled with plug blocks for its entire 211-foot length. Robbers removed the blocks for the first 60 feet, Hussein continued for the next 45 feet, and Fakhry completed removal to the entrance. Here Fakhry found the only example of an original pyramid closure. The entrance was closed with a casing block placed in the passage and indistinguishable from any other casing block. (Fakhry 1959:49,52. Fakhry 1954:511) Today, from the exterior, the western entrance 109 feet above the desert floor looks inaccessible.

To the left (east) from the connecting passage, after a step up, the upper passage runs straight to the upper chamber. About halfway is the second portcullis, still in the raised position. A modern wooden beam supposedly holds the portcullis in place. What kept the portcullis from falling before the beam was installed is not apparent. Possibly the portcullis was not lowered because side pressures on the stone resulting from the settling of the pyramid would not allow it to slide. However, the beam provided us some assurance that the portcullis would not slip.

Based on reports and diagrams from earlier investigators, I had anticipated that the upper passage would provide direct access to the upper chamber. This was only partially true. Although the passage does lead directly into the chamber's southwest corner, within the overall 26 feet 2 inches by 17 feet 3 inches chamber, the small space that is accessible measures only 9 feet by 4 feet. My first impression was that I had not yet reached the chamber. However, a glance up at the 54-foot-high corbeled ceiling confirmed that this small space was in fact part of the upper chamber. To the left (north), the small space is bounded by a 21-foot-high vertical wall of well-cut blocks laid in courses. The east end of the wall is missing and roughly cut fill stones are visible. At the top of the wall's rough section,

long flat blocks sit on top of the rough stones and appear to indicate a floor. Maragioglio and Rinaldi described this large masonry mass of small limestone blocks, roughly squared and mortared, as a massif. (Maragioglio and Rinaldi 1964:70) To the front (east) is an 11-foot high short wall of similar quality to the left wall. This short wall is not flat but is well-cut, and mortared blocks projecting from the wall's bottom half indicate much of the original configuration is now missing. With some difficulty the short wall can be climbed. Over this wall is a space that reaches to the chamber floor and was probably excavated by early robbers. We had hoped to get over the massif to see the famed cedar beams which span the chamber. Climbing up the eastern, rough part of the massif looked possible, but dangerous. A slip here, deep inside the pyramid, could have had disastrous results and we decided not to risk it.

Just inside the upper chamber, robbers had cut a rough hole two courses deep spanning the floor and continuing under the left wall. On stepping down into this space, on the lower course we found an inverted cartouche of Snefru, drawn in red ocher, that confirmed the pyramid's owner.

The preceding is a description of the pyramid interior as it appears today. During the past 4,500 years, robbers and excavators searched for treasure, hidden spaces and burials. In doing so, they changed the pyramid's interior, sometimes completely destroying both the original configuration and our ability to determine the builder's original intent. The Bent pyramid's interior has probably suffered more at man's hand than any other pyramid. Maragioglio and Rinaldi attempted to identify individual parts of the original configuration based on the remaining physical evidence but did not provide a cohesive description of the original pyramid interior. (Maragioglio and Rinaldi 1964:62-64,70,102,106-108)

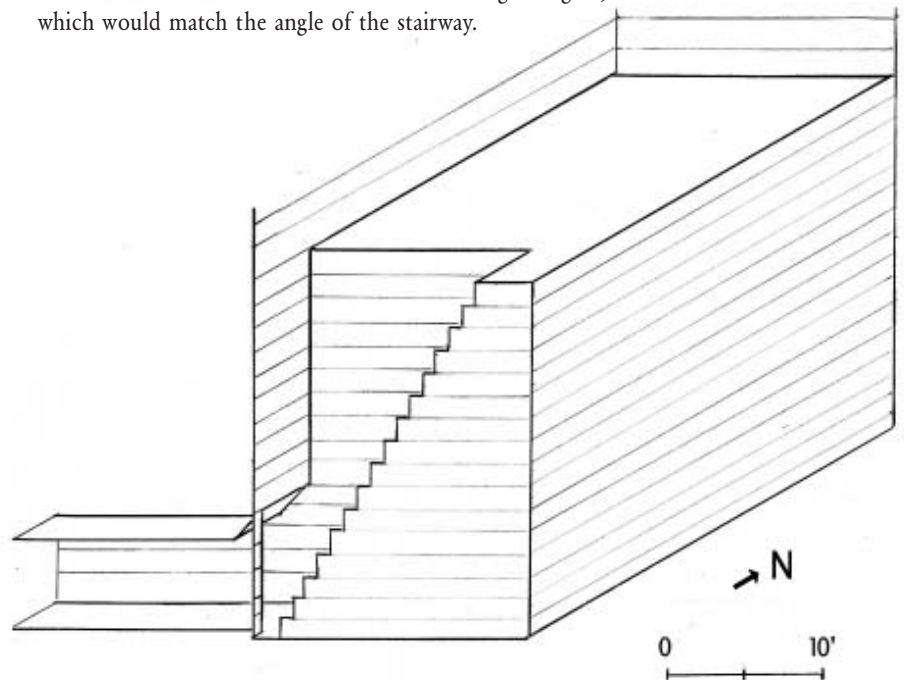
As noted earlier, marks on the side walls of the antechamber provide evidence that a staircase originally angled steeply upward from near the antechamber's lower entrance toward a point significantly higher than the present floor of the lower chamber. According to Maragioglio and Rinaldi, the mortar I saw on the antechamber walls exists only in the space which would have been covered by the staircase. (Maragioglio and Rinaldi 1964:62) Perring's drawing (Perring 1839:Plate XVI, Figure 2) shows that masonry, probably rubble from the destruction of the stairs, filled the antechamber to almost the first corbeled

course, 29 feet high, and lay on an angle that roughly followed the steps.

Perring's drawings also show that the lower chamber contained a masonry fill. Fakhry reported that small squared blocks filled the chamber to the first corbelling, about 20 feet high. (Fakhry 1959:47) Maragioglio and Rinaldi suggest that the level was 3 feet lower at the base of the window. (Maragioglio and Rinaldi 1964:102) While we saw significant amounts of pink mortar on the east wall, Maragioglio and Rinaldi reported mortar on other walls as well, at times thick, up to the first corbel overhang. (Op. cit.)

This evidence indicates that originally a stairway ran steeply upward from near the antechamber's north entrance and provided access to the lower chamber, which had a floor about 17 feet above the current level. The presence of this staircase explains the apparently unnecessary height of the opening from the antechamber to the lower chamber - the lower half of the opening was filled by the staircase. It is likely that the small blocks forming the staircase were first shifted by robbers in their search for hidden spaces. Robbers also took apart the lower chamber floor and threw the debris down over the remnants of the staircase. With the intent of cleaning the pyramid interior, archaeologists removed most of the blocks and debris over a long period. The stones still littering the floors of both chambers and the debris piled against the south and west walls of the

Figure 5: The upper chamber reconstructed. The cedar beam were buried within the massif which filled most of the chamber. A sarcophagus, if present, would have sat on the raised floor. At the chamber entrance the ceiling is angled, which would match the angle of the stairway.



lower chamber are what remain of the staircase and floor.

Changes are also obvious in the upper chamber. Much has been made of the cedar beams spanning the chamber without a satisfactory explanation of their purpose. Perring found the upper chamber largely filled with the stone massif. (Fakhry 1954:510,512) Robbers had removed some the blocks in the northeast part and in the southeast corner, forming the shaft-like space we saw behind the short wall. In 1946 Hussein dismantled the northern part of the massif in search of Snefru's burial. As he removed stones in the middle of the chamber, the cedar beams became visible among the stones. He cleared the chamber's northern end to the floor level and exposed 10 beams composed of tree trunk halves. The massif at the chamber's south side remains and likely contains additional beams. The significant point is that the beams were contained and hidden within the massif. Therefore they could not play any symbolic or practical role in the burial and their purpose had to relate either to the construction or to the purpose of the massif.

Perring's drawings, one of Hussein's photographs, and possibly one of Fakhry's drawing all indicate that the south side of the upper chamber was filled with a sloping mass starting at the entrance and inclined up to the top of the massif. This might indicate a stairway was present at one time to access the top of the massif which was the real chamber floor. While there are no markings on the side walls to indicate a stairway, it would not be inconsistent with the structures in the chamber today or with the stairway in the lower chambers. In addition, the angled ceiling at the entrance to the upper chamber could have provided headroom for people using a staircase. While the presence of the staircase is not based on strong evidence, the existence of the large massif filling the room and raising the floor is a near certainty.

That small blocks were used to fill the spaces in the lower and upper chambers is indicative that these were afterthoughts and not part of the original plan. If they were part of the original construction, blocks consistent with and integral to the pyramid construction would have been used. It is possible that the small blocks were used to fill the spaces and thereby strengthen the pyramid but that purpose is far from certain. As is so often the case in archaeology, as we find answers to some questions, the answers themselves raise other questions.

Note: Pictures of the Bent pyramid's interior can be found at www.guardians.net/egypt.

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