

XVII

The Ascending Corridor (2)

We must take a look again at the Ascending Corridor, which we have a little spoken about, but having its nodus.

It goes up from the intersection point with the Descending Corridor, but in abnormal way. Instead of being built by well-arranged blocks, for the first twelve meters it passes through a series of large limestone blocks placed transversely to the corridor, so it was probably excavated *a posteriori* through them.

This particular arrangement, according to me, is due to the need to get, within a preexisting rocky protuberant of the bedrock, a cavity I'll describe toward the end of this book and I call "the mouth".

This cavity, dug into the rock, is perhaps the point from which the construction of the whole pyramid began, and the crude limestone blocks, described above, had the purpose of linking the small bedrock protuberance of the with the rest of the pyramid.

The corridor starts excavated through the blocks used to fill the void, then continues using well-shaped blocks.

In the first part, the excavated one, all the gaps have been filled by mortar in order to create even here the usual perfect seal.

In the built-up stretch, however, we find other oddities: the floor of the corridor was carried out like the one leading to the Queen's Chamber, by fitting blocks between the two walls, whereas the stones of the ceiling are processed in a particular way.

The ceiling, in fact, has not been built by simply overlapping, as elsewhere, square blocks. Instead these blocks are of rectangular-trapezoid shape, with the oblique side parallel to the corridor slope and all the other three sides per vertical and horizontal planes like the rest of the pyramid body.

Personally I find nothing wrong in that. Indeed, it tells me that the ceiling blocks are inserted in the pyramid in quite a simple way compared to the blocks of the Grand Gallery. There must have been much more complication to do it!

However, there is more: climbing upward, we come across three unusual block arrangements at a distance in between of 10c exactly.

The upper one is 20 cubits far from the groove in the Grand Gallery (or about 10 meters before the Quadrivium).

Each consists of two blocks that "hug" the corridor from above and below like horseshoes. This creates a discontinuity in the building scheme.

We add that the two stones thus constituting one of the "girdle stones" are touching each other by oblique planes (they are cut into "mostacciolo") and chasing the slope of the corridor (photo **I01**).

The extreme care in their construction means Hemiunu must have had a very special purpose about.

Meanwhile, the desire to incorporate the corridor in the pyramid structure is evident. The foreseeable big size of the girdles stones in the vertical plane, well embedded in the body of the colossus, will clamp the corridor, ensuring its perfect alignment, even under extreme conditions.

The ceiling block next to the "girdle stones", either in the front or behind, is also modeled as "hugging" horseshoe, although in more modest manner.

These blocks will help the girdles stones in between to restrain the lateral forces during the descent of the blocks.

It's not enough: downstream of each "girdle block" there is a block, in one of the corridor walls, much longer than the others.

I will try to clarify (sigh!). The "girdle stones" are three and not identical: the first and last are "right-handed", while the middle one is "left-handed".

Looking from the bottom up, the "right-handed" ones have the contact surface lying along a oblique plane connecting the top right edge of the corridor to the center point of the left wall. In this case only the right sidewall, downstream of the corridor, will host the large and longer stone block.

Obviously the left-handed one will have the long block included in the left sidewall.

These three large stones have further complications, the purpose of which I hope to explain to you.

Small limestone blocks are placed longitudinally (parallel to the corridor), in a central position within their lateral faces (still photo **I01**).

Keep in mind that according to my hypothesis large granite blocks will first go up and then down in this corridor.

Since the floor blocks simply rested between the walls, to avoid any risk of dragging phenomena, some braking wedges have to be installed to discharge the slipping thrusts into the structure of the pyramid: the "girdle stones" aim to do this.

The need to have at least one large side area, containing centrally the small limestone wedges to be, in due time, stressed by a considerable lateral force, explains the asymmetry of these blocks.

This is not easy to understand, but I was lucky and partly helped by my work.

It needs to start far away, very far away.

Somewhere I have already said that the first granite block, the one visible looking up at the intersection point, cannot fall since it is wedge-shaped and perfectly fits into the opening of the shaped block around. So they are clamped together.

At first I did not linger on this detail since, as any self-respecting detective, I intended to solve the mystery at last. Then I will continue on this path, and though the details so far glossed over are now obvious, you still have to wait until the end of the book...

This granite block is so different from the others having a very particular purpose: it will stop exactly at the right point and be a stopper for the rest of the convoy.

Even its length is different, being considerably shorter than the others, measuring in fact only 3 cubits.

Making a guess, I figure the wedge-shaped part just 2 cubits long, so only 1 cubit length keeps a rectangular shape. This will cause difficulty to block it inside the Grand Gallery using the dam beams.

To be able to block it, preserving the option of a lateral release, its rectangular section has to be used, so there will be a gap between it and the next monolith (photo **F63**). This may give it an initial advantage, allowing it to enter the corridor perhaps resting on a wedge side, due to the modest gap against the walls (being the rectangular part very short: just 1 cubit).

But this way, it would arrive at the final destination in a wrong position, which will be a big problem. This must be absolutely avoided.

As if that is not enough, there is another serious problem. I hope that at least some of the readers (if I ever will have any) have noticed it already.

If everything had been made in the way that I have described, the pyramid probably would have been destroyed by the descent of the block convoy.

Let's think about: 25 blocks weighing 5500 Kg each, sliding together along a very steep plane (26.5°), in conditions of low friction due to the water acting as a lubricant, for a distance of nearly 40 meters... what will be the convoy speed at the bottom?

We know when the pushing forces are bigger, in value, than the frictional ones, the convoy will begin to move, albeit with a modest acceleration since the dynamic friction is always lower the static one. Thus a "snowball effect" will be triggered.

I am not able to calculate this acceleration, but certainly it will act on the convoy increasing the speed steadily.

I estimate the final speed to be 20-25 km/h, equal to 6-7 m/sec, but I'm afraid I erred on the side of caution.

Do not forget the end point, the bottleneck, has no elasticity and the convoy cannot stop before or after, not even for a few centimeters.

Here's something more to chew on: the first cap-block is wedge-shaped with a very narrow angle about 4° (photos **I02** and **I03**), so producing two lateral disproportionate efforts, which multiply up approximately twenty-six times the impact force.

When I said that this force could destroy the base of the pyramid, I was not joking...

Even if actually the blocks are three only, they stopped at the right place as light as feathers, without producing any crack in the walls, exactly where Hemiunu predicted.

In spite of everything, the miracle took place; there is no doubt as the three blocks are there to witness, wonderfully in their place after 4500 years.

This mystery made me go crazy; to say I have lost sleep over, it is by no means an exaggeration. It is during this period that I kept a tiny digital recorder on the nightstand and, hidden under the covers so as not to wake my wife, I whispered into it any ideas that came to me at night.

At the end, it came to me one night and I have also evidences to show, even if almost in the realm of science fiction: Hemiunu had used none other than a hydraulic brake (4500 years ago)!

Now that I've told you, let us see how things went.

Let's leave out the fact that there are three cap-blocks only and go back to the initial hypothesis of 25 blocks. When the time comes, before pouring water into the ducts of the King's Chamber, the lower part of the pyramid will be flooded to the brim by pouring water from the main entrance.

If you check the section of the pyramid, the level of the water will reach exactly at the level of the highest of the three "girdle stones" within the Ascending Corridor. This cannot be a coincidence since this is the perfect spot for the brake to begin working (dwg. **I04**).

Upon impact, the pressure could force water out from the entrance. To avoid that an adequate sized block has to be dropped down to act as a plug located just below the intersection of the two corridors.

I imagine a limestone block, matching the size of the corridor and long enough to cover the entire stretch below the entrance of the Ascending Corridor, having laterally an U-gullet to allow a suitable rope wrapping around it.

The rope will be used to remove the block after the job is done. Another block resting inside the groove (partially showed in the Rutherford picture), conveniently ending very just after the junction, will allow the block to be positioned safely in the right place, preventing it from slipping beyond (photo sequence **I05...I11**).

The Rutherford's photo is very old and worthy of being observed with care. There is another detail I find very interesting: the ceiling of the corridor, just above Rutherford's head (photo **H05**), shows traces of abrasion, as if a block having the same size of the corridor had been forcibly pushed down. It leads me to the special block, just described, used to get the hydraulic seal...

The need to have an abundant water flow, when the four grooves plugs blow up, is finally understood: there is no time to lose, the blocks must move immediately down, before the water can flood the Grand Gallery, eliminating the propelling cascading effect.

Imagine everything works as expected: the block convoy will begin its descent preceded by the first plug block, which may not be exactly in position (I have not forgotten).

No possibility of a big run because the water is nearby (the first of the "girdle stones" is 10 meters far and, perhaps, already flooded...).

Obviously, the shaped block will be the first to suffer from the impact of the water, reducing speed and getting the others closer, but it may have an incorrect positioning, slightly crooked, or have position changed, tilted on one side due to hydrodynamic issues caused by some imperfection of the lateral surfaces...

This is an anomaly that Hemiunu feared and rightly so.

To prevent these problems, small stones were inserted sideways into the walls close to the "girdle-stones", stuck in place after the ascent of all the blocks, having a shape slightly protruding into the interior of the corridor, probably like a saw-tooth pattern (see again **I01**).

On the last check before the publication, I noticed that the drawing of **I01** (Fig. 18 of the text) with the three small brake-stones actually corresponds to the central girdle-stone only, which is "left-handed". The braking action started at the level of

the top girdle stone (a right-handed one) with only two small stones embedded in the side block next to it.

These small stones didn't stop the granite blocks but, sacrificing themselves (the limestone is soft), they had the goal to slow down the first block and keep it in the groove center by pushing from both sides.

In my opinion the brake-stones, projected slightly from the wall, were used to reduce the stress due to friction without transferring the thrust to the next one. For this reason there are tallest blocks embedded in the large block in between.

This also explains why the first brake-stones are smaller than those in the two latter "girdle-stones": they have to withstand the first impact of the block, which has to slow down gradually.

In this process, the friction will generate considerable lateral forces on the first sliding block causing it to waver and then delaying it slightly, enabling the rest of the convoy to join it. From this moment on, all the blocks will be move stuck together, forcing the first block to continue the descent properly positioned.

Curious how re-reading can sometimes give new ideas! It happened to me while reviewing the description and my drawing to understand why the "girdle stones" are transversely cut with a "mostacciolo" section. For example, let us consider one of the right-handed ones, with the oblique plane that runs from west to east. I said this facilitates the placement of the large lateral block, but something doesn't feel right. I felt a sense of incompleteness.

Now I know what it was: when the descending block arrives here, it comes strongly into contact with the small brake-stones, pushing the great block westward.

At the same time the block in transit will instead be pushed to the east, deforming the corridor and forcing the next blocks to drag the girdle-stones sideways.

The girdle-stone, made of two differently shaped halves, will also have an asymmetric behavior: the bottom part that "captures" the block in transit on three sides will tend to slide rapidly toward the east, while its "top" part, less engaged in the embrace, will respond to the same stress with a slight delay.

In this way, the bottom part of the girdle-stone will move a tiny bit earlier, inducing the upper part to lift up due to the two inclined contact surfaces. But bearing the weight of the entire pyramid above, I guess that the top half of the girdle-stone will keep the bottom part firmly, avoiding any sliding toward the east and forcing it back to position.

In short: if the two halves of the "girdle stones" had been symmetrical, being strongly stressed on one side only, they would have caused a catastrophic and permanent deformation of the corridor.

Instead, in this way the affected girdle can move when the first block goes through, keeping the correct alignment since the action is concentrated in a very short time.

It works, but it unnerves me greatly: such structural refinements 4,500 years ago. What kind of brain ever did Hemiunu possess?

To continue with the theoretical part: the impact with the water will generate a terrible pressure wave, forcing the blocks to slow down sharply to a very modest critical value; thus allowing the entire convoy to reach the final position without any problem even for the plug block.

It works, it really does work.

I understand this is incredible, but it worked in real life. Without the hydraulic brake, the first cap-block would certainly have gone through the stopper monolith into the corridor below.

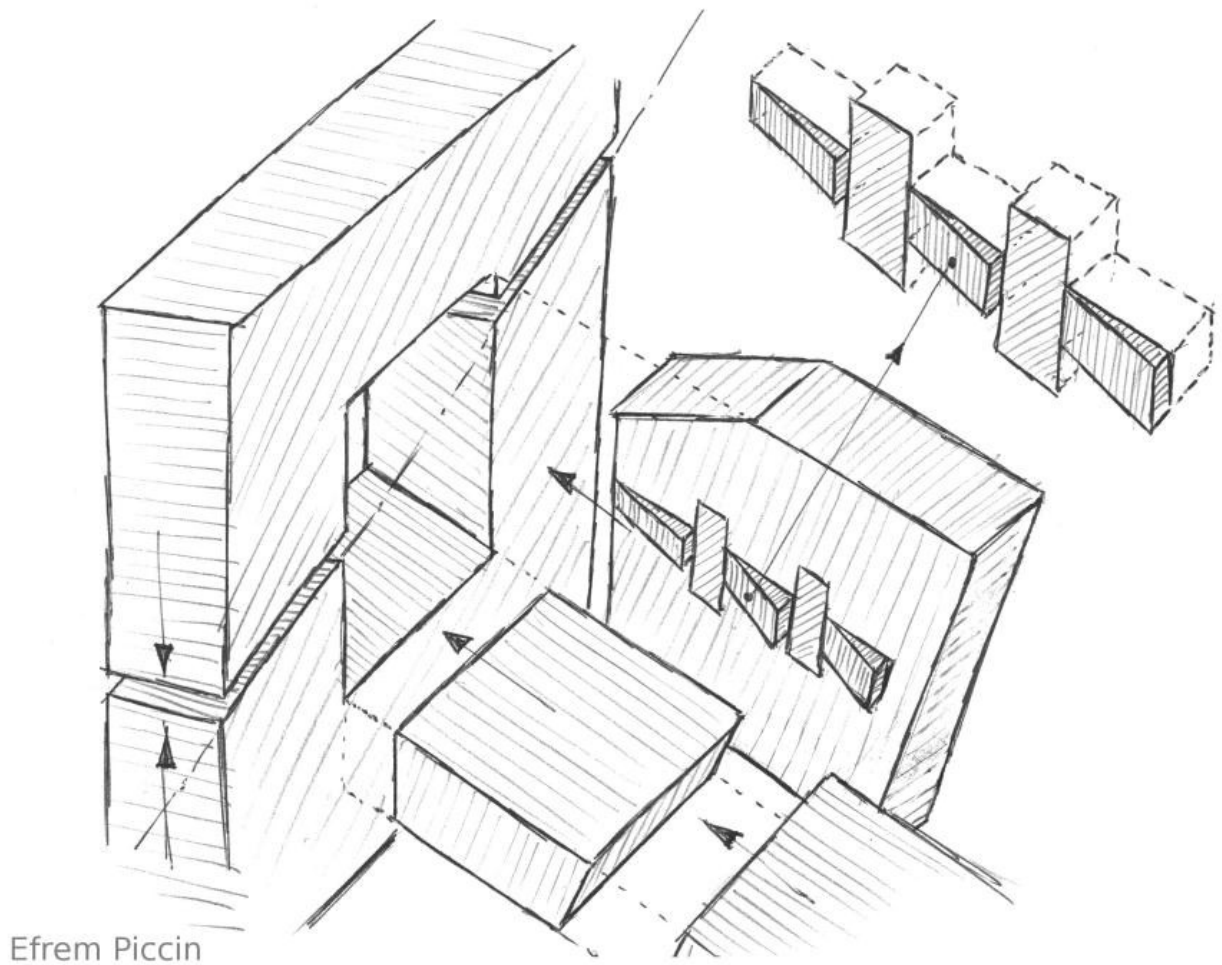


Figure 18: The "girdle stones"

In this case Hemiunu is confident: it will work because he has already carried out all the necessary tests. Where? In the "trial passage," of course! Despite being so important, this site lies in conditions of shameful oblivion (if this book should ever be published, I hope it will cause at least a decent restoration).

I have said already this strange double trench is located near the northeast corner of the pyramid, about 80 meters away.

It is a perfect replica, without any doubt and to the scale 1:1, of the intersection of the two corridors, having the same measures and the same slope angles as well.

Again, located south side, there is a hint of a Quadrivium with the Horizontal Corridor entrance and a short stretch with the two platforms: doubt is not a possibility.

However, there are some differences.

First and foremost: the final part, the one where the first block must stop, is not only laterally tapered but also with a step in the floor.

Evidently, the test results were satisfactory since Hemiunu modified the device (though there is a third option I will speak later, describing the "mouth").

From the entrance side the corridor is abruptly reduced, just after the intersection, decreasing its section to form a frame to stop the stone acting as a water-plug (which had to be inserted here as well, fig. **I12**).

There is something more, something very important.

In the ceiling of the trial passage, exactly at the intersection, there is a square section well going up outside. This detail does not exist inside the pyramid.

One more detail and we are there.

Externally, a few meters to the west and carved into the rock, we find a strange horizontal trench 7.34m (14c) long with an average width of 71cm.

Its floor is not horizontal, but has a curious gentle downhill slope, having the two extreme ends at different heights, in particular the north side is 15cm deep and the south side 43cm. One of the two ends is not even vertically, being slightly tilted inward.

The sides of the trench are slightly flared; to the south, the trench bottom is 9cm narrower and 7m shorter with respect to its outer edge.

This curious excavation is all too often ignored (photo **I13** and **I14**).

I knew that almost by accident, but it was providential as its purpose became clear to me immediately.

At the "trial passages", Hemiunu had tested his hydraulic brake, flooding the site several times and launching the block. Obviously, in the vertical shaft a plug had to be inserted—a sealing cap heavy enough not to get shot away by the pressure.

A limestone cap, of a truncated pyramidal section (dis. **I15** and **I16**), resting in safety conditions in the horizontal trench just described which shape and size perfectly match with this cap.

By the way: while studying this part, I was not sure that the walls of the vertical shaft had been worked in a slightly truncated pyramid style. It was just my hope, nothing more.

Imagine my satisfaction to know that in reality things are actually as I had imagined!

Once the launch was completed, the cap was extracted from the well and Hemiunu checked the plugging of the block against the wall: it was mandatory to have a

"light" contact, just the result of a mere resting against the wall, not an interlocking which might be too dangerous.

Reviewing this part (October 2008), I realized that the explanation about the vertical shaft is a bit lacking. But just now I am able to fully understand the necessity of it and I am surprised it had not occurred to me a long time before: the trial was expected to have numerous launches, for that the big granite-cap had to be removed each time; to drag it out the towing stone device has to be installed, with the double rope in it.

To fix this, someone has to go down into the vertical shaft after it is emptied, as it is from here that the water is poured and removed, an operation that should be performed without interfering with any other ongoing activities.

After emptying, the towing will be inserted with the double rope under the block to extract it from there. Then the sequence of launching will go on.

This operation requires the presence of a groove dug in the middle of the trial corridor, some evidence of which, I hope, may still be found inside the excavation. Currently outside, on the south side, the floor is covered as usual by wooden beams, leading me to think that it is in poor condition (the floor square groove is probably ruined and transformed into a V-shaped excavation).

On the north side, however, the floor outside is still in good condition, not requiring any protection.

Alternatively, the trial block-cap could have carved at the bottom a square groove to insert the towing stone and the ropes, ensuring also an exit to the water.

Let's return to the pyramid: if everything had worked perfectly, more operations had to be taken to close the monument properly.

The rectangular block used as a plug had to be removed and the water drained. The granite block plugging the Ascending Corridor had to be concealed by a limestone block that subsequently would be confused among the others of the ceiling, making invisible the access to the upper path.

Just to allow the insertion of this stone, the first granite cap-block is shorter.

It could be argued this concealing stone would hardly have got stuck against the ceiling, without falling into the corridor below, but Hemiunu has it all planned.

Even today you can see in the limestone walls of the corridor, by side of the granite plug, two central little rectangular-carved niches, partially obscured by the blockade, appearing at the top of the corridor (photos **I17** and **I18**).

I imagine that these two small niches had a dual purpose: first, they would have to accommodate two stones to ensure the exact stopping point for the block convoy

and then, these stones removed or demolished, the two niches could allow to keep in position the hiding stone in the corridor ceiling.

First thing the cavity had to be well dressed, not as it is now. Next, imagine that the stone to get stuck in the ceiling had two slanting grooves carved on the sides, containing two wedges or granite cylinders, ready to drop downwards: something similar to the sealing device of the sarcophagus.

After introducing a thick mortar to help the "grip", the stone will be pushed upward.

During the installation the "cylindrical plugs " would have remained inside their homes, but meeting the side niches, they would have slipped out, getting stuck into the small niches.

Then smoothing and dressing.

I've read several times about a tilting triangular stone that was supposed to close the legitimate entrance of the pyramid.

I do not know where this new from but in my opinion, this stone never existed. Someone, standing right under the granite plug, could have noticed the two small prismatic niches at the sides and have misunderstood their purpose. These may suggest the possibility of having hosted the pins of a hypothetical stone acting as a rotating door in this cavity of the ceiling, to open or close the entrance to the Ascending Corridor...

It is a fantasy, but not too far from the truth.

It then happened that, describing this detail, confusion has been made between the pyramid entrance and the beginning of the Ascending Corridor, so talking about it, some people placed this stone in the wrong place, spreading one more legend about the Great Pyramid.

Returning to our business, if the closing solution I proposed convinces you, remember that a fortiori the first block must stop exactly at the position where it is and this is possible only going down slowly...

In my opinion, however, the sealing device is still lacking: Hemiunu had planned to complete the work by removing the water stone-plug from the corridor below, then filling the Descending Corridor (still flooded) by limestone (or granite) blocks, the first positioned close to the bottom frame, just beyond the Service Shaft.

After that concealing the outside exit of the ducts rising from the King's Chamber, and then seal all up to the main entrance level.

Stop.

Shame, shame really that things are not going as planned and no fault of Hemiunu, but for the usual miserable reasons still affecting our choices.

Upon the death of Cheops there must have been some problems.

Khafre was not immediately placed on the throne, but was preceded by Zedefrà, stepbrother and maybe usurper, who ruled for about eight years (others speak of 22 years, but I don't believe it).

I do not know the facts in detail, but there is fairly to be assumed the succession to the throne generated problems and chaos, involving also the correct procedure for the pyramid closure.

I have already given an explanation about the ducts of the Queen's Chamber.

Rather difficult to explain the two stones with copper handles occluding both ducts at the top.

Sometime ago I tried to publish some part of this book and at least I have succeeded two times. The next part has already been published in a journal of archeology in very small print run (Archaeology, July-August 2004).

Next here, slightly modified, the writing with the drawings accompanying it (photo **I19**).