Reconstruction

They were designed to appear as: a step pyramid, a benben or some other expression we are unaware of. We are unable to decide how they eventually looked; because the surviving ruins can lend themselves to the shapes just mentioned.

Today all the layer monuments are truncated and we have no information concerning their final appearance; the remaining relics could lend themselves to a variety of pyramid or benben shapes. The fact hitherto that they were layer monuments made every one consider that their final appearance would have been a step pyramid. Indeed I have given into that temptation but I cannot exclude the possibility of the benben shape in archaic inscriptions and the sun temples of the fifth dynasty. Consequently I am presenting an example at Seila and Hebenu.

I am suggesting that the proposed pavement level outside the monument was the datum line. I have reconstructed with regard to the profiles available.

Some stone objects at Seila helped discover the shape of the step top which can apply to both the step pyramid and benben options. In my reconstructions the length of the sloping top of each step equals the rise of the exposed part of the step above. With this arrangement the lowest step will appear taller,[1] and the topmost feature of the monument becomes a square horizontal platform.

The latter encourages us to assume that the other layer monuments had them and, that they had disappeared or were left unfinished as the case is with Sinki.
Brick wall

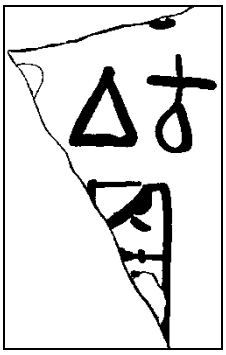
A level base was necessary for the ancient builders to control and monitor measurements, heights and the final appearance. This level base is seen in my reconstructions with a surrounding pavement. They have been drawn according to the investigation at Seila, and over the highest level of the bed rock surrounding; el Kula and Elephantine and over the highest foundation course of the outer facing at Hebenu; or to be placed at Sinki; and Nubt.
The layer monuments were perhaps some of the first attempts to conceder a full scale planning, logistics, building techniques and administration of stone projects. With the exception of Seila they may have introduced building traditions of the third dynasty seen in courses of masonry inclined backwards. A method seen at: Gisr el Modir , the Step pyramid at Saqqara, the constructions of Sekhemkhet, the layer pyramid at Zawyet el Aryan and the unidentified construction at north-west Saqqara. And was maintained at the Bent pyramid and lingered further at Giza and Abu Rawash[2].

[1] it is not taller because all the steps are of the same vertical height
[2] N. Swelim, G 1-a, -b, -c and –d Ashlars, *Structure and Significance* 495, Wien 2005.

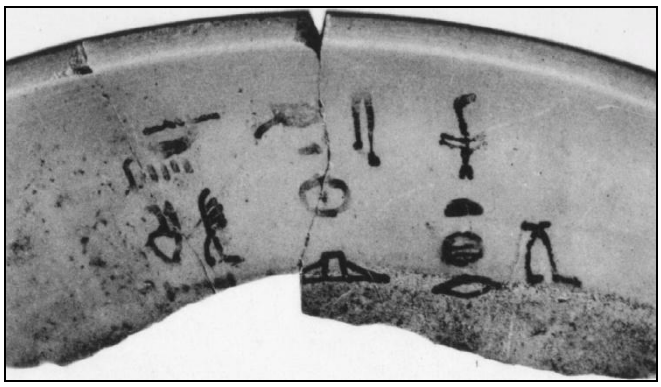
In the step pyramid option, the base length, the width of layers and their side angles determine the number of steps. The layers at Sinki and Seila were 5 cubits wide while at the other Hebenu, Nubt, el Kula, el Ghenimiya and elephantine are 4 cubits. Consequently Seila with a longer base length results in four steps, Sinki results in three. The monuments: Hebenu, Nubt, el Kula, and Elephantine result in four steps also. It is worth noting that Nubt has the smaller core, but an additional layer equates the base length with the other monuments. Being not investigated, I am unable to deal with el Ghenimiya.

Some early Old Kingdom constructions were related in some respect to the layer monuments: the revetment at Hieraconpolis, the tumuli at Naqada, a square structure under the chapel of Ay at Abydos,[3] the dam at wadi Garawi, the funerary step pyramids of queens of Menkura at Giza.

Two ink inscription references found in the galleries under the step pyramid at Saqqara seem to refer to a pyramid and a benben:[4]



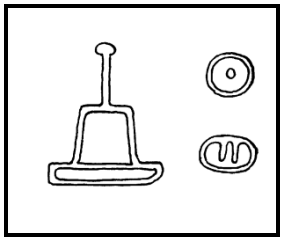
The inscription of the pyramid *nfr*



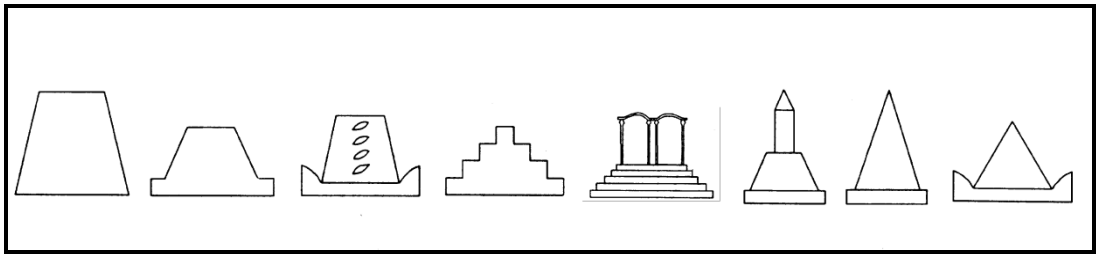
An ink inscription mentioning *Seketra* with a benben determinative

[3] Currelly CT. in *Abydos* III, 1904, 10, pl. XV

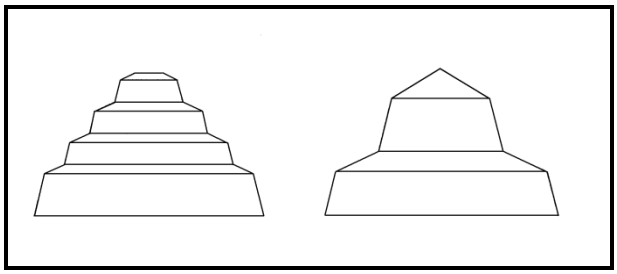
[4] J-Ph. Lauer, *Fouilles a Saqqara: La pyramide a degres* T III *Complements* (le Caire, 1939) 74, pl. XIX 5, T V *Inscriptions à l'encre sur les vases* (le Caire, 1965) Pl. 5; H. Goedicke, "Bemerkung zum Alter der Sonnenheiligtümer," *BIFAO* 56, 151-153.



A benben determinative of the 5th dynasty



Benben determinatives from the hieroglyphic list of buildings



The 2 possible shapes considered in this study

Datum line and pavement

In addition to the base length we already know, the inaccessible thickness of **LAYERS** and **CORE** at datum level need to be calculated. By comparison the original **HEIGHT** would have been **17.8 METERS.** [5]
It remains that we have some problems:
How did the builders correct the irregularities of the side angles?
How can we reconstruct the shape of the step?
How high could the steps rise above one another?
What would the ultimate shape have looked like?

CONCERNING THE RECONSTRUCTION PROCESS

[5] During dynasties III and IV Pyramids had a height of less than 50% of the side or the diagonal of the base length; thus acquiring the stability created by *the angle of repose*. It seems that earlier builders had realised the advantages of *the angle of repose* by trial and error on religious and funerary mounds. The existing ruins of the other layer monuments, Hebenu, Sinki, Nubt, el Kula , el Ghenimiya and Elephantine have a base length of 22 -25 meters and an estimated height somewhere between 11-12.5 meters. During the Fifth Dynasty, however, some queen's and subsidiary pyramids have a height equal to the base length.

The following questions present themselves:
How did the builders correct the irregularities of the side angles? See table.
How can we reconstruct the shape of the step of the pyramid or benben?
How high could the steps rise above one another?

Like Seila, Sinki differs from Hebenu, Nubt, el Kula, el Ghenimiya and Elephantine, by having layers of a thickness of 5 cubits instead of 4.
The side angle of the layers varies but eventually 76^{o} (seked of 7); as it is common to Netjerykhet, Seila and Hebenu.
Unlike the horizontal top, of the step, at Meidum; I prefer the shapes at Netjerykhet and Seila.
The slope begins from the vertical level (above the pavement or step below) and rises to meet the side of the step above. This process results in a square platform over the uppermost step.
Applying these considerations to the profile and the square drawn on the aerial view; we have a balanced appearance.[6]
In the step pyramid option
The layers of 5 cubits thickness and the 14^{o} angle from the upright would allow for a monument of only three steps.
Layers 3, 2, and 1 would create the first, second, and third step. The core would rise to create a square platform over the third step and each step would measure 8 cubits high.
The slope above the first, second and third steps would be equal in length to the rise of the slope over the first and second step. Above the third step the core is a square platform measuring 4 X 4 cubits.
In the benben option
The outer faces of layers 3 would create the first, step. The outer face of layer 2 would create the shaft carrying the pyramidion.
Layer 3 would create the first step, which would be cased.
Layer 2 would create the shaft carrying the pyramidion, which would be cased.
Layer 1 would rise to be topped as part of the pyramidion.
The core would remain imbedded in the nucleus.

The overall height and proportions

During the Fifth Dynasty, some queen's and subsidiary pyramids begin to have a height equal to the base length. All pyramids before that date have a height which relates to half the base or diagonal lengths. If we apply this to the layer monument of Seila its height would fall within the range between 30-42 cubits (16-22 meters)
In the reconstruction's mentioned above one observes a general tendency towards:

- A decrease in the height of the upper steps.

Equating 2 lengths: of the top of one step and, the slope of the rising step above it

[6] I have to mention that at the step pyramid of Netjerykhet some of these considerations are not found.