IUBILATE CONLEGAE
STUDIES IN MEMORY OF
ABDEL AZIZ SADEK

Part II

The Pyramidion of Khafra
by Nabil Swelim

In an ever changing world, Egyptology is constantly loosing scholars who represent their era. In my generation the late Azzouz (Dr. Abd el-Aziz Sadek) was a friend and a college who will not be forgotten. He was a *General Practitioner of Egyptology*; I honour his memory by a short archaeological study on the pyramidion of Khafra. The ideas I suggest are based on some remarks recorded by Richard Lepsius and two fragments of a diorite object found by Selim Hassan.

From the Old and Middle Kingdoms remain a few pyramidions at Giza, Abu Sir, Saqqara and Dahshur; a few of which are on display at the Cairo Museum. They were made of limestone, sandstone, granite and basalt. The pyramidions of all other pyramids have not been found; nevertheless with the pyramids of Khafra and Udjepten we have some information on the courses below the pyramidion which may help in their reconstruction. In this article I am concerned with the former pyramid.

Maragioglio and Rinaldi describe the uppermost part of the pyramid of Khafra: "The summit of the pyramid is destroyed and the edifice now ends in a small platform: here the masonry is coming apart and one block of the last casing course to the east is precariously balanced. Immediately under the surviving part of the casing the nucleus is seen to be formed of regular, clearly marked masonry courses which form as if it were an actual flight of steps." A sketch drawn by Lepsius was modified and redrawn in their publication.[1] What had been described by the Italian scholars in 1966 applies to the situation at the pyramid of Khafra today in 1996, despite two recent earthquakes of a power of 6.+ on the Richter scale.

Describing the situation in 1843, Lepsius mentions that there were missing blocks at the top of the pyramid and all the remaining ones were displaced. The uppermost remaining block was 0.54 meters high and had a groove cut 2.5 feet (= 0.75 meters) from one edge. A drawing of that block was published.[2] Accordingly a reconstruction of the course from which this block came was sketched in the diary of Lepsius; it showed a platform with a curious cross-shaped sockets sunken into its center. This means that the grove was more than 2.5 feet from the other edge. In the drawing published here (fig. 1 B) I am suggesting that the socket was rectangular by two dotted lines. Maragioglio and Rinaldi ignore the cross-shape in their modification and draw a square socket. This course will be named the uppermost course.

Concerning the outer facing below, Lepsius measured the tops of each course as follows :
- The second course below was 3.88 meters.
- The third course below was 4.20 meters.
- The fourth course below was 5.18 meters.

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[1] V. Maragioglio and C. Rinaldi, *L'Architettura delle Piramidi Menfite.* Vol. V. (Rapallo, 1966) Text 50, Plates Tav. 6, fig. 1.

[2] C. R Lepsius,. *Denkmaeler aus Aegypten und Aethiopien* Text 1 27-28.

Putting this information on a drawing to scale, with the side angle of the pyramid of Khafra, 53° 7′ 48″ (fig. 1 A), we reach some additional information:

- The construction above the second course was 2.5867 meters = 5 cubits high (less 0.0333 meters = 1.5 fingers).
- The second course below was 0.2133 meters high.
- The third course below was 0.6533 meters high.

These results are interesting; while the height of 0.2133 meters of the second course below is rather small compared to the masonry of this pyramid; the five cubits present a nice whole number for the construction above it.

On the sketch published by Lepsius and modified by Maragioglio and Rinaldi, Stadelmann reconstructed a pyramidion by extending the sides to a point where they met.[3] Arnold presents the idea of fixing the pyramidion by inserting one course of masonry between the modified sketch and the pyramidion; both having a lower bevel to fit into sockets in the uppermost and the inserted courses. The drawing does not represent the height of the courses of masonry measured by Lepsius.[4]

Selim Hassanís diorite object

Near the main entrance of the tomb of Ra^c-wer, at an area south of the causeway of Khafra and south west of the rear side of the Sphinx. Selim Hassan found " two pieces of polished diorite measuring 30 cm. in height by 54 cm. wide, ... they probably formed part of a pyramidion.[5] (fig. 2) Although the published drawing indicates that the lower part was broken, a damaged corner, 2 slanting sides and an upper projection surrounded by a flat border suggest that it was a fragment from a block below a pyramidion. The flat border is estimated as (0.10 - 0.15 meters) and the upper projection was slanting inwards. The fragments comes into context because:

- The pyramid of Khafra is the closest pyramid to the place of discovery.
- The area between that pyramid and the place of discovery slopes down hill and is clear.
- Many diorite objects date to Khafra, and probably this one also.

The pyramidion and the block below

I assume that the objects used for the construction above the second course would have been prefabricated before they were mounted. The stone work involved was not achieved by a builder; it was made by a craftsman who was capable of producing sophisticated works of stone, such as sarcophagi with sliding lids, canopic boxes and polished facings. The builders of the pyramid, however, would have prepared a mounting platform on top of the pyramid with exact measurements to accommodate the prefabricated objects. Perhaps a small building error brought their work 0.2133 meters short of the required platform and consequently they had to add a slim course of that height, (i.e. the second course). According to Lepsius the prefabricated uppermost

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[3] Rainer Stadelmann, *Die Ägyptischen Pyramiden.* (Darmstadt, 1985) 134.

[4] Dieter Arnold, *Building in Egypt. Pharaonic Stone Masonry.* (Oxford, 1991) 129.

[5] Selim Hassan *Excavations at Giza.* (Faculty of Arts. Egyptian University, 1932). Vol.: I. 1929-1930. 7, Fig. 3.

course was 0.54 meters high (1 cubit + 1 finger). This leaves 2.0467 meters (4 cubits less 2.5 fingers) for the pyramidion.

Pyramid scholars have known that the builders of the pyramid of Khafra were manipulating megaliths in lower levels. No doubt, manipulating a pyramidion on a limited area on top of the pyramid–144 meters high–would be difficult. If it were a monolithic pyramidion of diorite or granite, it would weigh 11 tons. This figure does not qualify for a megalith, but is still very heavy. Dividing up the tonnage would make things easier at such great heights.

A limestone pyramidion of smaller dimensions, recently found by Zahi Hawass at the subsidiary pyramid of Khufu (G1d), was set on two limestone monolithic blocks on the pyramid top.[6] Selim Hassan's fragments suggest that the construction of the pyramidion of Khafra was similar, and it is tempting to suggest that there was, at least, one block between the uppermost course and the pyramidion, and that they were of diorite. Fig. 3 demonstrates a three-dimensional view of that configuration: A diorite block with a base of 3.0700 meters and a height of one cubit was prepared to come on the uppermost course; it would weigh almost 4 tons. Two bevels above and below would fit into the pyramidion and the uppermost course. All that remains of it are two fragments. The pyramidion on top would have had base of 2.2840 meters and a of height 1.5227 meters (3 cubits less 2.5 fingers); it would weigh 7.15 tons. Hitherto, no remains of it have been identified. Eventually the pyramid of Khafra would have had a gold-whitish outer facing with a course of rose granite below and a dark green diorite pyramidion on top.

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[6] Z. Hawass, "The Discovery of the Pyramidion of the Satellite Pyramid of Khufu [G1D]," *VA* 10 (1995): 105-124.

A

1.5227   Suggested Pyramidion

0.5240   2.2840   Block below pyramidion (S.Hassan)

Lepsius 0.5400   3.0700   Uppermost course

0.2133   Lepsius 3.8800   Second course

           Lepsius 4.2000   Third course

0.6533   Lepsius 5.1800

                                           Fourth course

53°7'48"   53°7'48"

B

Lepsius 3.8800

3.0700

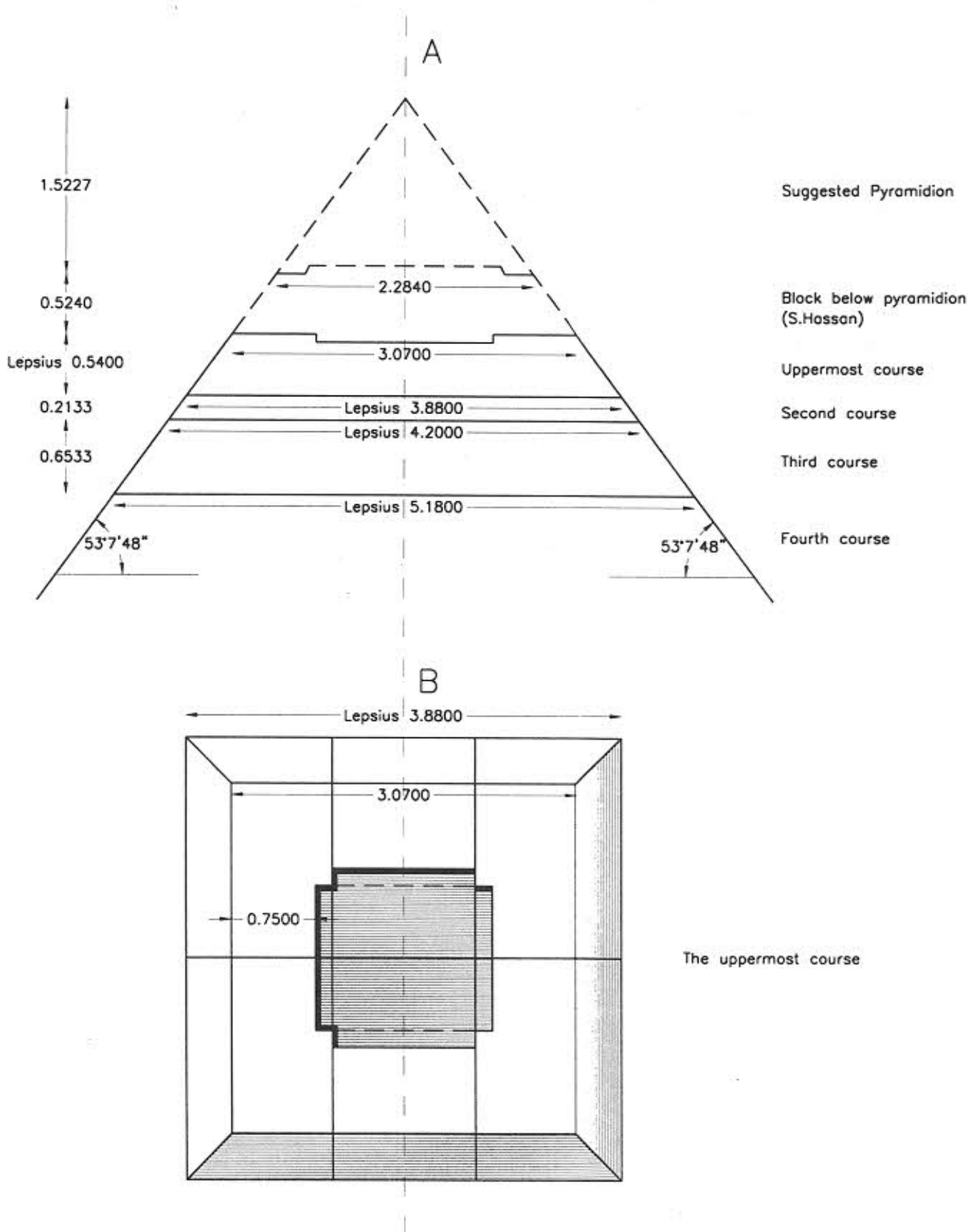0.7500   The uppermost course

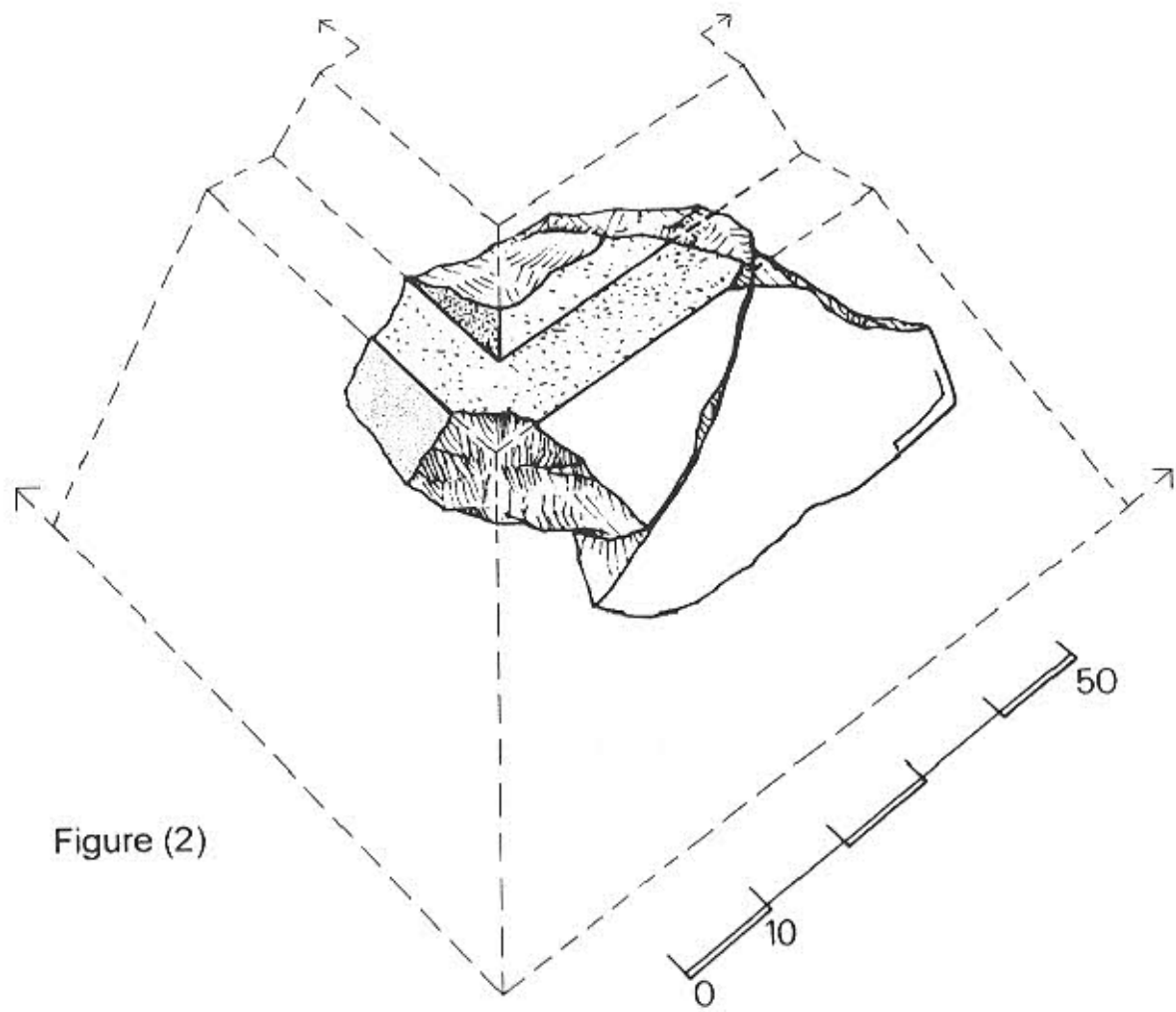Fig. 1. Lepsius' Measurements Drawn to Scale 1:50.
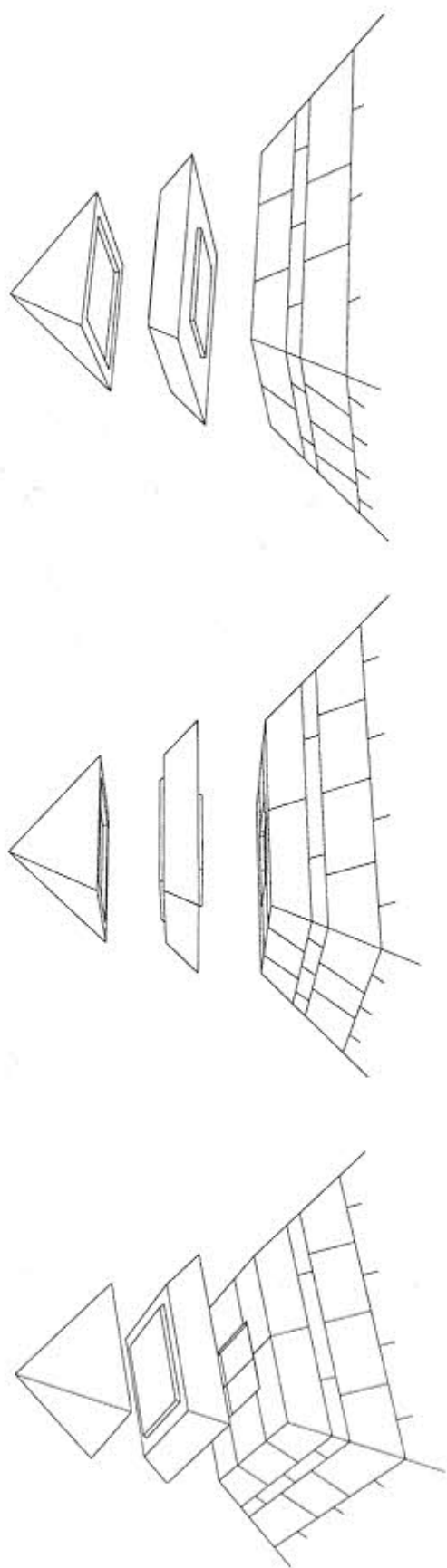
Figure (2)

Fig. 2. Selim Hassan's Diorite Objects.

Fig. 3. Three 3D Views of the Configuration of the Pyramidion of Khafra.