

REMINDERS AND REMARKS
ON
THE ROYAL SUBSTRUCTURES OF THE THIRD DYNASTY
NABIL SWELIM

This study is a reminder of already published material, and presents at some observations and remarks; they would have interested the late Prof. Dr. WERNER KAISER. Thanks to the publishers of this ‘*Gedenkschrift*’ for including them. KAISER was a booster of Egyptological progress; his legacy has a lasting impact. For helpful assistance from younger Egyptologists, I would like to thank: CLAUDIA LACHER (Germany), FRANK MONNIER (France), and BRUNO DESLANDES (Latvia). To PAM REYNOLDS (USA) I am grateful for revising my draft. My Granddaughter FARIDA SWELIM helped with 2 images. Finally on every study about the Step Pyramids I salute J. PH. LAUER.

INTRODUCTION

The bases of construction, which led to the pyramid age magnificence, were enhanced during the Third Dynasty. Its heritage shows that Egypt was a nation of wealth, discipline, and knowledge; the inhabitants had persistence and enthusiasm. Funerary superstructures and substructures made some amazing leaps. In this short article one can clearly see that the funerary monuments of the Third Dynasty are characterized by tunneling below and building with accretion layers above. We are being refreshed by a description of the substructures of 8 monuments: 5 pyramids, 2 mastabas, one sacred-hillside-monument; and some remarks on substructures before and beyond an entrance and the Inner South Channel of the Dry Moat. The identification of kings: Khaba, Nebkara and Neferka (or Huni), with Zawyet el Aryan south, Brick and Zawyet el Aryan north pyramids; is based on poor evidence.¹

We already know that pits were dug in the sand and cut in the bedrock; their sides were maintained by walls and were roofed with wood, matting and rubble. Tunnels (galleries and hypogeum) did not need walls and roofs. They were perfect when: working horizontally (corridors and chambers) and vertically (shafts) also? But they failed when they penetrated layers of tafla, (desert clay).

¹ N.SWELIM, Rollsiegel, Pierre de Taille and an Update on a King and Monument List of the Third Dynasty, *Intellectual Heritage of Egypt, Studies Presented to Laszlo Kakosy Friends and Colleagues on the Occasion of his 60th Birthday, SA XIV.*, Budapest 1992, 541-554

At the beginning, galleries were tunneled within a limited area, which gradually increased and became vast, then decreased and became simple; finally a single tunnel was annexed to the stone masonry above. Roofs of masonry had stone blocks span over narrow corridors and trenches. To widen the area roofed, at the superstructure, columns were introduced,. At substructures however, chambers and magazines with flat roofs needed megaliths, and corbelled roofs with small blocks were preferred.

Constructing the projects of Netjerykhet, Userkaf, Unas² and others, have cleared earlier monuments in their way. When excavations expose such evidence research becomes difficult, but understanding increases.

REMINDER

THIRD DYNASTY '1' THE STEP PYRAMID COMPLEX

The substructures of the Step Pyramid complex were within: the Temenos Wall, and the Dry Moat. Unfortunately, only incomplete excavations have been achieved in both. A rough estimate of 5 km hypogeum was entered by 22 shafts, 10 stairways and 2 geophysical discovered tunnels. Only small parts of the Dry Moat have been accidentally uncovered.

WITHIN THE TEMENOS AREA

Shafts 1 and 2 were at the House of the North and South, shaft 3 at the Entrance Colonnade, shafts 4, 5, 6, 6.1 and 7 at the Western Galleries, shafts 8 and 9 at the east-west corner galleries. One stairway led to: 1 to the Western Galleries, 4 stairways to north-south corner galleries and 3 stairways led to earlier tombs.

² N.SWELIM, "Some Remarks on the Great Rectangular Monuments of Middle Saqqara" *Fs Kiaser, MDAIK* 47, 1991, 393

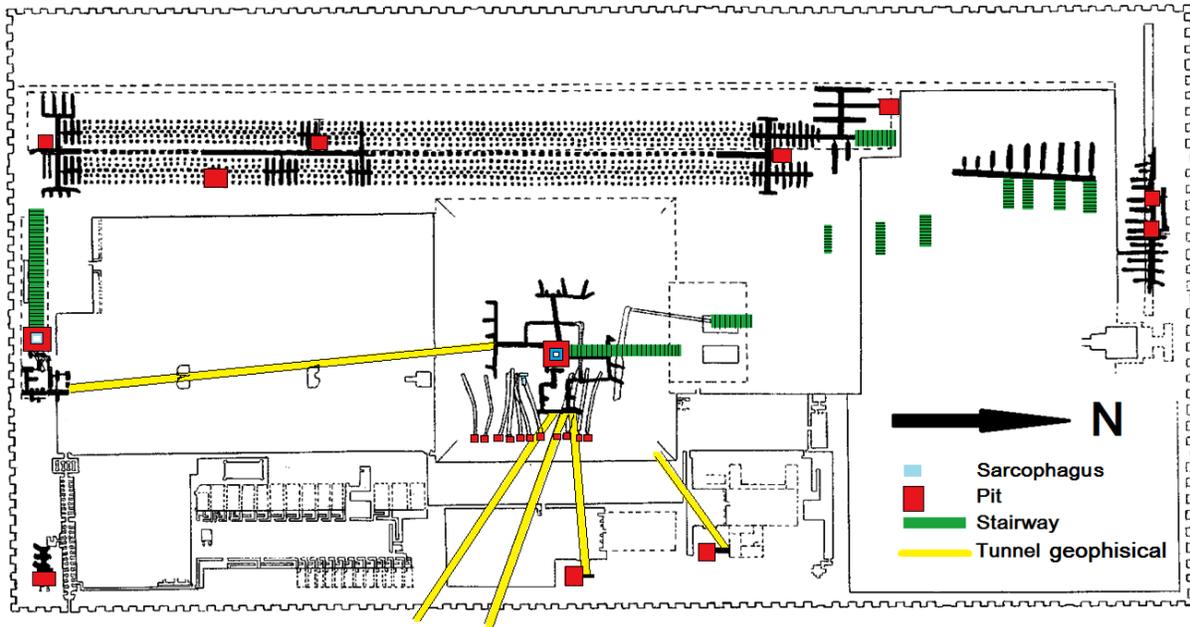


fig 1

i- THE SOUTH TOMB

The substructure is a copy of that at the pyramid: stairway, shaft, burial chamber, Granite-Chamber-**Sarcophagus**, and other chambers with reliefs and blue tiles, but at 3 levels instead of 4. The deepest extends beyond the tomb area and a horizontal (geophysical) tunnel connects with level 2 under the pyramid area

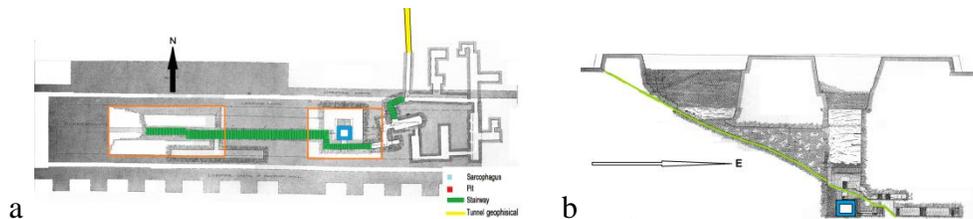


fig 2

ii- THE STEP PYRAMID

The substructure was worked at 4 levels. The deepest, level 1 was at the bottom of 11 shafts. Level 2 surrounded the Burial Chamber and had tunnels (geophysical) reaching the South Tomb, the houses of the North and South and to the area between, the East Channel of the Dry Moat, and the east Temenos Wall. Level 3 was a blind corridor tunneled out of the descending stairway. Level 4, was tunneled with supporting columns from the south. Levels 1 and 2 were connected, by a shaft, at a point where their plans crossed.

The original **entrance** was blocked by expanding the initial mastaba. It was tunneled as a Grand Stairway descending to a window in the Great Shaft; which dropped to level 2. A second entrance led to a tunnel ending at level 2. Level 3 branched out of this tunnel halfway. A third entrance was at a large pit east of the pyramid, where a stairway ended at the first shaft (of the 11 shafts). A fourth entrance from the south side of the pyramid led horizontally to a window near the top of the Great Shaft. A fifth and a sixth entrance (geophysical) extend easterly from level 2 to between the East Temenos and the East Channel of the Dry Moat.

At the heart of level 2 was the Granite-Chamber-Sarcophagus. The granite slabs and decorated blocks of limestone (belonging to a destroyed magazine) were brought down the Grand Stairway and the Great Shaft. The Great Shaft was most probably filled wooden cedar beams and rubble filling, similar to the shaft at the western chamber of the Bent Pyramid. Tunneled at this level are unfinished corridors and chambers with reliefs and blue tiles.

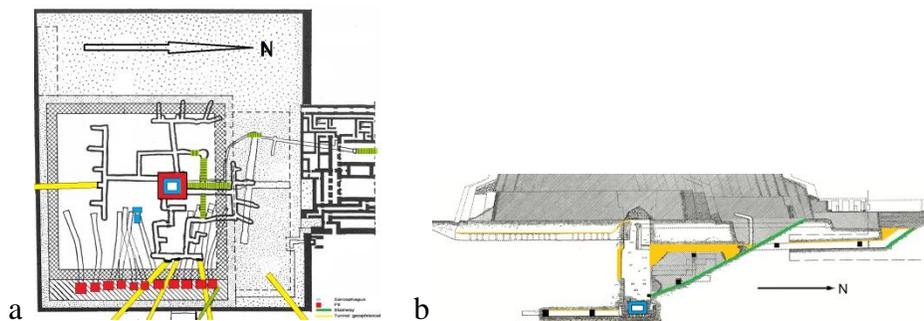


fig 3

iii- THE DRY MOAT³

The length of the Dry Moat is 3.5 km; it is 40 meters wide and a few meters deep, it reaches 26 meters at some compartments. Little is known about the north and the east channels. Definitely, Userkaf was the first to cross the East Channel. Excavations have partly exposed much information along 250 meters.

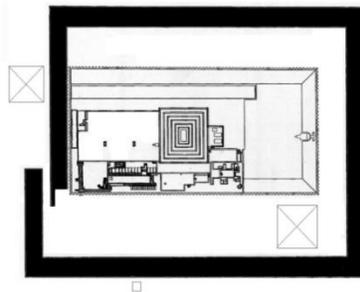


fig 4 a

³ N.SWELIM, The Dry Moat of the Netjerykhet Complex, in: J. Baines, et al, *Pyramid Studies and Other Essays Presented to I.E.S. Edwards* (London 1988), 12-22.

At the West Channel, Polish investigations were active.⁴ In the outer South Channel, Unas placed his Boat Pits, and, causeway and later Sixth Dynasty tombs were built. The Inner South Channel yielded information within 220 meters. These were a series of narrow compartments with destroyed rock roofs along the south rock wall, at:

THE EASTERN AREA, 100 meters long, 40 meters were excavated by Selim Hassan, unearthing 3 narrow compartments with remains of a destroyed rock roof were connected by 2 window corridors at a high level. At the east end Tomasz Herbich⁵ has shown (by geophysical investigation) that under the rubble it does not go any farther. The west end, the third compartment is blocked by a filling.

THE MIDDLE AREA, 170 meters long; 80 meters were excavated by Zaki Saad exposing a large compartment of the same narrowness and remains of a destroyed rock roof. The east and west ends were not cleared. Towards the west at the bottom he reports a **stairway** descends to a lower buried level.

THE WESTERN AREA, 140 meters long; 60 meters was excavated by Zaki Saad. A compartment and beyond were completely cleared. The east and west ends of the compartment were cut upright. The bottom was paved at a depth of 26 meters, over unfinished rock leveling. Above the compartment were niches in 2 rows 9 meters apart. Above them The Dry Moat had cut across the entrance ramp of Hetepsekhemwy-Raneb. At the east end of the compartment and some sharp upright cuts. At the west ends towards the top, and a little to the west the channel breaks into a hypogeum. And in the same area are remains of accretion layers built along the rock wall.

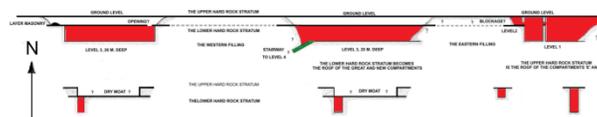


fig 4 b

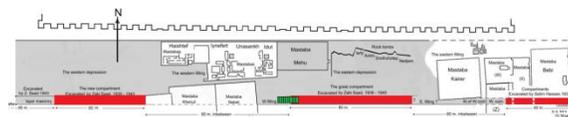


fig 4 c

⁴ K. MYOELIWIEC, *West Saqqara in 2002*, Warsaw 2003, pp.111 - 127; A harpoon thought to date to Netjerykhet and earlier blue tiles were found here.

⁵ T. HERBICH, ET AL, *Geophysical Investigation Of The Dry Moat of the Netjerykhet Complex In Saqqara, Man Millennia, Environment, Studies in honour of Romuald Schild*, Warsaw 2008.

THIRD DYNASTY '2 and 3' BET KHALLAF

i- MASTABA K1 DATING TO NETJERYKHET

Is a monument which imbeds a tumulus lingering from the past, like the initial mastaba of Netjerykhet; tunneling and accretion layers, of the monuments which followed. The substructure starts from the top of the mastaba with a brick stairway, 2 meters wide, passing through the superstructure with a barrel roof. It goes north, turns west and turns again south till it reached the desert level at an angle of 30° . The descending corridor continues rock cut to a depth of 27 meters below the top of the superstructure. Five shafts open to the sky were at the roof of the corridor, for portcullis. There is a rock tunneled, horizontal corridor, with 18 magazines around the Burial Chamber. The roof of this chamber was rock cut in the shape of a dome; the walls were lined with smooth limestone. On the east side of the mastaba was a blind descending stairway; it went through the bricks to the tumulus imbedded in the superstructure.

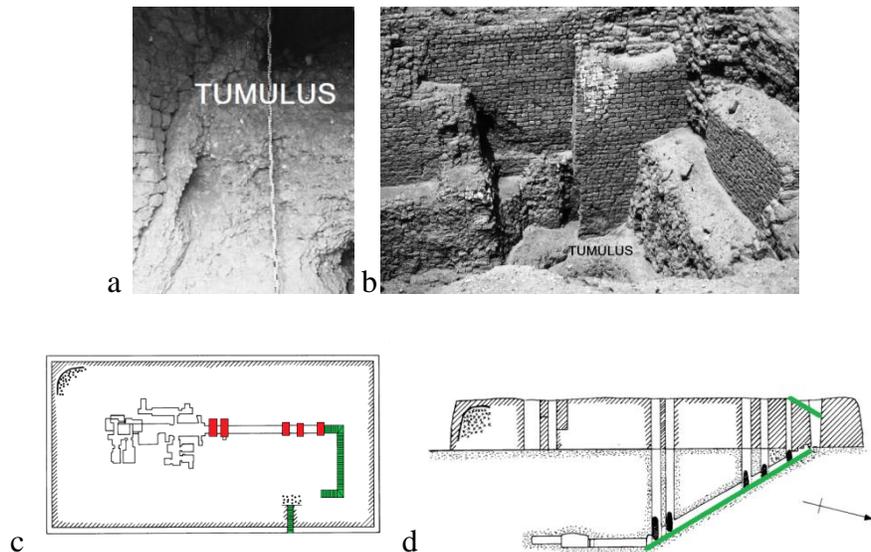


fig 5

ii- MASTABA K2 DATING TO NETJERYKHET AND SANAKHT⁶

there is no tumulus, but accretion layers composing the superstructure. There are 2 independent substructures below Mastaba K2; the larger is to the south. This began with a stairway from the top of the mastaba going west and turning south at an angle of 41° to a depth of 11.5 meters. Part of the passage is built in the superstructure with an arched brick roof and 2 portcullis shafts the last at the passage end. A wide horizontal corridor was followed by 7 magazines and a burial chamber which had a wooden sarcophagus in which the bones of a tall man were found. The northern **independent** substructure began by a stairway corridor starting with the same directions

⁶ J.GARSTANG, *Mahasna and Bet Khallaf* (London 1903) pp.3-4, 8-14, pl., ii, vi-xviii.

of K1 but the passage was much steeper 51° to a depth of 11.5 meters. At the end was a suspended portcullis in a shaft open to sky. A level corridor with magazines and a burial chamber follow.

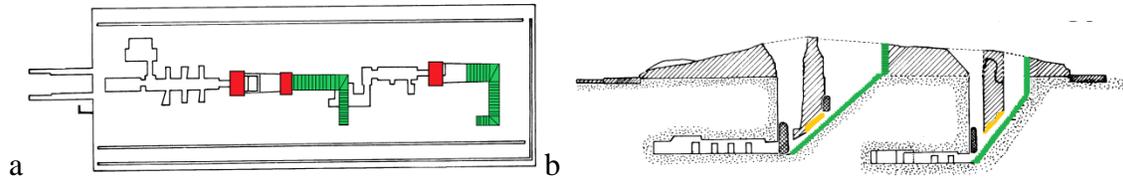


fig 6

THIRD DYNASTY '4 and 5' SAQQARA AND ZAWYER EL ARYAN SOUTH

i- THE PYRAMID COMPLEX OF SEKHEMKHET

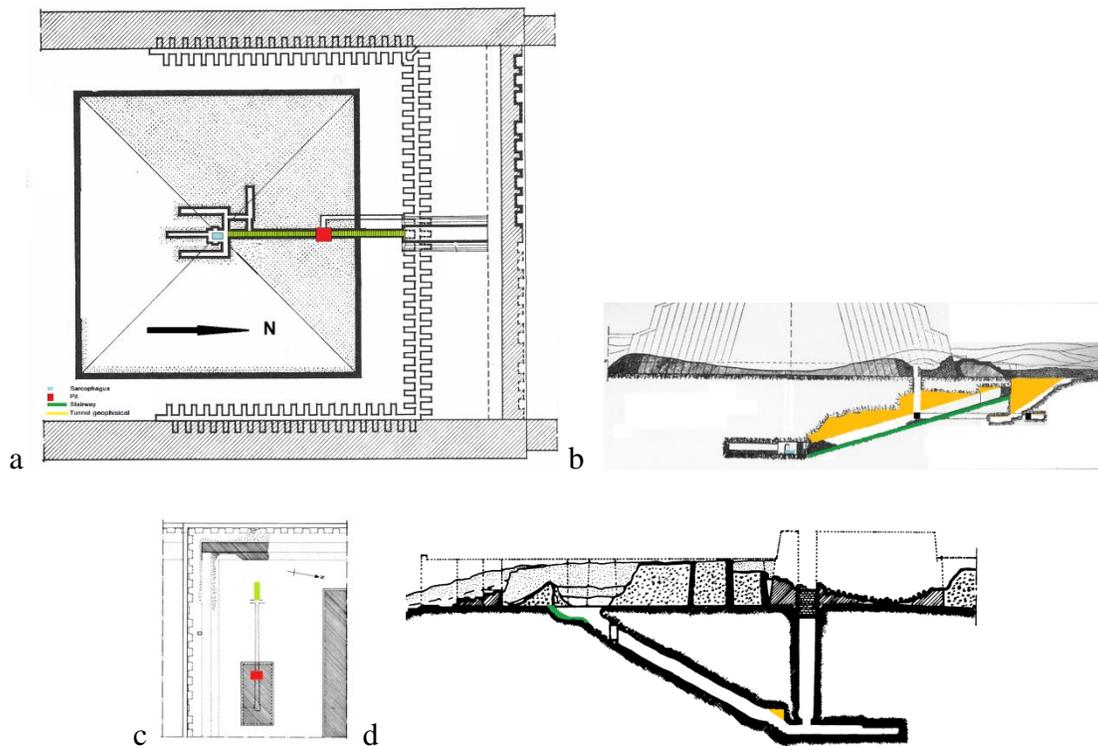


fig 7

The concept of vast substructures was never continued, the access to their components were reduced at Sekhemkhet to: 2 stairways and 2 shafts. A Temenos, Burial Chamber, sarcophagus and South Tomb were maintained but with no Dry Moat. The bedrock was soft, and descending corridors had to be supported by stone walls narrowing them. They were found earlier at several components of Netjerykhet. This narrowing wall must have been built after delivering the

sarcophagus. The substructure entrance was completely blocked when discovered, and was partly opened by Zakaria Goneim.

A little north of the pyramid area, a descending passage open to the sky, with sides built over the bedrock. Following is a wide tunnel at an angle of 13° leading to the burial chamber. A second independent substructure which had a descending passage at 35° followed by short horizontal tunnel was abandoned. The tunnel crosses the bottom of a shaft where another tunnel, turns west and north to a series of fish-bone magazines surrounding the pyramid area at three sides. The descending stairway continues to the burial chamber, out of which branch 4 blind corridors. In the center of the pyramid and chamber, the sarcophagus with a sliding side panel was found.

At the south tomb a shaft was sunken through the superstructure and bedrock to end in a descending stairway coming from the west to the burial chamber. In it was a wooden coffin with bones of a child.

ii- THE LAYER PYRAMID, KHABA?⁷

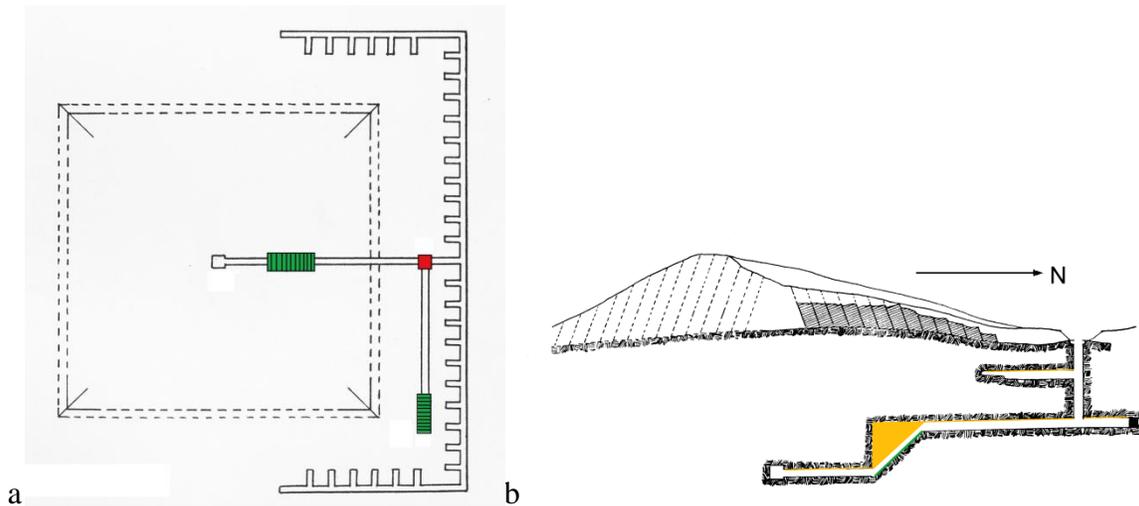


fig 8

The plans of Sekhemkhet were repeated with few simplifications. There is no independent substructure to the north, like K2 and Sekhemkhet. At the Pyramid of Zawyet el Aryan south, the entrance was at the north-east corner of the pyramid area with a stairway descending westwards at a steep angle of 50° . A gentle sloping corridor ends at the bottom of an open shaft, where it meets a north-south horizontal corridor. At the north end are 32 magazines directed inwards, in a comb-shape plan. To the south the horizontal corridor descends as a stairway of 45° . Another horizontal corridor ends with a squared burial chamber, 24 meters below the desert surface. This

⁷ D. DUNHAM, *Zawyet El Aryan*, Museum of Fine Arts, Boston. 1978.

Pyramid was the first to be discovered without a sarcophagus; thus its corridor did not have to be wide.

To avoid crumbling, the roof of the stairway corridor continues horizontally and drops at the end; creating an interesting triangular vacuum. At Netjerykhet and Sekhemkhet such roofs over stairways had collapsed; and supporting walls were built; thus narrowing the corridors.

A little below the mouth of the shaft, a rough corridor was unfinished in a south direction.

THIRD DYNASTY'6 and 7' ABU RAWASH AND ZAWYET EL ARYAN NORTH

i-THE BRICK PYRAMID, NEFERKA OR HUNI? ⁸

The return to a brick superstructure has not been studied. The Substructure plan however harmonizes with Snofru and Khufu. Better geological formation made tunneling the corridor and chamber less liable to collapsing as with the 3 step pyramids of this dynasty. The descending corridor had an unfinished widening before it went through a hard layer. This layer was to continue as the roof of the burial chamber. This chamber had a squared plan like Netjerykhet, and Khaba?

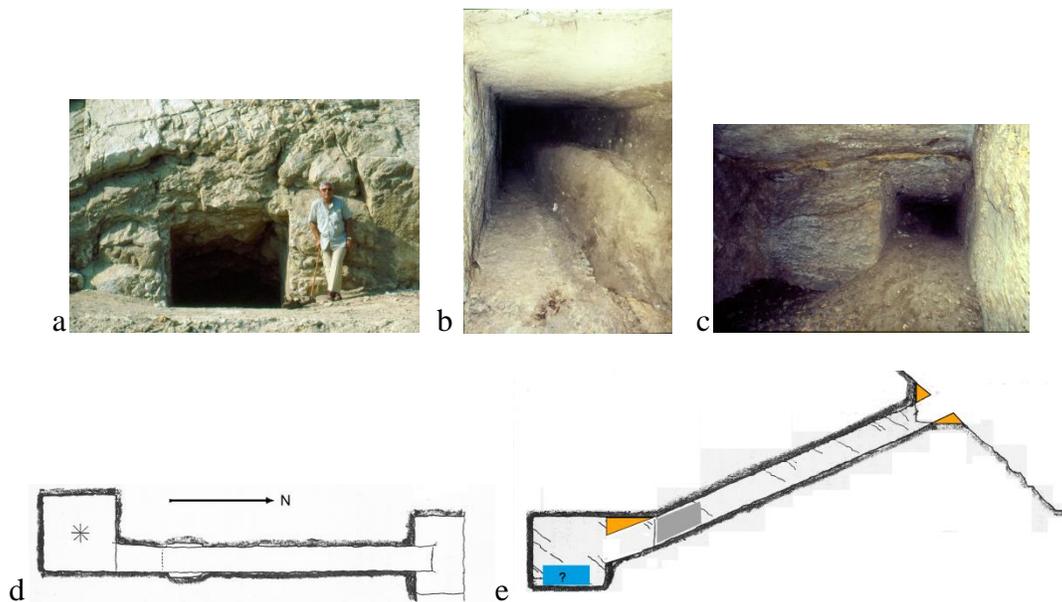


fig 9

⁸ N.SWELIM, *The Brick Pyramid at Abu Rawash, Number 1 by Lepsius*, Alexandria, 1987, 60-70.

ii- THE UNFINISHED PYRAMID, NEBKARA? ⁹

Due to failures of tunnelling, the open pit, passage and granite floor reappeared at the Unfinished Pyramid at Zawyet el Aryan north. The entrance passage, like Netjerykhet, Sekhemkhet and Khaba (?), had sloping sides. A gentle ramp, horizontal platform and rock cut stairway lead to the burial chamber. Resembling the Great Shaft of Netjerykhet, the intended chamber at the bottom would probably have been roofed with cedar beams and rubble. It would be assembled in a similar way to the pit below the west chamber of the Bent Pyramid? The chamber of the Unfinished Pyramid was floored with large granite blocks, in one of which the oval sarcophagus was carved. Possibilities of a corbelled or a gable roof would be unlikely, if this pyramid belongs to the Third Dynasty?

Cedar wood and granite come from far away distant sources. The project was discontinued. The similar pit of Djedefra at Abu Rawash was floored and lined with limestone instead of granite; the passage to the burial chamber was narrower with almost vertical sides. It had no sections: ramp, platform or rock cut stairway, and logically, like his predecessor Khufu, and successor Khafra, he would have had a conventional sarcophagus.

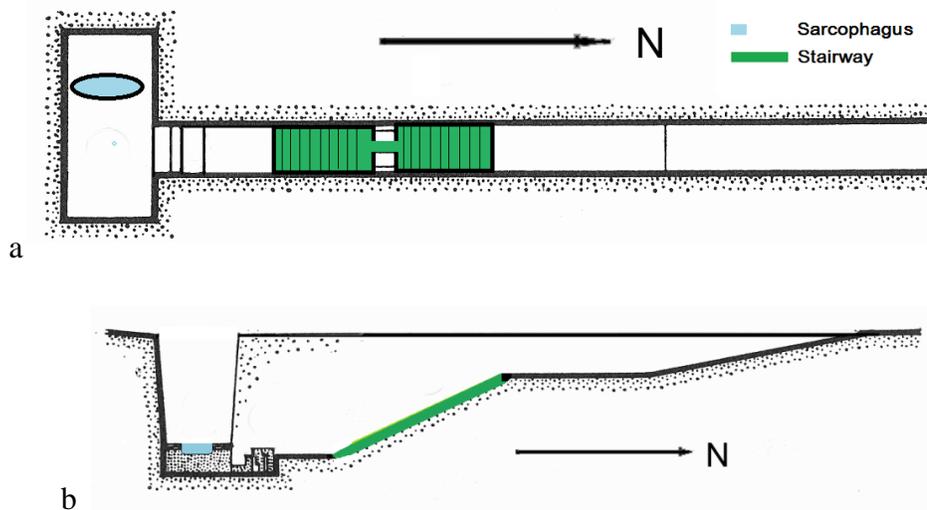


fig 10

⁹ N.SWELIM, *Some Problems on the History of the Third Dynasty*, Alexandria 1983, 125-177.

THIRD DYNASTY'8' NORTH-WEST SAQQARA

A SACRED-HILLSIDE-MONUMENT

The monument raises questions because the building is definitely of the Third Dynasty while the corridors, chambers, shaft and a portcullis, were rock tunneled at one level. It is strange that they were worked on a slanting hillside above the main remains; and were subject to later additions.¹⁰

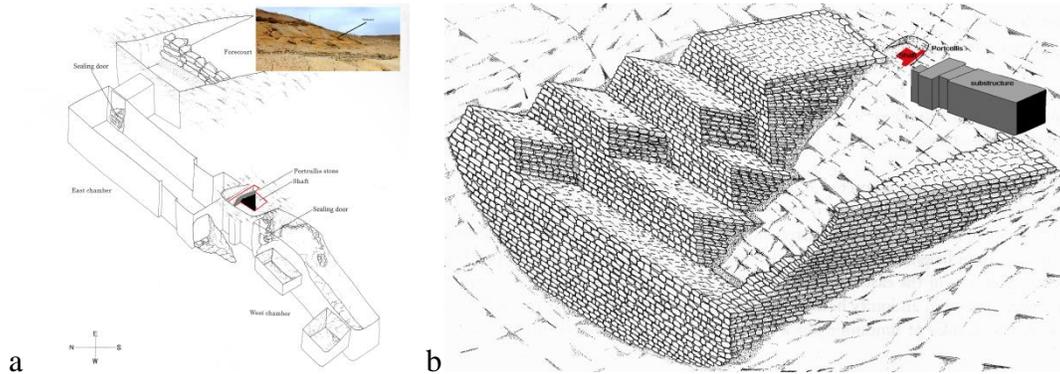


fig 11

REMARKS

1) SUBSTRUCTURES BEFORE AN ENTRANCE

The entrance of the Third Dynasty substructures were by descending ramps (open to the sky) which passed through the: superstructure building, cuts in the bedrock or dug in loose sand. Accretion layers were built on their 2 sides to prevent outer material from braking in. Upwards they were built slanting outwards to a height above the surface; at a distance depending on the descending angle; and they were founded on the bedrock. At: (a) the Step Pyramid; (b) the South Tomb entrance, (c) the South Tomb shaft ; (d) a blind stairway to the tumulus of K1; and, (f) Sekhemkhet.

After the actual burial, these ramps were blocked by more accretion layers. (c) With stone at the South Tomb and (e) with mud bricks at K1. At mastabas K 1 and 2, the stairways started at the top. And at the unfinished pyramid at Zawyet el Aryan north; the entrance was rock cut, open to the sky. From outside the pyramid area, it descended as a ramp, a horizontal platform and finally a stairway to the burial chamber. It was to be blocked by 2 accretion layers on the sides; and in the centre by a wedge-like plug of masonry (g) and (h). This method can be seen at the South Tomb (c) and K1 (d). Such blockage was removed at (a), (b), (d), (f), and at (figs 5 b and 21 d).

¹⁰ S. YOSSIMURA ET AL, *A sacred hillside at northwest Saqqara: 2001 – 2003*, MDAIK 61, 2005, PP 361- 402.



fig 12

2) SUBSTRUCTURES BEYOND AN ENTRANCE

Beyond the stairways and shafts at the Temenos Area of the Step Pyramid Complex are 5 km of tunnels; a considerable part of them were not investigated. Geophysical discoveries of more tunnels have not been verified (fig 1). At all the monuments descending ramps were sloping between a gentle 13° and a steep 51° ; and parts of them had crossed layers of tafla where roofs collapsed (figs: 6 b, 7 b, 8 b, 9 e, 13 a).

i- CHAMBERS

Chambers of the Step Pyramid (a) and its South Tomb (fig 2 b); the Unfinished Pyramid at Zawyet el Aryan north (b); the Bent Pyramid, north chamber (c); and Djedefra (d), were at the bottom of deep shafts open to the sky; they would have been roofed by beams and rubble; or by corbelled roofs?

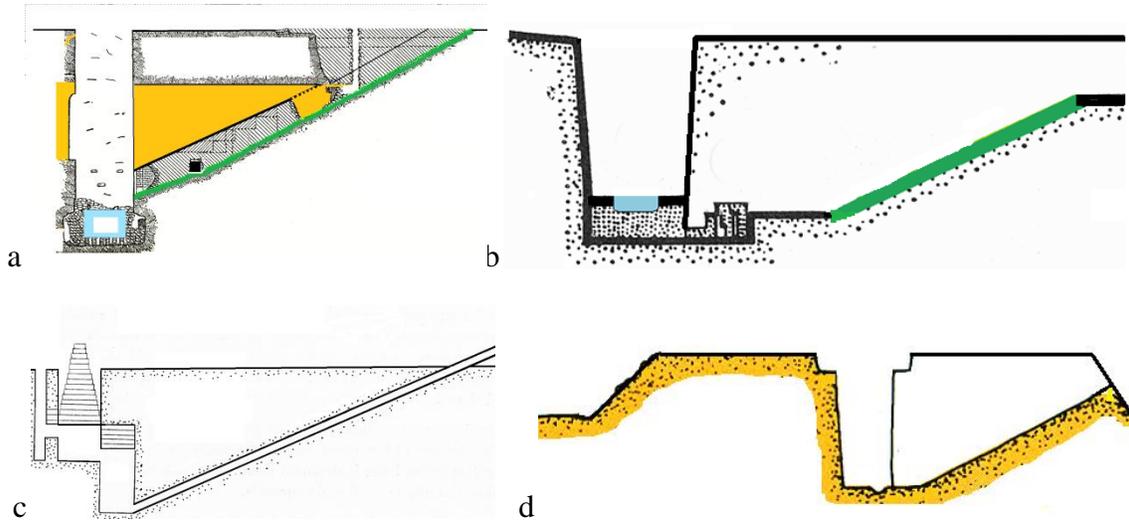


fig 13

Tunneled subterranean chambers at K1 and K2 (fig 5 b, and 6 b) Sekhemkhet (a); Zawyet el Aryan south (b); the Brick Pyramid (c); Khufu's lower chamber (d) and Menkaura (e) did not need roofs. Notice a similarity of the square shape of these chambers, especially the Layer and Brick pyramids.

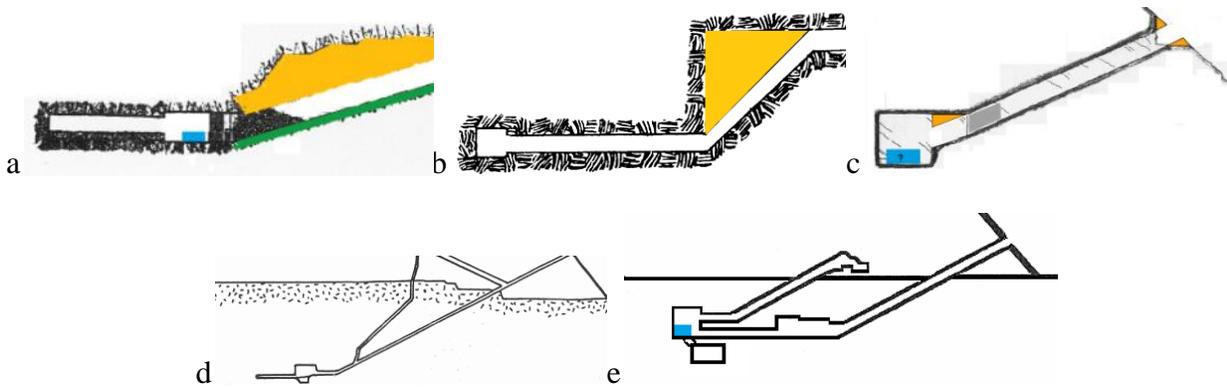
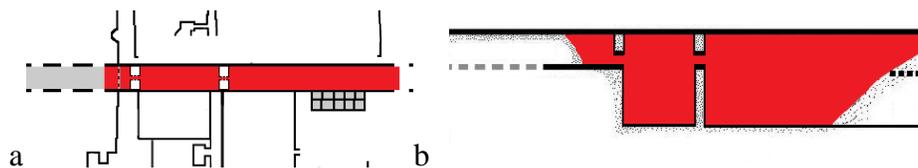


fig 14

The compartments of the Dry Moat show remains of rock roofs all along. It will be difficult to determine if they collapsed or were quarried. By the appearance of the masonry of the pyramid of Userkaf it looks as if it was quarried from the Dry Moat.



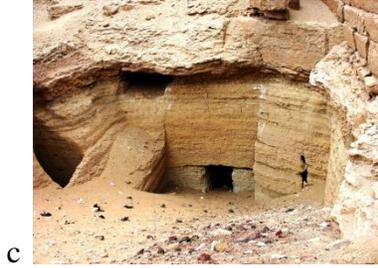


fig 15

ii- INDEPENDENT

Mastaba K2 (a) and the pyramid of Sekhemkhet (b) have an additional independent substructure. They do not appear in that relative position elsewhere! Nevertheless they may belong to the same concept of the independent shafts of Netjerykhet and the additional chambers at the pyramids of Dahshur and Giza.

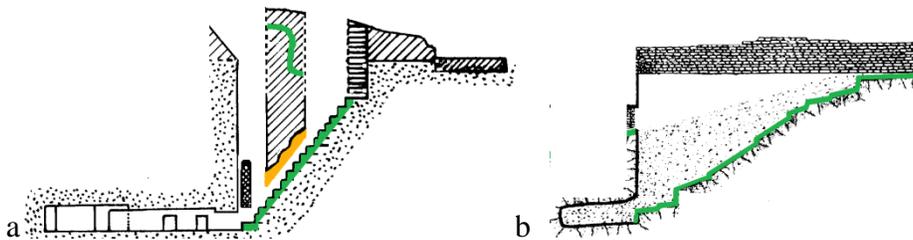


fig 16

iii- SARCOPHAGI

Royal sarcophagi appeared in 3 different forms before the traditional shape was conformed at Mastaba 17. A small granite chamber with a plug was assembled at the Step Pyramid (a) and South Tomb of Netjerykhet (fig 2 a, and b); an alabaster, monolithic rectangular, box with a sliding end panel was placed at Sekhemkhet (b); and an oval cavity was carved in a granite flooring megalith in the chamber of the Pyramid of Zawyet el Aryan north, its heavy oval lid was placed behind it (c). Narrow corridors at Zawyet el Aryan south led to a tunnel chamber without a sarcophagus. But a wide square corridor of 1.8x1.8 meters would allow transporting a sarcophagus at the Brick Pyramid. The remains may be there under the trash filling? It would be an interesting link between the box and the oval shape sarcophagus. The conventional shape had already appeared in wood and alabaster (a) before mastaba 17.

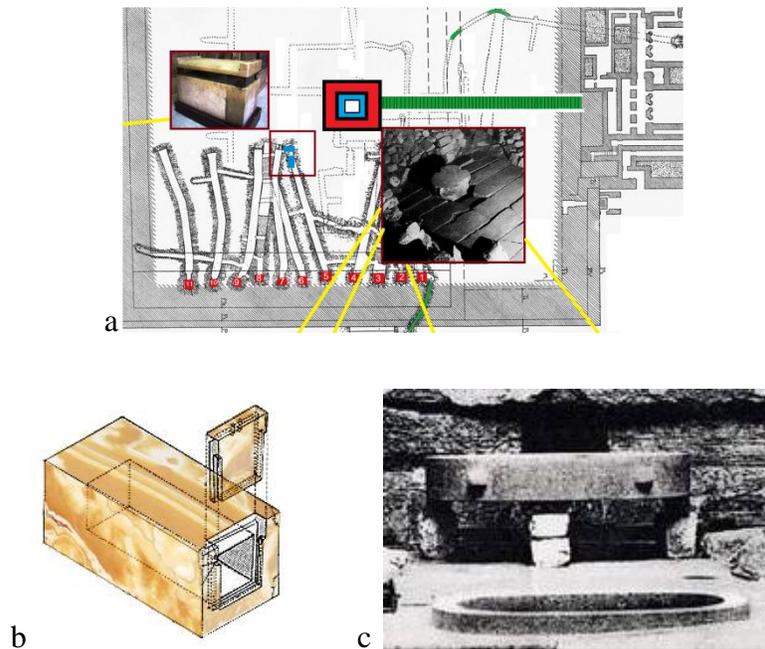


fig 17

3) OTHERS

i- GRANITE

Anorthosite gneiss erroneously referred to as granite is a hard stone quarried at Aswan. It was selected for: flooring at Umm el Qa^cab; assembling sarcophagi-chambers at Netjerykhet; flooring and containing a sarcophagus at Zawyet el Aryan north; and for the burial chamber of Khufu? This stone was found at other pyramid temples also.

ii- MISSING, HITHERTO

All 5 pyramids had no portcullis (except K1, K2 and the Hillside-Sacred-Monument); and hitherto, no boat pits. During the Third Dynasty, there are monuments, hitherto, without substructures: Gisir el Modir (a), El Dair¹¹ and 7 Minor Step Pyramids. At Seila however there were 2 large blocks emerging at the bottom of the robber's pit. They could be ruins of a destroyed roof (b)?

¹¹ N.SWELIM, *Some Problems on the History of the Third Dynasty*, Alexandria 1983, 36-39; *The Brick Pyramid at Abu Rawash, Number I* by Lepsius, Alexandria, 1987, 91-95.

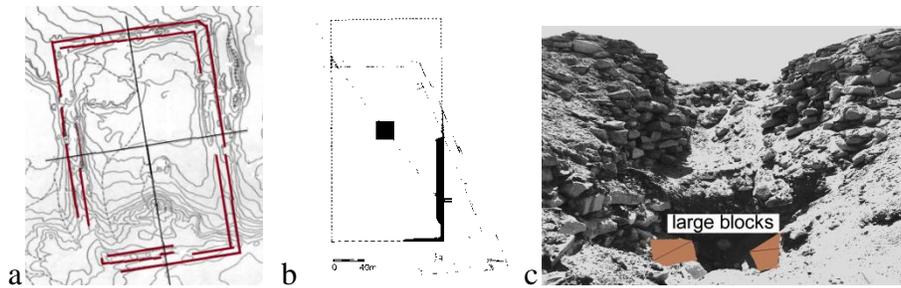


fig 18

4) THE INNER SOUTH CHANNEL

i- A STAIRWAY

A stairway, reported by Zaki Saad¹² would probably lead to a 4th level below the great compartment of the Middle Area of the Dry Moat (fig 21 e). There may also be a descending stairway at the accretion layers of the Western Area of the Dry Moat (fig 20 a).

ii- NICHES

Two horizontal rows of niches (a) and (b) for hitching Platform or roofing beams were found along a layer of tafla. 10 niches were above and 3 below the destroyed rock roof of the compartment. They are similar to niches at the South Tomb (c). But they may be for a religious purpose also?



fig 19

iii- ACCRETION LAYERS

Building during the Third Dynasty was by accretion layers at 10 pyramids, a hillside-sacred-monument, the walls of Gisir el Modir, the superstructure of Mastaba K2, and where narrowing open pits is needed before tunnels at: the Step Pyramid, South Tomb, K1, Sekhemkhet and Zawyet el Aryan south. I believe that they were going to be built at Zawyet el Aryan north also. In all cases, except supporting roofs, accretion layers were built slanting inwards as superstructures and outwards at open pits; except when supporting roofs of tafla. Remains of 2 accretion layers ran for a few meters along the rock wall, and continued sloping a few degrees

¹² N.SWELIM, The Dry Moat, the South Rock Wall of the Inner South Channel, E.CZERNY, et al, *Timelines. Studies in Honour of Manfred Bietak*, Leuven-Paris-Dudley 2006, 363-376.

downwards towards the west, (figs, 21 b and figs 20 a and b). They have similarities with walls supporting roofs, and narrowing corridors. Or accretion layers at the entrance ramp at Great Stairways of the step pyramid (c); South Tomb (d) and Sekhemkhet (e).

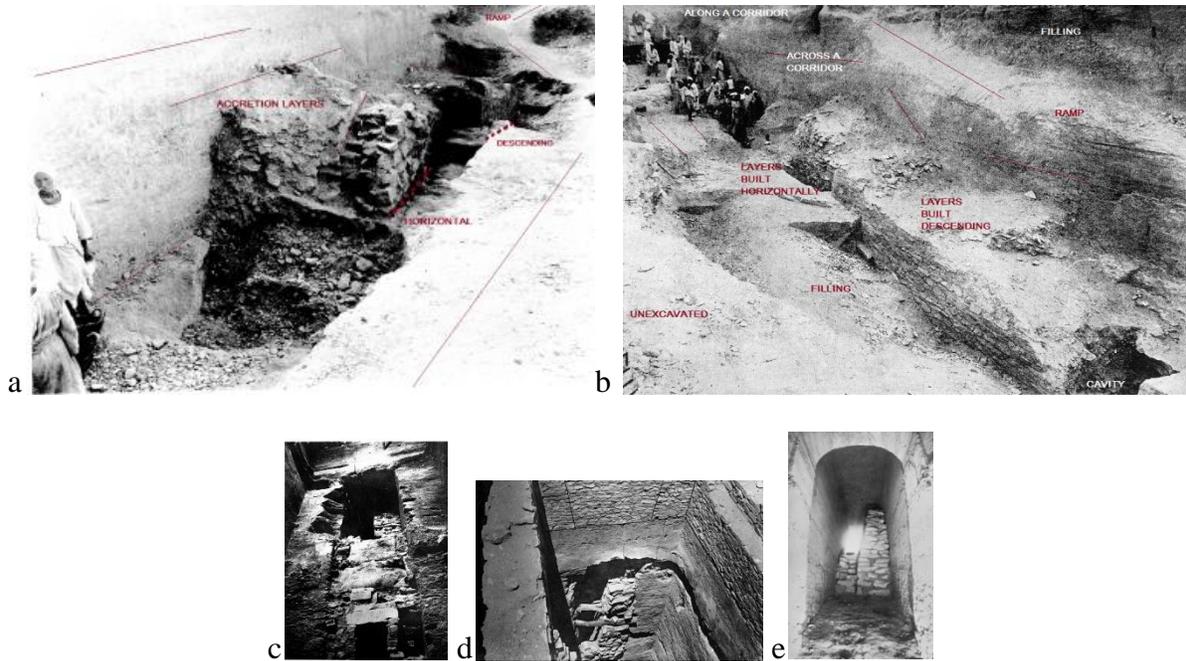
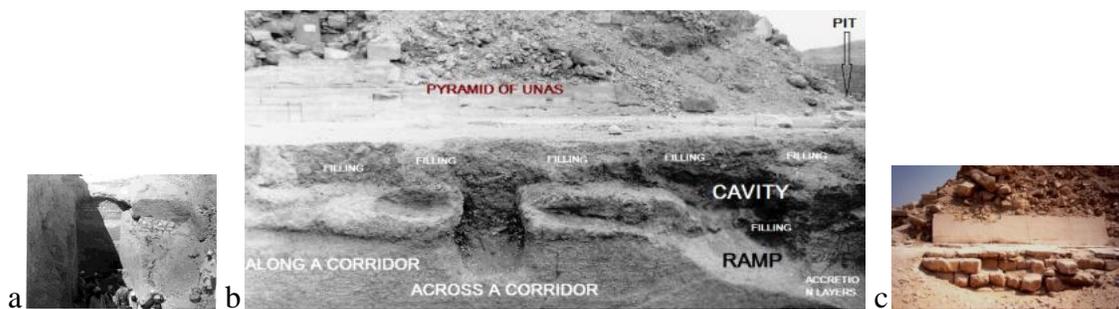


fig 20

vi- HYPOGEUM

The Western Compartment of the Dry Moat ends at the west side at a rock wall. Towards the top, under the rock roof, is a stone wall hiding an unexcavated hypogeum (a).

At the Western Area, beyond the compartment; the Dry Moat cuts along a ramp and crosses a corridor and a cavity (b). Very close is a pit, filled with large blocks, at the west side of the Pyramid of Unas (c). The tombs of Hetepsekhemwy-Raneb and Nynetjer to the east suggest that this is an unexcavated hypogeum belonging to the Second Dynasty (d).



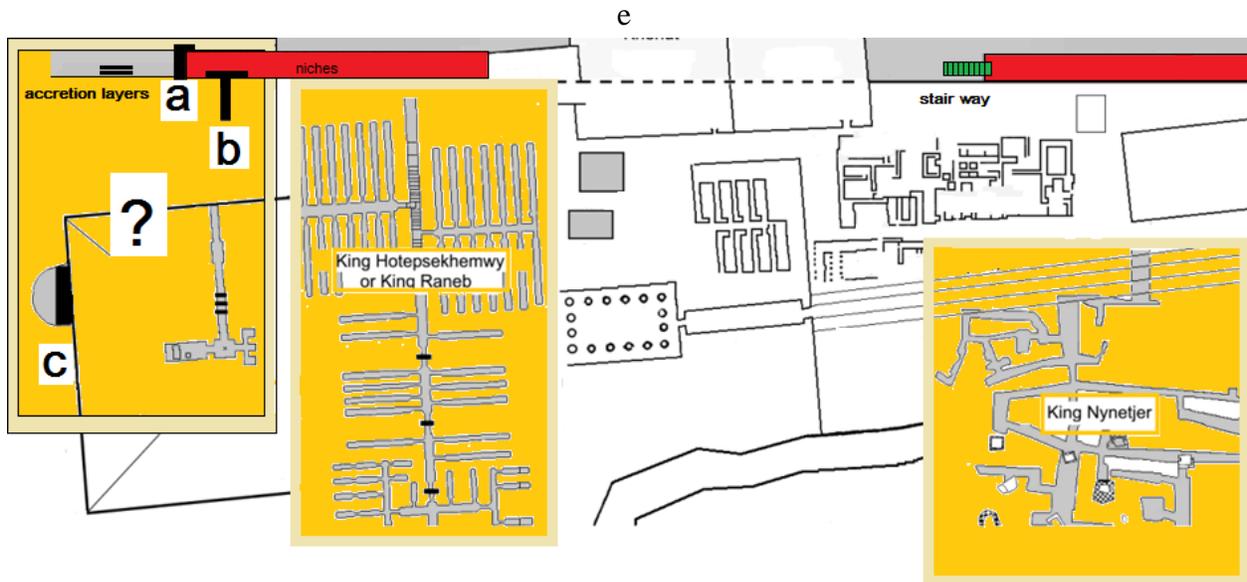


fig 21

vii- HYPOGEUM ?

The Eastern Compartment of the Dry Moat is covered with rubble at one end, it continues westwards cutting across two corridors on the north side and exposing a third one at south west corner (a). The rock roof of these corridors seems to be the same as the one at fig 21 (a), the galleries of Hetepsekhemwy- Raneb and Nynetjer. This raises my curiosity about a second dynasty necropolis, cut though by the Dry Moat and later demolished by Unas?

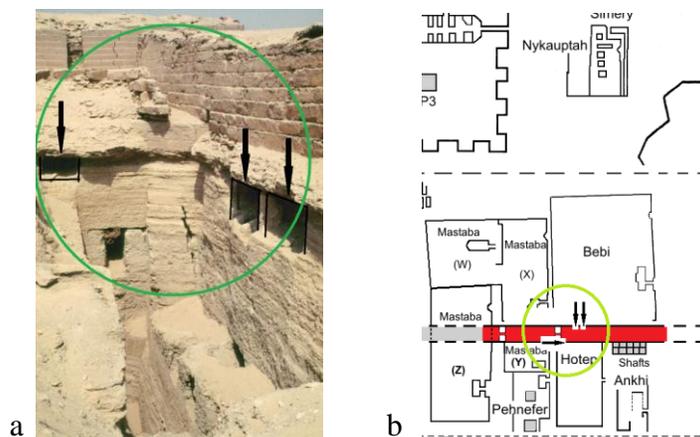


Fig 22

EPITOME

It was safe to penetrate the bed rock *vertically* for shafts, *horizontally* for tunnels, but was unsafe to penetrate for *inclined* tunnels and stairways through layers of tafla.

Some *burial chambers* were rock cut; others were at the bottom of shafts. The latter were roofed with wooden-beams, flat megaliths, corbelled stone, or gable megaliths, successively!

The burial-rock-cut-chamber of the “Brick Pyramid Lepsius 1” was the first *westerly disposed* plan which was repeated at all pyramids until Khufu. Its entrance, high up on the north side, was found at the following pyramids of Meidum and Dahshur.

The roof of the granite-burial-chamber at the “Unfinished Pyramid of Zawyet el Aryan north” may have been finished like the burial chambers of the Step Pyramid and Southern Tomb. The developing shape of the oval *sarcophagus design*, and the descending corridor, been prepared for an *accretion wedge blockage*, support dating this monument to the Third Dynasty.

What were the reasons for *the independent substructures* at Sekhemkhet and K2? *Portcullis* were found only at Bet Khallaf, and the Hillside, and not, at the 5 pyramids of this dynasty. There is also a total absence of *boat pits*. How can one define the *Sacred-Hillside-Monument*?

Concerning the chronology of the second dynasty; there are 9 names on the Saqqara king list and in the Manethonian tradition. There are 6 names on the Abydos king list and 6 names discovered in contemporary Serekhs. But there are only 4 tombs at Saqqara and Umm el Qa^cab. More royal tomes may exist at the Inner South Chanel of the Dry Moat where it had cut across and along earlier unidentified tunnels.

Constructing the Pyramid Complex of Unas cleared their superstructures of the Second Dynasty Necropolis. His causeway was constructed on a dike filling the Outer South Channel of the Dry Moat.