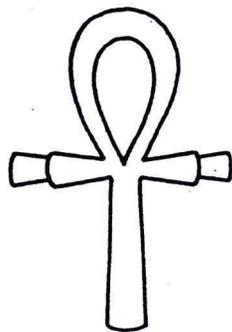


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Études sur
l'Ancien Empire
et
la nécropole de Saqqâra
dédiées à Jean-Philippe Lauer

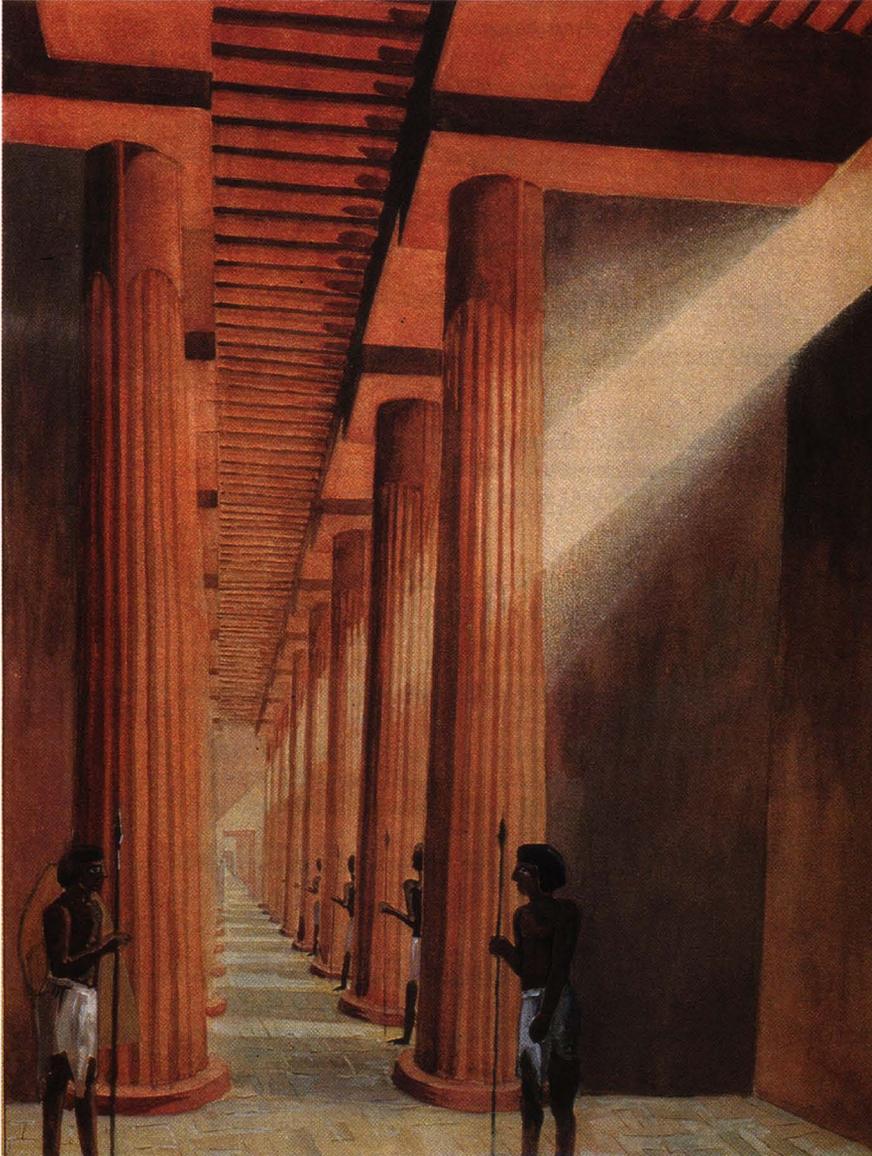
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Sommaire

Tome 1

| | |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sommaire..... | III-IV |
| Préface de Pierre HUNT, Ambassadeur de France..... | V-VI |
| Bibliographie de Jean-Philippe LAUER..... | IX-XVIII |
| ABOU-GHAZI Dia'..... | Objects in the Egyptian Museum from the Works of Jean-Philippe Lauer at Saqqâra..... 1-10 |
| ALTENMÜLLER Hartwig... .. | Der Grabherr des Alten Reiches in seinem Palast des Jenseits. Bemerkungen zur sog. Prunkscheintür des Alten Reiches..... 11-19 |
| ANDREU Guillemette..... | La fausse-porte de Nykarê, Cleveland Museum of Art 64.91..... 21-30 |
| ARNOLD Dieter..... | The Late Period Tombs of Hor-Khebit, Wennefer and Wereshnefer at Saqqâra..... 31-54 |
| AUFÈRE Sydney..... | Une nécropole ptolémaïque de taureaux Apis visitée en 1716 par Paul Lucas et Claude Sicard ? Au sujet d'un dessin rapporté par le voyageur suédois Henri Benzel (1689-1758) et envoyé à Bernard de Montfaucon..... 55-68 |
| BAUD Michel..... | Aux pieds de Djoser. Les mastabas entre fossé et enceinte de la partie nord du complexe funéraire..... 69-87 |
| BEAUX Nathalie..... | Le mastaba de Ti à Saqqâra. Architecture de la tombe et orientation des personnages figurés..... 89-98 |
| BERLANDINI Jocelyne..... | Contribution aux "Princes du Nouvel Empire à Memphis". Le prince Thoutmès, fils d'Amenhotep III. Le prince Senakhtenamon, fils de Ramsès II..... 99-112 |
| BICKEL Susanne..... | Héliopolis et le tribunal des dieux..... 113-122 |
| BRESCIANI Edda..... | L'Agathodémon à Saqqâra..... 123-127 |
| COUR-MARTY M.-A..... | Les poids inscrits de l'Ancien Empire..... 129-145 |
| DEWACHTER Michel..... | Les recueils d'autographes et l'histoire de l'égyptologie..... 147-153 |
| DOBREV Vassil..... | À propos d'une statue fragmentaire du roi Menkaourê trouvée à Abou Rawash..... 155-166 |
| EDWARDS I.E.S. †..... | An Exploration of the Pyramids of Dahshur and Gîza directed by Robert Wood in 1750..... 167-175 |
| FISCHER Henry G..... | Quelques particuliers enterrés à Saqqâra..... 177-189 |
| GIDDY Lisa..... | A Saqqâra Square: two and a half millenia in 30 x 30 metres..... 191-198 |
| GODRON Gérard..... | Les rois de la I ^{re} dynastie chez Manéthon..... 199-211 |
| GRANDET Pierre..... | Une stèle d'Amenmosé, fils de Paouia..... 213-219 |
| GUILHOU Nadine..... | Les parties du corps humain dans la pyramide d'Ounas, lecture rituelle et valeur symbolique..... 221-231 |

| | | |
|-----------------------------------------|-------------------------------------------------------------------|---------|
| GUILHOU Nadine, MATHIEU Bernard..... | Cent dix ans d'étude des Textes des Pyramides. Bibliographie..... | 233-244 |
| HAWASS Zahy..... | The Discovery of the Harbors of Khufu and Khafre at Gîza..... | 245-256 |
| HELAL-GIRET Amal..... | Le lotus : renouvellement et projection vers l'avenir..... | 257-261 |

Tome 2

| | | |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| LABROUSSE Audran..... | Un bloc décoré du temple funéraire de la mère royale Néferhétepès... | 263-270 |
| LECLANT Jean, BERGER Catherine..... | Les textes de la pyramide de Téli. État des travaux..... | 271-277 |
| MARTIN Geoffrey T..... | “Covington’s Tomb” and Related Early Monuments at Gîza..... | 279-288 |
| MATHIEU Bernard..... | La fonction du sérdab dans la pyramide d'Ounas. L'architecture des appartements funéraires royaux à la lumière des Textes des Pyramides..... | 289-304 |
| MINAULT-GOUT Anne..... | Sur les vases jubilaires et leur diffusion..... | 305-314 |
| MORFIN Marguerite..... | Le pilier <i>ioun</i> et la lune..... | 315-325 |
| EL-NAGGAR Salah..... | Les voûtes à intrados à godrons..... | 327-339 |
| PANTALACCI Laure..... | De Memphis à Balat : les liens entre la Résidence et les gouverneurs de l'oasis à la VI ^e dynastie..... | 341-349 |
| PFIRSCH Luc..... | À propos du titre  attribué à Imhotep..... | 351-354 |
| PIERRE Isabelle..... | Les signes relatifs à l'homme dans les Textes des Pyramides. Quelques particularités et graphies inhabituelles, jeux graphiques et fautes d'orthographe..... | 355-362 |
| REBINGUET Murielle..... | Quelques réflexions sur les pyramidions de pyramides royales..... | 363-377 |
| SMITH Harry S..... | Uncharted Saqqâra: an Essay..... | 379-393 |
| SOUROUZIAN Hourig STADELMANN Rainer..... | La statue de Ny-ânkh-netjer, un nouveau document de la période archaïque à Saqqâra..... | 395-404 |
| SWELIM Nabil..... | The Pyramid Court and Temenos Wall of Khafre..... | 405-415 |
| VALLOGGIA Michel..... | La descenderie de la pyramide de Radjedef à Abu Rawash..... | 417-428 |
| VERCOUTTER Jean..... | Min / Ménès et le “barrage” de Memphis..... | 429-432 |
| VERNER Miroslav..... | Setting the Axis: an Ancient <i>Terminus Technicus</i> | 433-436 |
| VERNUS Pascal..... | Le vizir Ptahhotep et le balancier..... | 437-443 |
| WISSA Myriam..... | À propos du sarcophage de Sékhemkhet..... | 445-448 |
| WUTTMANN Michel..... | La restauration des parois des appartements funéraires de la pyramide de Pépy I ^{er} à Saqqâra..... | 449-460 |
| ZIEGLER Christiane..... | Sur quelques vases inscrits de l'Ancien Empire..... | 461-489 |
| ZIVIE-COCHE Christiane... | Un sarcophage tardif à Saqqâra..... | 491-494 |

The Discovery of the Harbors of Khufu and Khafre at Gîza *

Zahi HAWASS

Directeur général de Gîza et Saqqâra

Excavations in front of the Sphinx temple proved the existence of a harbor connected with the pyramid of Khafre at Gîza. Moreover, during the construction of an apartment buildings on the east side of Zaghloul Street a limestone basalt wall, 650 m. south of Pyramids Road in Nazlet el-Samman (where Zaghloul Street bends slightly northwest) was discovered. It is interpreted to be a part of the harbor of Khufu.

Previous Archaeological Research.

An archaeological survey undertaken by G. Goyon showed the existence of ports close to pyramids dating to the Old Kingdom.¹ East of the Senn el-Agouz at Gîza, Goyon found an outer casing of limestone built in steps which were badly affected by water. He assumed that this was connected with the harbor of Khufu,² thereby confirming earlier statements of scholars concerning harbors in front of the Old Kingdom valley temples.³ Recent excavations in front of the lower temple of Khafre revealed that a tunnel under ramps was built to preserve the water⁴. Goyon also investigated the area around the Old Kingdom pyramids and found that harbors could be located in front of those of Menkaure, Unas and Pepy II, but no archaeological evidence confirms this hypothesis.⁵

I. The Harbor of Khafre's Pyramid.

In 1980, our excavations in front of the Sphinx temple proved the existence of a harbor at the Gîza necropolis.⁶ At this time a small square (7 m. x 8 m.) was located in the bedrock. A vertical ledge running east to west was cut into the bedrock 21 m. east of the northeast corner of the Sphinx temple. This was 7 m. east of a crude unfinished tomb cut into the ledge and just beside a lamp box of the sound and light installation. When the loose sand and refuse was cleared of the surface, a layer of packed limestone and sand debris was exposed, containing the conical bases of crude redware jars, pots, and some sherds of burnished redware dated to the Old Kingdom.⁷ This deposit appears to be similar to one found during the excavations in the northeast corner of the Sphinx sanctuary; no further work was continued in this square.⁸

The other important square was surveyed 36 m. east of the Sphinx temple. The archaeological sequence of this area was noted, and two probes were cut down to the bedrock in the southwest and northeast corners of the square. The north east probe, located at a higher surface level, went down to about 9 m. of level 2 of the square. The elevation of the floor in the two probes was 6.57 to 6.60 m. After we finished the work on that square, the Institute of Underground Water (Ministry of Irrigation) began a core drilling 20 m. further to the east and slightly southwest of our square. A pit 1.5 m. x 1.6 m. was dug for anchoring the drill rig to a depth of 1.7 m. This went through loose gray sand (modern) to loose clean sand with scattered limestone fragments. A basket full of sherds was collected, many of which contained fragments of burnished red ware bowls quite possibly dated to the Old Kingdom. However, there were other pottery fragments that clearly belonged to Roman amphorae. Two large alabaster fragments as well were found in this pit.

The probes in the excavated square went through 2.29 m. to 3.4 m. of deposit to the levelled bedrock floor, and the core drill itself went through about 16 m. of deposit before hitting a solid surface. This must indicate that in the 20 m. between the square and the drill there is a subsurface drop-off to the bedrock which is at least 12.21 m. deep.⁹ It is desirable to know the limits of this drop-off to the north and south for the topography of the area, as it might indicate the edge of an Old Kingdom harbor or quay. Butzer has cited indirect evidence of cut-stone revetments, large piers, and extensive, artificial basins on the desert edge between Gîza and Abousir. He pointed out that a depth of the flood waters of less than 1.5 m. would have been too shallow for systematic navigation by loaded boats for the duration of the high Nile (about 6 weeks maximum).¹⁰

The cultural topography of the Sphinx complex reveals that this part of the plateau was quarried into a series of terraces. The drop-off in the bedrock indicated by the 1980 excavation and core drilling may reveal the edge of the lowest and easternmost terrace, a continuation of that upon which the Sphinx temple is founded. If this was formed early in the construction of the Gîza pyramids, it would have served as a main quay for a deep water harbor at the lowest point of the Moqqatam outcrop, where the bedrock strata being exploited meet the general level of the flood plain at a natural dip to the east south-east (about 6 degrees).

The core drilling was placed about 68 m. to the east of the Sphinx temple facade. About 320 m. to the south there is a large limestone wall known as "Heit el-Ghorab", the "Wall of the Crow".¹¹ It has been suggested that this wall was built about the same time as the Khafre's lower temple as a southern limit to the necropolis.¹² The wall runs an additional 147 m. east of the position of the core drill. In 1948 excavations under the wide gate built into this wall, were taken down to a depth of 5 m. below the bases of the monolithic slabs spanning the gate, at which point Nile mud wet with subsoil water was encountered.¹³ S. Hassan reported that test trenches along the south side of the wall exposed a pavement upon a bed of limestone rubble.¹⁴ It is still not clear whether this massive wall is founded on bedrock. In any case, its position suggests that a harbor in front of the Sphinx and lower temples turned into the area from some access to the east,

perhaps through a large canal. Thus Goyon's suggestion of a fairly large harbor fronting the lower temples of Menkaure, Khentkawes, and Khafre merits more investigation.¹⁵ At the same time, if the drop-off to the bedrock, indicated by the 1980 probes is the quay, then the waters did not advance so close to the temples as shown in his reconstruction. It is therefore possible that the sunken panel of bedrock, along the west side of the Khafre's lower temple, served as an arm of the harbor as Goyon also suggested.

At the 16 m. depth the core drill was on a hard surface which could not be penetrated. From this depth, the pounders, in the form of a metal I-beam, brought up a piece of red granite about 10 cm. broad. When the cylindrical sampler with a toothed end was turned on the bottom of the hole, it scraped a hard surface and brought up small chips and particles of red granite. They could be from granite blocks which fell over the edge of the quarry during the IVth dyn. construction or a result of later robberies of the Sphinx and the Khafre lower temple, since both structures were sheathed in granite.

It is possible that the harbor of the Giza necropolis began at the area of the drilling 60 m. east of the Sphinx, which renders Goyon's reconstruction of a port stretching before the lower temples of Khafre, Menkaure and Khenetkawes incorrect.¹⁶ The only support left for this theory is a quay which Fakhry mentions in front of the lower temple of Khafre.¹⁷ M. Lehner, on the other hand, reconstructed a harbor directly in front of the lower temple of Khufu, and until further archaeological work has been done, this remains the best possibility.¹⁸

Other harbors may have been built after the time of Khufu. Lehner located one in front of the Sphinx where our excavations found the drop-off. He based the hypothetical size of this harbor on the measurements of the Birket Habu at Malkata, which is 210 m. north to south and 350 m. east to west.¹⁹ His main objection to Goyon's reconstruction is that it brought the harbor into the area of Menkaure's pyramid city.²⁰

In conclusion, the area east of the Sphinx is the most likely location of the harbor. However, we do not know what happened during the time of the inundation when the water would have reached the lower temples.²¹ The steps that Goyon found by the lower temple of Khufu could have served to protect the temple from the waters of the Nile flood. If the water of the inundation reached the temple, this might have encouraged the ancient Egyptians to deliver the Tureh limestone and Aswan granite during the flood period only.

Goyon reconstructed a canal in the western desert which would have served the lower temples²² and named this the "Canal of Memphis". It would have run parallel to the Nile and connected all the pyramid harbors.²³ The existence of a canal at Memphis dates back to the time of Narmer; it is mentioned by the Arab writers and existed until Napoleon's expedition to Egypt. This canal served the Pyramid complexes from Hawara in the south to Abu-Rawwash in the north,²⁴ and ran close to the harbor at Giza as reconstructed by Goyon.²⁵ The recent survey at Memphis brought to light an alternative against the theory of a "Grand Canal" running parallel to the Nile on the west and attaining about 2.5 km. in length.²⁶

The Nile in this case was close to the Pyramid sites, having later shifted to its current location only gradually.²⁷ I believe that it was not necessary for the ancient Egyptians to cut this Grand Canal on the west if the Nile was closer to the pyramid sites in antiquity. Therefore, the ancient Egyptians could have cut a canal from the nearby river to connect it with the harbor discovered at Gîza.

II. The Discovery of the Harbor of Khufu's Pyramid.

A wall was found under the foundation of some new buildings, the owner having destroyed about 25 m. of its length. When the Inspectorate of Antiquities at Gîza found out about this in December 1993, the work of the Arab Investment Company for Housing was stopped.²⁸ The wall was found in Saad Zaghoul Street (Nazlet el-Sessi). The Antiquities Department at Gîza started excavations in the west of the wall but at the same time permitted the company to continue their work. Excavations continued until January 1994, uncovering more portions of the wall but ground water and lack of systematic research did not reveal any definitive information. In February 1994, when I was in charge of the Gîza monuments, I wrote a report (May 1994) and stated the following:

1. The wall is located about 450 m. to the east of Bahr el-Lebini and about 550 m. from the recent location of the causeway [fig. 1].
2. The wall is a very important discovery; therefore, further construction work by the company should be stopped because this wall is a part of the architectural component of the pyramid complex of Khufu.
3. The Supreme Council of Antiquities has to add this property to Antiquities land and to require all further work of the company to be suspended.
4. A new law should be issued requiring that the area between the hotel of Siag and the Pyramid site should be under the full control of the Antiquities Department. Therefore, any person who has a house and want to rebuilt it must get permission from the Inspectorate of Antiquities at Gîza.

The Permanent Committee agreed to all of these points and work was therefore suspended and excavation continued. Later, the owner of the company received permission to continue the project. In June 1994, I presented another report and requested that a High Committee should come to the site to decide about the situation and state again the importance of the site. The company continued the work and the Inspectorate of Antiquities reported to the police all of their activities undertaken without Antiquities permission. The General Secretary of the Supreme Council of Antiquities appointed a new High Committee and decided that a modern wall around the old one would be built in order to save the area and permit the company to continue the construction as well.

Description of the Wall.

The surface is about 17.01 to 17.02 m. above sea level. The wall is about 2 m. below surface, at about 15.00 m. above sea level. This general level corresponds with the level of the basalt blocks that probably mark the location of the Khufu lower temple and with the level of the bottom of the large stone wall, the Heit el-Ghurab, south of the Sphinx. The wall has been uncovered for the entire width of the modern lot that is

about 65 m in a north-south direction [fig. 1].²⁹ Toward the south side of the lot the modern builders scooped out the limestone and basalt blocks that compose the wall and piled them nearby before any antiquities inspector had been notified of the discovery. The builders apparently removed the entire extant height of the wall when they removed it to pour in a cement foundation. It appears that only the base or foundation is present of a wall that was either built or was intended to be constructed. While the wall is generally straight and linear, neither side was finished with a straight edge or flat face. Both the lower limestone blocks and the basalt slabs lying upon them have very irregular edges. In the pile of blocks that the modern builders took away we can see that the stones are not squared. Indeed, they have the appearance of boulders, being roughly squared. They vary in size but some are more than a meter thick and up to two meters in length [figs. 4-7]. The basalt blocks are found in irregular trapezoidal shapes. The faces are probably the natural cleavage planes by which the ancient workmen separated the basalt blocks from the quarry. These blocks also vary in size but they can be as thick as 60 m. and more than a meter in length.

The basalt blocks form an irregular lining along either side of the limestone foundation. Toward the north end of the west side this lining is missing, thereby revealing that the west side of the lower limestone foundation is very irregular. The space between the basalt linings seems to have been packed with limestone chips (this fill has already been removed by modern excavators). At the far north end of the east side there is a second course of basalt slabs that may retain a trace of an original straight edge and outer face. The latter shows a slight batter or incline. In summary, the remains are probably the foundation of a wall that may have been built up higher with inclined sides formed with a casing of basalt or limestone and having a core of packed limestone chips. Pending further surveys, we can obtain a rough orientation of the wall by measuring the distances to the back corners of the modern lot and using these measurements to plot the position of the wall in the 1:5000 maps of the area. The east side of the north end is close to 32 m. from the northeast corner of the lot and the east side of the south end is about 56.60 m. from the southeast corner of the lot. Hence, the wall is oriented slightly more than 19 degrees west of true north. It is interesting to note that this angle is close or roughly parallel to Zaghoul Street, which follows an old drainage ditch or canal called Zerayet Zaghoul on the 1:5000 map, and to the north-south part of the old canal farther east called Collecteur el-Sissi. Could these have been part of ancient stream channels built for the flood recession itself?

The wall is also located east of a subtle yet wide depression that extends from the location where the basalt blocks were discovered beside the Mansoureyah canal. These slabs are thought to be part of the Khufu lower temple. This broad low area is defined by a contour line 18 m. above sea level, curving westward just in front of the hypothesized Khufu lower temple location³⁰. The area thus defined extends 325 m. east-west and 550 m. north-south [see fig. 1 where the location of the lower temple and the discovered wall is indicated]. We should note that the floor within this area is 17.8 m. to 17.9 m. above sea level — higher than the valley floor where the wall is found. The drop of 60 m. to 70 m. corresponds to Zaghoul Street. But the area in question could

be a residual depression from a harbor excavated out of land that was already low desert in dyn. IV. The hypothetical harbor might have filled with drift sand, while leaving a telltale slight depression, more inclined than the flood plain just to the east where the wall is founded. While certainly not a breakwater wall, this ancient construction could have served to delimit the Khufu harbor on the east. It should be noted that the wall is about 450 m. west of the Lebeini channel which has been thought to be a vestige of an Old Nile channel. The area between the wall and the lower temple location could have included both a harbor and a secondary Nile channel. Otherwise, it could have served as a stream-discharge channel that remained filled with water longer than the general flood plain when the annual inundation receded.

On July 14, 1992, just before the discovery of the wall, two rows of basalt blocks were found through the installation of a sewage system for the nearby villages [figs. 2-3].³¹ The removal of them revealed at least one layer of limestone blocks underneath on which the basalt rested. As water completely flooded the trench, it was impossible to locate the full depth or extent of lower limestone masonry. However, it was clear that the underlying limestone was an artificial feature, constructed of blocks introduced into the area and not part of a bedrock outcrop. Whitish grey sand was also present below the basalt blocks occurring in streaks in the grey clay beyond the basalt blocks; no pottery was found in the area.

The space between the two parallel rows of basalt blocks contained darker grey clay and limestone flakes and chips; some few basalt chips and flakes were also present. Identical chippings were found adhering to the undersides of the basalt blocks when they were removed. The core of the basalt is of a dark charcoal grey-black color with greenish grey-black surfaces. Natural fissures have caused surface deterioration and a "cobbled" effect can thus be noticed. This type of basalt is similar to blocks found in the area of the lower temple of Khufu. On the undersides of the basalt blocks were many limestone chips of tiny to medium size, basalt chips and also some rare brown quartzite ones. Figure 2 shows the location of the blocks, the lower temple, and the wall. Together, they suggest that the harbor existed in antiquity in front of the lower temple of Khufu. The measurements of the recently discovered segment of the ancient wall can be listed since they indicate its exact location [figs. 1-2].

I: 490 m. east of the location of the lower temple of Khufu.

II: 930 m. east of the upper edge of the Giza plateau.

III: 1,270 m. east of the east side of Khufu Pyramid.

IV: 110 m. east of Zaghoul Street.

V: 450 m. west of the Lebeini canal.

VI: 270 m. west of the old canal, the Collecteur el-Sissi.

VII: 400 m. north of Nazlet el-Sissi.

VIII: 650 m. south of the Pyramid Road.

The wall could also have been part of a city wall, defining the settlement associated with the Khufu pyramid. According to our work in the area in 1992, portions of what might be the same wall were exposed in trenches associated with the AMBRIC sewage

project and the Cheops pumping station (along Amirah Fadya Street). If this part of the wall runs east-west instead of north-south, it lends more weight to the possibility that it was a city enclosure wall. It therefore could have defined the conglomeration of settlements on the higher ground that spreads out like two wings north and south of the end of the Khufu causeway embankment. The segment of the wall so far exposed is roughly perpendicular to the embankment of the Khufu causeway that projects from the Senn el-Agouz escarpment. It is not, however, perpendicular to the trajectory of the causeway as reconstructed from masonry remains of the causeway itself exposed by the AMBRIC trenches.

If the ancient wall does maintain an orientation about 19 degrees west of true north for another 400 m to the south, it leads right to the higher ground of Nazlet el-Sissi, the focus of another conglomeration of ancient settlements (here, we might note that this direction is roughly perpendicular to Amirah Fadya Street.). The modern street might have followed the north side of a second large low area again defined by the 18 m. above sea level contour line. This depression is rectangular in shape, extending 200 m. between Amirah Fadya Street and an old canal that is the part of the Collecteur el-Sissi that runs roughly east-west (strictly, east-northeast and west-south west). Lehner hypothesized that this canal and another old drainage channel, the Collecteur Nazlet el-Batran, located farther south, could be vestiges of canals that fed the harbors of Khafre and Menkaure, or else the general delivery area at the low southeast corner of the Giza plateau when the Khufu pyramid was under construction.³²

The second low area, which extends 400 m. from the Nazlet el-Sissi mound on the east to the modern Mansouriyah canal, is oriented to the general direction of the Sphinx and Khafre valley temples. However, the stratigraphy revealed by the AMBRIC trenches and drilling may refute the suggestion that the depression is what only remains of the harbor of Khafre's pyramid. This generalized low area, in any case, may separate the two conglomerations of settlement remains to the north from that in the area of Nazlet el-Batran to the south. The archaeological features and description of our work in the area of the Sphinx square and the discovery of the ancient wall at Nazlet el-Sessi may indicate that there was a harbor for each Pyramid [fig. 2]. The computer reconstruction of this wall showing the surface terrain model might also suggest that this wall is part of the harbor. Finally, its location at the lower temple on the west and to the east of the Lebeini canal seems to indicate a harbor wall rather than a temenos for a city.

* Jean-Philippe Lauer is one of the most important architects and archaeologists in our time. He has dedicated all of his life to Saqqâra and the restoration of the Step Pyramid complex. Once an Egyptian friend of mine said if he believed in reincarnation, he would see Lauer as Imhotep. Dr. Lauer is loved by almost everyone in Egypt. We hoped to build a museum for the Step Pyramid model, but there was objection to build a new structure near Djoser's pyramid. A committee chose another site at the entrance of Saqqâra. I hope to see this building finished in Dr. Lauer's lifetime. It is to Jean-Philippe Lauer that I dedicate this article.

1. G. GOYON, "Les Ports des pyramides et le Grand Canal de Memphis", *RdE* 23, 1971, 137-153.
2. *Ibid.*; see also W. SCHENKEL, "Hafen", *LÄ* II, 926-928.

3. A. FAKHRY, *The Pyramids*, 132; V. MARAGIOGLIO, C. RINALDI, *L'Architettura delle piramidi menfite V*, Turin, Rapallo, 1966. On p. 88 the latter two scholars mention that there was a platform connected with a north and south canal against Khafre's lower temple.
4. Publication of the work is not yet finished; see A. FAKHRY, *The Pyramids*, 132; G. GOYON, "Ports des pyramides", 141, fig. I.
5. G. GOYON, *op. cit.*, 143-145, figs. 3-5, and his *Secret des bâtisseurs*, 27, 139, fig. 2, 42-43.
6. See Z. HAWASS, M. LEHNER, *Excavations North-East of the Sphinx* (forthcoming).
7. G.A. REISNER, W.S. SMITH, *A History of the Giza Necropolis, II: The Tomb of Hetepheres, Mother of Cheops*, Cambridge, Mass., 1955, 70, fig. 85: Reisner's type A-IV.
8. Z. HAWASS and M. LEHNER, *Excavations*.
9. Z. HAWASS, *The Funerary Establishments of Khufu, Khafra and Menkaura During the Old Kingdom*. PhD. Diss., Univ. of Pennsylvania, Univ. Microfilms, Ann Arbor, 1987, part I, 406-409, plan 23: the total depth of the drill hole, 16 m., minus the depth of deposit from the surface to the level of the bedrock terrace as found in the excavated square.
10. K.W. BUTZER, *Early Hydraulic Civilization in Egypt*. Chicago, 1976, 45-46.
11. Z. HAWASS, "The Workmen's Community at Giza", in *Haus und Palast* (DAIK), 1992, 59.
12. R. STADELMAN, "La Ville de pyramide à l'Ancien Empire", *RdE* 33, 1981, 67-77.
13. D.R. ROSTEM, "Bridges in Ancient Egypt, with a Report on a Newly Discovered Bridge from the Old Kingdom, Giza", *ASAE* XLVIII, 1940, 167-177.
14. S. HASSAN, *Excavations at Giza II*, 42.
15. G. GOYON, *op. cit.*, 137-153; *id.*, *Le Secret des bâtisseurs*, 26, fig. 2, 136, fig. 42; 137 and 139, fig. 43.
16. *Ibid.*
17. A. FAKHRY, *The Pyramids*, 132.
18. M. LEHNER, "The Development of Giza Necropolis: The Khufu Project", *MDAIK* 41, 1985, 125-128, C 14.
19. *Ibid.*, 133, C 18; for Malkata, see B. KEMP, D. O'CONNOR, "An Ancient Nile Harbor: University Museum Excavations at the Birket Habu", *International Journal of Nautical Archaeology* 3, 1974, 101-136 and 182. G. Goyon's reconstruction is larger; see his "Ports des pyramides", 145, fig. 5, with *Secret des bâtisseurs*, 135 and 139, figs. 42,3.
20. M. LEHNER, "The Khufu Project", 126, fig. 3 C, n° 18; 133, C 18.
21. L. GRINSELL, *Egyptian Pyramids*, Gloucester, 1947, 108.
22. G. GOYON, "Les Ports des pyramides...", 148.
23. *Ibid.*; cf. K. BUTZER, *Hydraulic Civilization*, 46.
24. G. GOYON, *op. cit.*, 148-153.
25. M. LEHNER, *op. cit.*, 138, C 29; G. GOYON, *Le Secret des bâtisseurs*, 43, fig. 2.
26. H.S. SMITH, D.G. JEFFREY, "A Survey of Memphis, Egypt", *Antiquity* 60, 1986, 91, fig. 2.
27. *Ibid.*, 94; see also K. BUTZER, "Environment and Human Ecology in Egypt During Pre-dynastic and Early Dynastic Times", *BSGE* 32, 1959, 43-88.
28. I do not understand why the person who was responsible for Giza in Dec. 1993 did not begin any legal action against the company because according to the Antiquities Law 117 for 1983, they should be under penalty.
29. Dr. S. El-Naggar was involved in the architectural work of the wall and was assisted by architect Abdou El-Hamied Kotb, Dir. of Engineering Dept. at Giza and Nevin El-Magrabi.
30. Z. HAWASS, "Programs of the Royal Funerary Complexes of the Fourth Dynasty", in *Ancient Egyptian Kingship*, eds. D. O'Connor and D. Silverman, E.J. Brill, 1995, 224-226.
31. The archaeological work was supervised by the Giza Inspectorate of Antiquities in cooperation with Michael Jones.
32. M. LEHNER, *op. cit.*, 109-140.

The Discovery of the Harbors of Khufu and Khafre at Giza



Fig. 1. [Scale 1 : 10000]



Fig. 2. [Scale 1 : 10000]

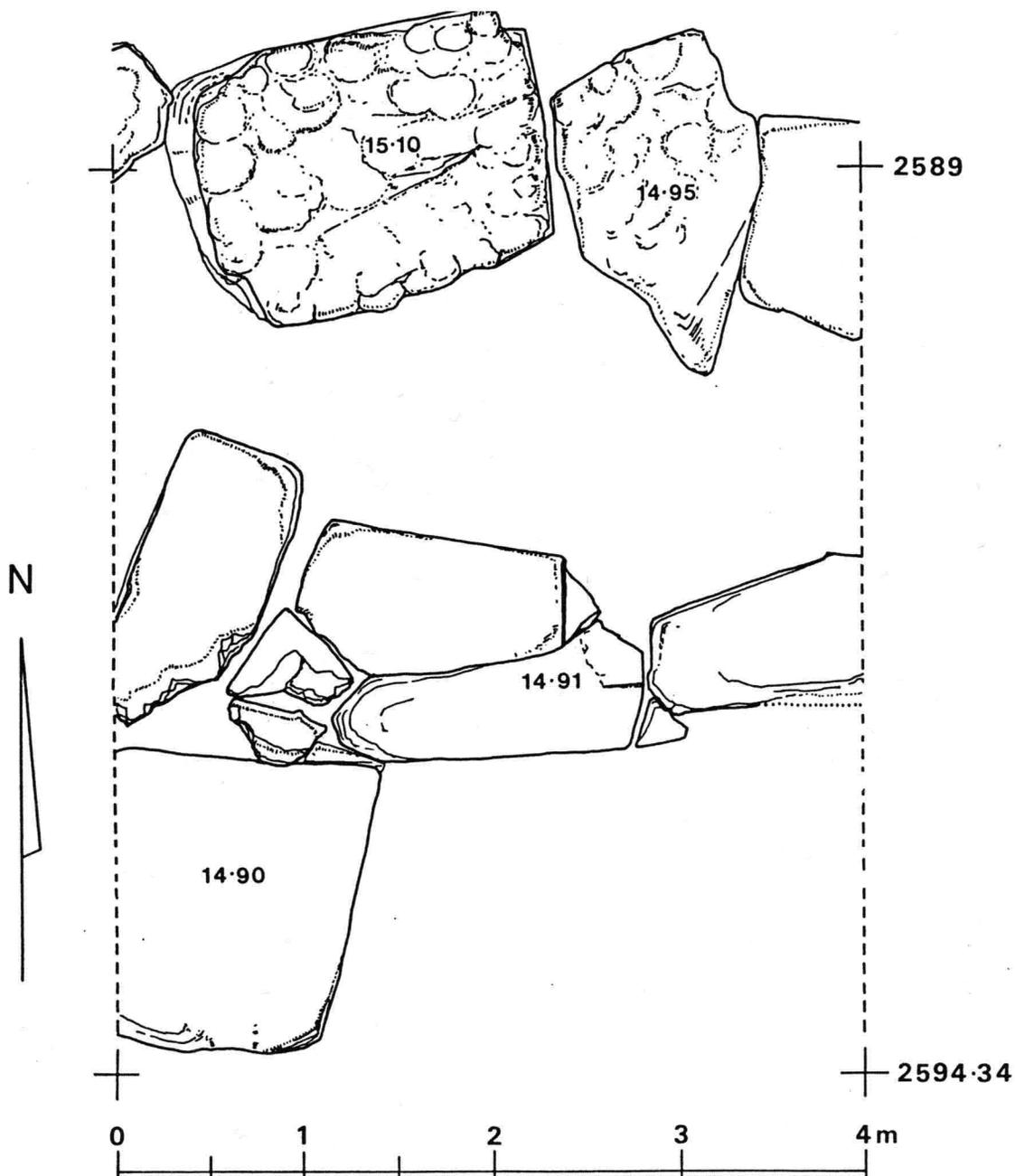


Fig. 3.



Figs. 4-7.