

## **The Planning and the Preparations of the Buildings in Ancient Egypt**

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### **Abstract**

In Ancient Egypt many things had to be done before the workers start building any construction. Plans or models of the proposed building had to be submitted to the king himself or by deputy, put the limits of the building, conducting the foundation ceremonies, and made offering to the god to whom the building was dedicated. Also, the architect, after preparing the plans, had to organize a constant and sufficient supply of stone from the quarries, and after the preliminary formalities were over accurately set out the lines of the proposed walls.

**Key words:** Plans, planning Maps, surveying, Plans of the temples, the tomb of Ramsses IV, Turin papyrus, Plan of the tomb of Ramsses IX at Thebes, Cairo Ostracon 25269, Surveying in Ancient Egypt, Stretching the cord.

### **Introduction**

Many details were known about the preparations before building in Ancient Egypt, like the well-preserved actual Plans and models; temple sculptures, the foundation ceremonies, and tomb- scenes give glimpses of the ancient methods of measuring land. Many palace archives were found containing plans of temples in good cases, for instance; an inscription of the temple plan the crypts at Dendara was found, in the palace of King Pepi. A restoration dating back to King Khufu reign.

Plans of tombs and estates are known, often showing the doorways, pylons, alters, etc... One of the most interesting dimensioned plan-elevations is that of the tomb of Ramsses IV, on a papyrus preserved in Turin, Fig. (1), fully discussed by Howard Carter and Alan Gardiner.

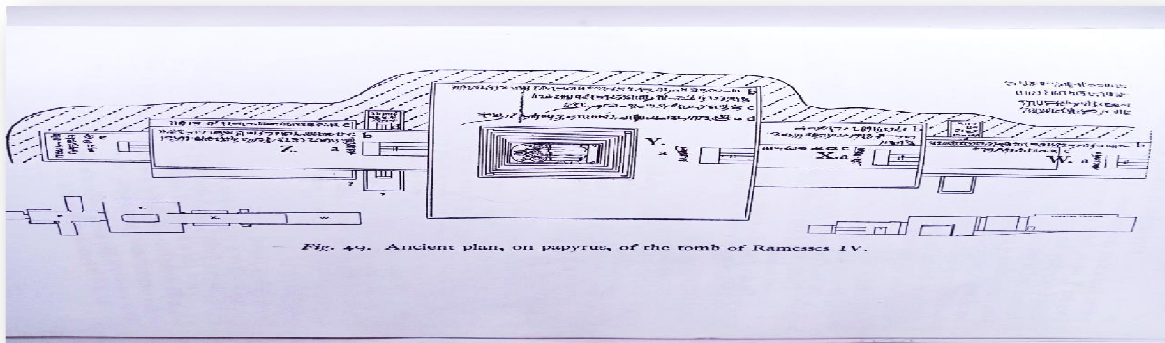


Fig. (1) Ancient Plan, on Papyrus of the tomb of Ramsses IV.  
After, Clarke, S., Engelbach, R., Ancient Egyptian construction and Architecture,  
New york, 1990, fig.49, pp. 49.

## **1. Mapmaking in Ancient Egypt as evidence of a good planning**

Plans and maps in Ancient Egypt<sup>1</sup> differed from nowadays in their subjects, Orientations and symbols. The difference in the orientation is represented in: today the north exists at the top of any map unlike in Ancient Egypt. Ancient Egyptian maps appeared since the Early Old kingdom, but unfortunately there were no good patterns of maps dating back to the predynastic and the early dynastic periods except for the palette of Narmer, showing a walled city, of course it didn't represent a map but a geographical site<sup>2</sup>.

Another Example of a wooden coffin of Sepi from the twelfth dynasty representing a map of the netherworld see fig (2). Another example dating back to the 3<sup>rd</sup> dynasty, a sketch of a vaulted roof, found in Saqqara on a pottery (displayed now in The Egyptian Museum)<sup>3</sup>. Another drawing of a garden, representing an architectural plan from the temple of Montuhotep II of the eleventh dynasty, exhibited now in the Metropolitan Museum of Fine Arts.



Fig. (2). Map of the Netherworld, showing the book of the two ways in the coffin of Sepi.

After, Maps and Mapmaking in Ancient Egypt, p.2, fig 2.

## **2. Planning of the residential areas and Reasons for Establishing New Settlements**

There are several reasons for erecting a new settlement in Ancient Egypt as follows: probably for security and economic reason such as Buhen<sup>4</sup> “The southern fortress town”, political as Akhetaton, or for Administrative and cultic purposes as “Lahun City”. Ancient Egyptians used to put some considerations before building their proximity of the water sources.

<sup>1</sup>Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*, New York, 1990, p. 48.

<sup>2</sup>Barnard, H., *Maps and mapmaking in Ancient Egypt*, Los Angeles, 2008, p. 1-2

<sup>3</sup>See, Arnold, D., *Building in Egypt, Pharaonic Stone Masonry*, New York, 1991; Edwards, I. E. S. *Pyramids of Egypt.*, Penguin Books, Harmondsworth, 1993.

<sup>4</sup><http://www.reshafim.org.il/ad/egypt/building/townplanning.htm>

They also used to keep few areas for important ways and roads. The Planned cities<sup>1</sup> like Akhetaton were group of houses<sup>2</sup>, court and paths.

Concerning the Plot owners, they were restricted that they couldn't do what they want, they should put into their considerations the rights of their neighbors to reach a joint point with each other. This was a contract between two persons respecting the Neighbor rights. At the end of the contract, they mentioned: *"If I do not act according to what has been said above, then I shall pay you 5 pieces of silver, that is 25 stater... If you hinder my building, then I will act according to what has been said above without leaving a lightshaft - without punishments see fig (3).*

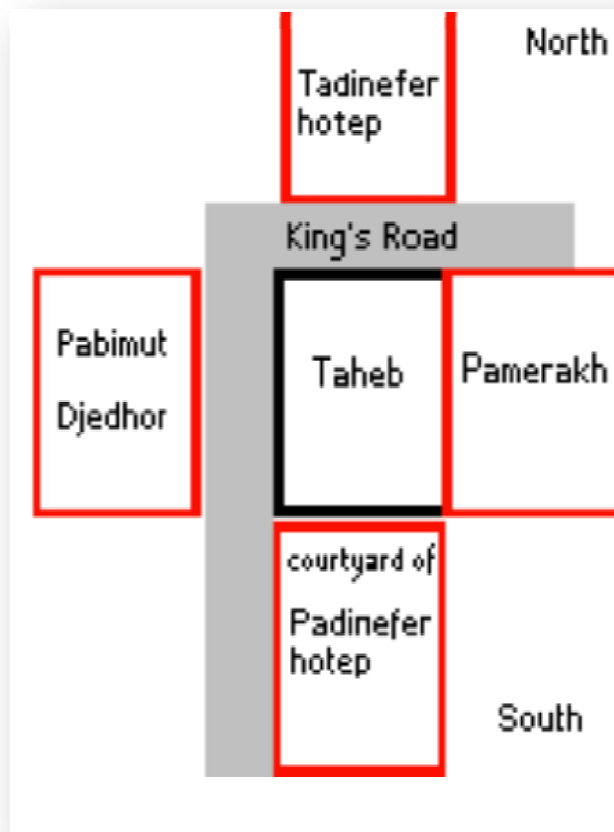


Fig (3) A Contract between Taheb, daughter of Padineferhotep, and Pamerakh, son of Djehutiirdis.

After, Dollinger, A., Town Planning in Ancient Egypt, p. 4, Fig. 5.

The Ancient Egyptians wanted to live above the ground level but they had limited options to add more storeys. The proposed site of the building should be above The Nile flood level and near the Water source, so they were obliged to live in such crowded areas.

<sup>1</sup>Dollinger, A., Town Planning in Ancient Egypt, p. 4.

<sup>2</sup>for more details about plans of houses in Ancient Egypt see: Azad, m. m., "A Case Studies of Ancient Egyptian Architecture" in: *International Journal of Engineering and Applied Sciences (IJEAS)*, pp. 38-9.

### **3. Principles of Temples Planning in Ancient Egypt**

Unlike the residential districts in Ancient Egypt, temples sites were more planned. They were planned symmetrically. This could be seen in the walls surrounding them. The Avenues occupied a wide area, for processions. Rarely paved streets could exist in Ancient Egypt unlike the temples. The enclosure wall of the temple played a great role as at El- kab; the temple was located at the town Center. Its ramparts served as forts against enemies.


### **4. Turin plan of A royal tomb of Ramesses IV**

Richard Lepsius<sup>1</sup> since fifty years discovered royal tomb at Thebes with its plan, displayed now in Turin Museum. Some tombs at Biban El- Muluk of the Nineteenth and Twenties dynasties and their plans were known and published during the Expedition of Napoleon in Egypt. Mariette made another study of this papyrus with all its related problems. Once again Lepsius<sup>2</sup> studied it after seventeen years, finally by Howard Carter. It has two sided, the recto and the verso.

#### **4.1. The First Side of Turin Plan (Recto)**

Papyrus of Turin<sup>3</sup> measures about 24.5 in its height and 86cm in its length. The plan is characterized by being of a ground plan, its doors are on a height on the ground line. In this papyrus the doors thickness couldn't be seen. The description of all the tomb parts was written in Hieratic.

#### **4.2. The Letter W in the Plan (The 4<sup>th</sup> Corridor)**

The door of the tomb<sup>4</sup> was marked by letters W, a,  *smn sb3.f*, meaning "its door is fastened". This could be applied to the four double doors W, X, Y and Z but there is a difference in the spelling in (z and a) unlike the doors z,d and z,e which are single here. If the papyrus was a report copy during the tomb finishing or a report on the tomb status after the final stage, the word *smn* could be translated as "made fast" or affixed, meaning bolted<sup>5</sup>. Among the opinions "*smn .tw*", the passive was also expected but the word here is intransitive<sup>6</sup>.

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<sup>1</sup>Carter, H., Gardiner, A. H., "The Tomb of Ramesses IV and the Turin plan of a royal tomb", in: JEA, Vol.4, 1917, pp. 130-158, p. 130.

<sup>2</sup> for further details see: R. Lepsius, "Über die Masse in Felsengrabe Ramses IV", in: ZAS, Vol. XXII, 1884, pp. 1-5.

<sup>3</sup>Carter, H., Gardiner, A. H., The Tomb of Ramesses IV and the Turin plan of a royal tomb, p. 133. See also, Gardiner, A.H., *Theban Ostraca*, Oxford, 1913.

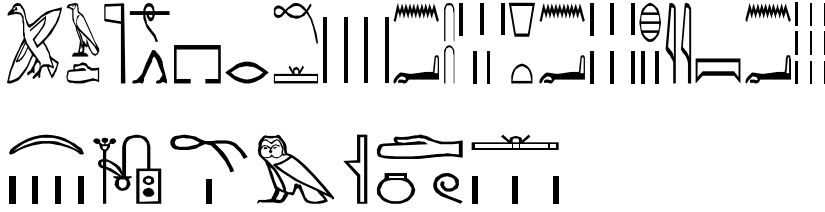
<sup>4</sup>Carter, H., Gardiner, A. H., "The Tomb of Ramesses IV and the Turin plan of a royal tomb", in: JEA, Vol.4, 1917, p. 130.

<sup>5</sup> for further details see: R. Lepsius, "Über die Masse in Felsengrabe Ramses IV", in: ZAS, Vol. XXII, 1884, pp. 1-5.

<sup>6</sup>Carter, H., Gardiner, A. H., The Tomb of Ramesses IV and the Turin plan of a royal tomb, p. 133. See also, Gardiner, A.H., *Theban Ostraca*, Oxford, 1913



W,b, along the entire length of the corridor above the door



"The fourth [corridor]<sup>1</sup>, 25 cubits; breadth, 6 cubits, 9 cubits: height and 4 palms; being drawn with outlines, graven with the chisel, filled with colors and completed". Sometimes in other passages on the verso and recto *p3 st3-ntṛ* as in Y,c this term came with the determinative and in other cases without<sup>2</sup>.

The term *st3 ntṛ* could be translated as "Corridor" as in the case of Cairo Ostrakon 25269<sup>3</sup> and in the graffiti of Cairo plan from Ramses 9<sup>th</sup> tomb<sup>4</sup>. Brugsch mentioned the meaning of *Sta* could be "a sloping construction" like a ramp or a passage", becoming compound by adding the word *ntṛ*.

The details of the dimensions<sup>5</sup> here are considered to be the best ever. For example; the three largest ones after the chamber *nṛme* are: the Length "*3w*" , "*w3ht*" the breadth (considered less measurement in the tomb axis), ; the height while the depth is mentioned here as . Noteworthy that the measurement tool which is used here in this tomb, is the "*mḥ*" "cubit", sometimes abbreviated as , equalling 7 palms or *šsp* (hand breadth) and 28 "digits" or "finger-breadths" *db* .

Four descriptions for the chamber status are mentioned. *sš* "drawn", *t3* "graven" and *mḥ* "filled". The scholars of the tombs at Thebes know well how the wall of the tombs were decorated. The outline draughtsman was responsible for the designing in red ink., then "*t3w md3t*" the wielder of the chisel or the sculpture (responsible for carving in the low reliefs and *sš* the painter, making the reliefs colored. Finally, the term *grḥ*, meaning the decoration tomb finishing<sup>6</sup>.

<sup>1</sup>Lepsius mentioned that the meaning of the word *sb3* is "a lock"; he translated *smn sb3.w* mistakenly as: "Einrichtung eines Verschlusses." in: R. Lepsius, *Über die Masse in Felsengrabe Ramses IV*, in: *ZAS*, Vol. XXII, 1884, p. 4

<sup>2</sup>Carter, H., Gardiner, A. H., *The Tomb of Ramesses IV and the Turin plan of a royal tomb*, *JEA*, Vol.4, 1917, p. 134.

<sup>3</sup>for further details see: M., Daressy, *Ostraka*, pl. LV. See also Chabas, Fr., "Sur un plan égyptien d'un tombeau royal à Thebes", in: *Mélanges Igyptologiques*, vol. II, pp. 175-202.

<sup>4</sup>See: Guilman, *Le tombeau de Ramses IX*, PL. LXIV.

<sup>5</sup>Carter, H., Gardiner, A. H., "The Tomb of Ramesses IV and the Turin plan of a royal tomb", *JEA* 4, p. 135.

<sup>6</sup>Carter, H., Gardiner, A. H., *The Tomb of Ramesses IV and the Turin plan of a royal tomb*, p. 136.

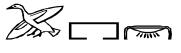
#### 4.3. (*wšht isk*) waiting Hall

Next to the door inscription, having the meaning of "its door is fastened". Along chamber X, the inscriptions can be translated as: "The hall of waiting, of 9 cubits; breadth of 8 cubits; height of 8 cubits; being drawn with outlines, graven with the chisel, filled with colors, and finished". The name of this hall is mentioned in the Papyrus of Turin and Cairo Ostrakon, where it designates the first of the three rooms, forming Ramesses IX tomb end; unlike the tomb of Ramesses IV. "Hall of waiting" name described the place where relatives, courtiers should wait before being in the pharaoh presence.

#### 4.4. Chamber Y of the sarcophagus

Y.a. next to the door "the door is fastened".

Y.b. Inscription of this chamber exist in the upper part as follows: "The golden house, where one rests, 16 cubits; breadth, 16 cubits and height of 10 cubits; being drawn with outlines; graven with the chisel; filled with colors, and completed<sup>1</sup>; and being provided with the equipment of His majesty (He lives, prospers, is in health) on every side of it, together with the Divine Ennead which is in the the netherworld "dwzt".

The name "House of Gold" is also repeated in Y, c.d; M. Daressy reads "*P3 pr nbw*"  as the legend of the sarcophagus chamber in the Cairo Plan, the verso of our papyrus appears to give, however, "the chariot hall". It is easy to know why this room is called (house of the gold), Probably because the Ancient Egyptian kings used to bury with them their artifacts and jewels inside the tombs. Carter explained the reason for its name probably because of its yellowish color of the ground (the traditional halls color).

Another example of the royal tomb plan, the tomb of king Ramesses IX<sup>2</sup> at Thebes, drawn on a limestone ostrakon in the Kings valley of (fig. 4). Its length is 32.7 inches. It was drawn in red; the space is in white. The doors lintels and jambs are yellowish. Noteworthy that This plan is considered a sketch-plan for the workers guiding but not the original plan used by the tomb architect.

There are two limestone ostraka from Thebes in the Kings valley which are exhibited in Cairo Museum. The first (Fig. 5), in red, it is a building with roof of 4 rectangular columns. Its door is flat as usual in Ancient Egypt, but with no more details. The second (Fig. 6) has no more interest, it is a double door probably of a shrine or a temple, with double stairs. The artist drew a royal head on the left side. Its measurement is 16 \*11 inches<sup>3</sup>.

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<sup>1</sup>Carter, H., Gardiner, A. H., The Tomb of Ramesses IV and the Turin plan of a royal tomb, p. 137. See also Lacau, *Sarcophages*, vol. II, pp. 195, 211. Schack-Schackenburg, H., Das Buch von den zwei Wegen des seligen Toten Zweiwegebuch, Leipzig, 1903, pp. 13-15.

<sup>2</sup>Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*, p. 51.

<sup>3</sup>Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*, p. 52, see also Petrie, *Ancient Egypt*, London, 1926, p. 24.

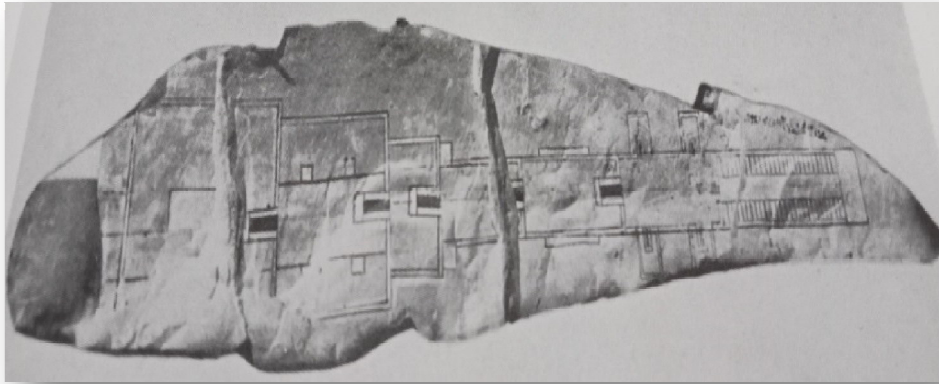


Fig. (4) Plan on limestone, of what is probably the tombs of Ramesses IX, from the valley of the Kings at Thebes (Cairo Museum)  
After, Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*, p. 51, Fig.50.

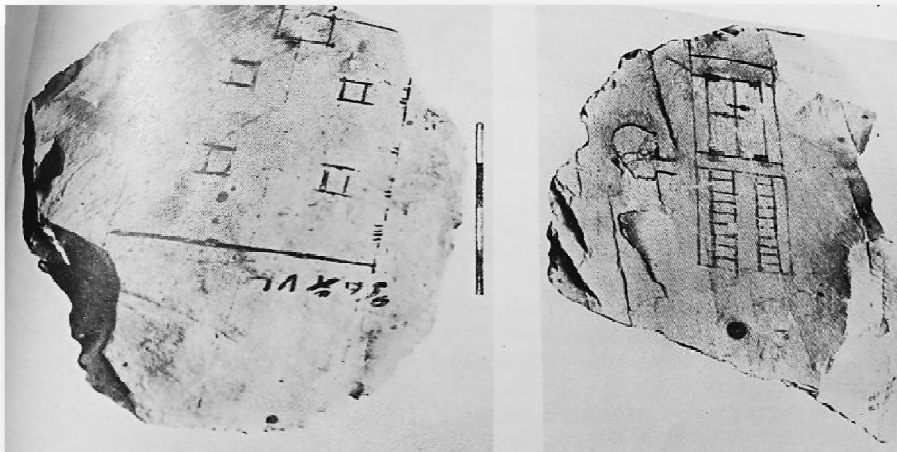


Fig. (5,6) Plan of a building on A limestone flake from the valley of the kings at Thebes. New Kingdom.  
After, Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*, p. 51, Fig.51.

A diagram of an architect was found at Saqqara by the Antiquities Department (Fig.7). It is made out of limestone, measuring 5\*7\*2 inches, had only one face, painted in red, dating back to the 3<sup>rd</sup> Dynasty.

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<sup>1</sup>Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*, p. 52.

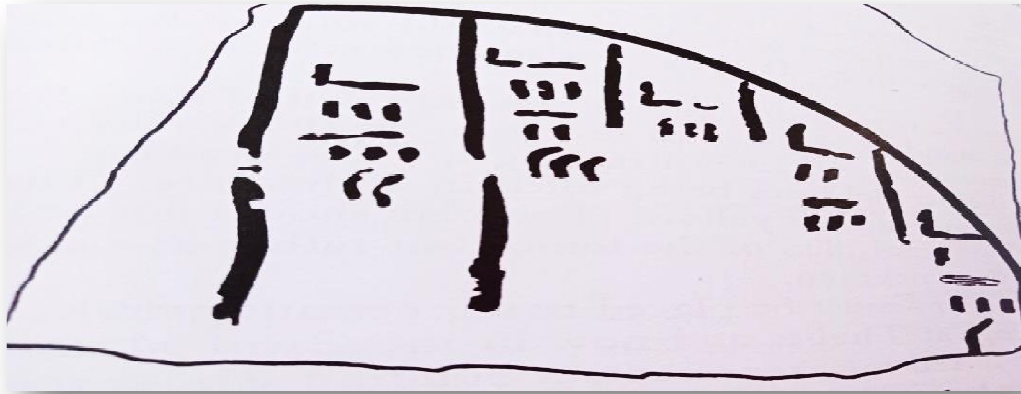


Fig. (7) An Architect diagram, defining a curve. Probably 3<sup>rd</sup> dynasty, Saqqara  
After, Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*,  
New York, 1990, Fig. 53, p. 52.

At Amarna tombs<sup>1</sup> there were many royal palaces plans and also the private estates, on the walls; the best one is in the tomb of Merire (Fig. 8), with a great accuracy (fig. 9). A plan of an estate (Fig. 10), with great importance. It was called An Architect plan from Thebes; it is examined by Davis<sup>2</sup>.

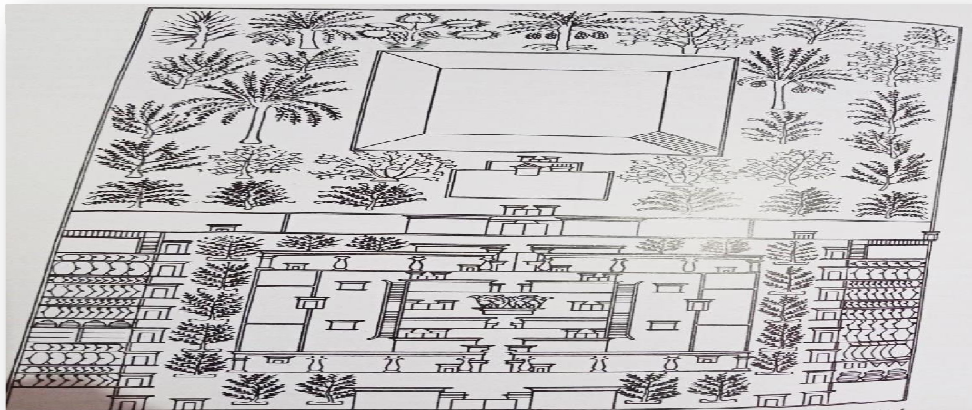


Fig (8) Plan of an estate, from the 18<sup>th</sup> dynasty, tomb of Merire at Amarna.  
After, Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*, New york, 1990, Fig. 55.

<sup>1</sup>Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*, p. 52.

<sup>2</sup> For more details see: Davis, N. DE G., JEA, Vol IV, P. 194.

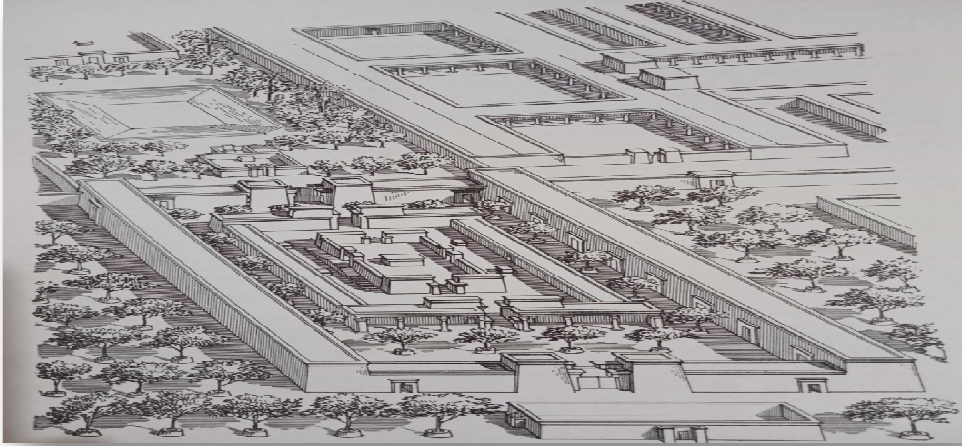


Fig. (9) Restoration of the estate of the ancient plan of fig. 5  
After, Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*,  
Fig. 56.

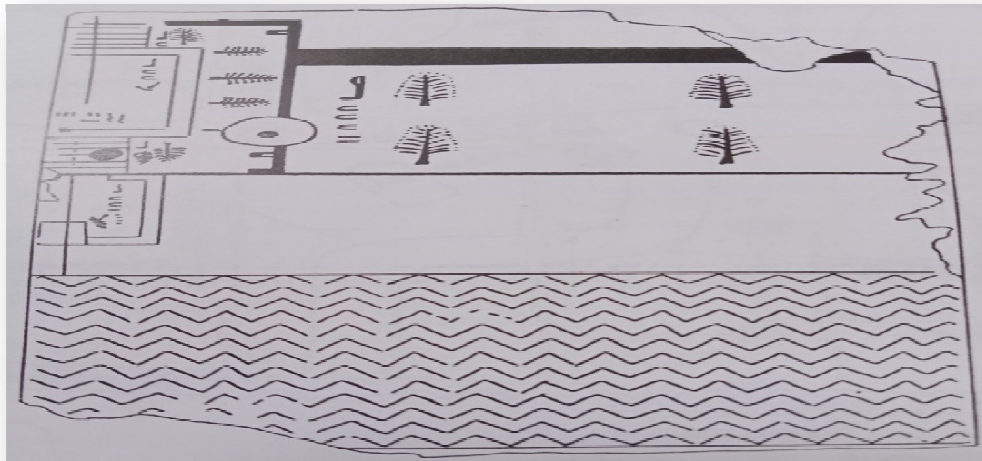


Fig. (10) An Architect plan of an estate, on a wooden panel, from Thebes  
After, Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*,  
fig. 57.

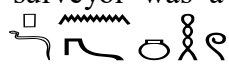
Another drawing<sup>1</sup> of a map with a great importance was made on behalf of the mine workers of the gold during the reign of king Seti. It has two valleys which are paralleled and a winding valley connecting them. It has an entrance to 4 galleries, with a water cistern and a stela of the king. The upper right corner has the mine workers houses. The original is now in Turin<sup>2</sup>.

<sup>1</sup>Clarke, S., Engelbach, R., *Ancient Egyptian construction and Architecture*, New york, 1990, p. 56.

<sup>2</sup>see: Lepsius, *Auswahl*, pl. XXII.



## 5. Surveying

The Egyptian term for a surveyor was a “rope stretcher” and surveying was known as “stretching a rope”  (pd nwh)<sup>1</sup>. The rope was among the tools used in surveying. Several tombs from the New Kingdom era, show the tomb owner watching men using ropes to measure fields, may be for calculating the taxes. The Egyptians used also another tool that was the human arm. They used cubits, from the elbow to the fingers; palms, the width of the palm of the hand; and digits, the width of the human fingers. So, four digits equals one palm and seven palms equals one cubit.

There were Several attempts of the Egyptologists concerning the cubit length. For example, Paulson used the same tool of Howard Carter in the Kings Valley of equaling 0.5231 m. One of the main surveying tools in Ancient Egypt were the plumb bob, a cubit rod, for short measurements and a calibrated rope of 100 cubits for longer measurements.

The “stretching of the cord”<sup>2</sup> in Ancient Egypt was so essential for any new structure. The king himself participated in the ceremony of stretching the cord, acting as the chief surveyor. Details of this ceremony are depicted on the walls of Edfu temple. The king with goddess Seshat are shown together with an inscription as follows: “I take the stake and I hold the handle of the mallet. I hold the measuring cord with Seshat”<sup>3</sup>. The king was also participating in establishing the structures alignment. Khufu pyramid of the 4<sup>th</sup> dynasty is the best example of the high accuracy in surveying and construction<sup>5</sup>.

## Conclusion

The Ancient Egyptians were more organized than we can expect that they used to put plans before mason, represented in setting out limits of the building, surveying, foundation ceremonies, etc. Our best example is the tomb of Ramesses IV and Turin plan of a royal tomb and tomb of King IX at Thebes. The last Example seems not to be the Architect's original Plan of the Tomb, but rather as a sketch- Plan for the guidance of the workmen. The pyramids, temples commissioned by the king, and probably palaces and other major structures would have been surveyed prior to construction. The “stretching of the cord” was a ceremonial laying out of the new structure. For important structures, even the pharaoh took part in the ceremony, playing the part of the chief surveyor. Finally, The Ancient Egyptian were an organized people in the royal and the state projects through finding maps and plans.

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<sup>1</sup>Paulson, J. F. *Surveying in Ancient Egypt*, pp. 2-3.

<sup>2</sup>For further details see: Lyons, H., "Ancient Surveying Instruments" in: *The Geographical Journal*, Vol 69, Institute of National Geographers, pp.132-139

<sup>3</sup>Paulson, J. F., *Surveying in Ancient Egypt*, USA, p. 4.

<sup>4</sup>Edwards, I.E.S., *The pyramids of Egypt*, University of California, 1947, p. 259.

<sup>5</sup>Paulson, J. F., *Surveying in Ancient Egypt*, p. 5.



## **Bibliography**

- Allam, S., Hieratische Ostraka und Papyri, 2 vol, Tübingen, 1973.
- Arnold, D., Building in Egypt, Pharaonic Stone Masonry, New York, 1991.
- Azad, m. m., "A Case Studies of Ancient Egyptian Architecture" in: International Journal of Engineering and Applied Sciences (IJEAS).
- Barnard, H., Maps and mapmaking in Ancient Egypt, Los Angeles, 2008.
- Carter, H., Gardiner, A.H., "The Tomb of Ramesses IV and the Turin plan of a royal tomb", in: JEA, Vol.4, 1917, pp. 130-158
- Chabas, Fr., "Sur un plan égyptien d'un tombeau royal à Thèbes", in: Mélanges Igyptologiques, Third series, vol. II, pp. 175-202.
- Clarke, S., Engelbach, R., Ancient Egyptian construction and Architecture, New York, 1990.
- Daressy, G., Ostraka, Cairo, 1901.
- Edwards, I.E.S., The pyramids of Egypt, University of California, 1947.
- Edwards, I. E. S. Pyramids of Egypt, Penguin Books, Harmondsworth, 1993.
- Gardiner, A.H., Theban Ostraca, Oxford, 1913.
- Guilmant, G., "Le tombeau de Ramsès IX" in: MIFAO, Cairo, 1907.
- Lacau, P., Sarcophages Antérieurs au Nouvel Empire, vol. II, Cairo, 1904.
- Lepsius, R., Über die Masse in Felsengrabe Ramsès IV, in: ZAS, Vol. XXII, 1884, pp. 1-5.
- Lepsius, K. R., Auswahl der wichtigsten Urkunden des ägyptischen Alterthums, Leipzig, 1842.
- Lyons, H., "Ancient Surveying Instruments" in: The Geographical Journal, Vol 69, Institute of National Geographers, pp.132-139.
- Mariette, A., Abydos, Description des fouilles II, Paris, 1880.
- Petrie, W.M.F., Ancient Egypt, London, 1926.
- Pleyte, W., Rossi, F., Papyrus de Turin, Leiden, 1869.
- Paulson, J. F., Surveying in Ancient Egypt, USA, 2004.
- Schack- Schackenburg, H., Das Buch von den zwei Wegen des seligen Toten Zweibegebuch, Leipzig, 1903.

## **Web Sites**

<http://www.reshafim.org.il/ad/egypt/building/townplanning.htm>

## الملخص العربي

### التخطيط والإعدادات للأبنية في مصر القديمة

شيماء محمد أبوزيد أ.د. مجدي محمد فكري أ.د. هدي عبد الله قنديل

كان يجب القيام بالعديد من الأشياء قبل الشروع في البناء ومنها إعداد الخطط والخرائط ونماذج للأبنية المقترح إنشائها. كان الملك في مصر القديمة يقوم بالإشراف بنفسه علي حفلات افتتاح الأبنية الجديدة سواء معبد أو هرم أو قصر بل ويقوم بتقديم الأضحيات والقرابين لإرضاء الآلهة وبالطبع كان للمهندس المعماري الدور الأعظم في ذلك كإعداد الخطط وتنظيم العمالة وتوفير الإمدادات الكافية من الحجارة من المحاجر.

**الكلمات الدالة:** خطط، الخرائط، المسح الميداني، مقبرة رمسيس الرابع، بردية تورين، طقسة شد الحبل