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Ancient Egypt:
planning and cutting the royal tombs
in the Valley of the Kings

SAW Project
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Wider context

Ancient (Egyptian) Architecture: problems of interpretation

Lack, generally speaking, of reliable architectural surveys:

- lack of ‘raw material’;
- archaeological vs. architectural surveys;
- unreliable surveys are unreliable bases for further studies.

Problems relating to methodology:

- differences and similarities between ancient and modern planning and building methods;
- adoption of modern mathematical tools and concepts to analyse ancient buildings.
Differences and similarities in the planning and building stages

Common practical problems:
• decide shape and size of the building;
• decide (calculate?) thickness, height, distances of vertical elements;
• mark it on the ground (not in the case of rock-cut spaces, though);
• set up right-angles;
• pile up stones / bricks.

Modern way to plan a building: prepare a plan on paper, then stick to it (the completed building will correspond to the initial project)

Modern way to analyse an ancient building: look at its plan on paper.
Questions to bear in mind:

When we study ancient buildings, do we rely too much on plans?

Did the ancient Egyptians rely on plans in the same way?

How did they use their mathematical tools?

Are we sure we have properly understood their mathematical tools?
Ancient Egyptian units of measurement

1 c = 45 cm
1 small cubit = ......
6 palms = ......
24 fingers
1 royal cubit = ......
7 palms = ......
28 fingers
1 f = 1.8 cm
1 p = 7.5 cm
1 c = 52 cm
+ 1 p
From pyramids to rock-cut tombs

Old Kingdom: 2686-2160 BC

24 kings

26 royal pyramids, plus over 30 smaller pyramids (satellites and for queens)

Middle Kingdom: 2055-1650 BC

10 kings

10 royal pyramids, plus over 20 smaller pyramids (satellites and for queens)

New Kingdom: 1550-1069 BC

No more pyramids, but rock-cut tombs
The standard elements of a pyramid complex

The New Kingdom tombs in the Valley of the Kings

The tomb of Seti I (Nineteenth Dynasty, New Kingdom, 1294-1279 BC)
From R. Wilkinson and N. Reeves, The Complete Valley of the Kings, 1997, p. 139.

Painted relief from the tomb of Horemheb (Eighteenth Dynasty, 1323-1295 BC)

The mountain Meret Seger (‘She-who-loves-the-silence’)

From R. Wilkinson and N. Reeves, The Complete Valley of the Kings, 1997, p. 139.
What we see...

... what they saw...

... and the starting point
The making of a royal tomb: the initial project

The plan as a distribution scheme

Dimensions in round figures of whole cubits (e.g. corridors 30 cubits long)

As the work proceeded: definition of details…..

The plan as a working drawing

precise dimensions of elements are decided

….. and written records

Strasbourg Ostracon H.112: QV44 – Khaemweset, son of Ramses III

Recto
1 ///
2 done in the 23rd regnal year
3 by the vizier Ta from the 22nd regnal year.
4 The god's passage which is upon the sun's path ///:
5 its length 14 cubits, breadth 3 cubits 3 palms, height 6 (cubits).
6 The second (corridor): its length 15 cubits, breadth ///
7 height 4 cubits 4 palms.
8 2 treasuries, each 10 cubits, breadth 6, height 3 cubits [3 palms (2 fingers?)].
9 The third (corridor): its length 28 cubits 3 palms ????
10 [breadth] 5 cubits, height 4 cubits 5 palms
11 ///

Verso
1 /// the resting-place
2 /// its length 9 cubits
3 /// breadth 8 cubits
4 /// height 4 cubits
5 /// its plan until the 20th regnal year
6 /// 2nd month of winter, day 26
7 /// in it in the 22nd regnal year, 2nd month of winter, day 14
8 /// which makes 1 year, 8 months, 14 days
9 /// 137(?) cubic cubits
10 /// total (?)9
11 137
The end of the works: the final ‘certification’ (survey)

Drawing of Turin Papyrus 1885 by Howard Carter (ca. 1920, Griffith Institute, Oxford).
- performed at the very end;
- contained extremely detailed dimensions in cubits, palms and fingers;
- was not necessarily equal to the initial distribution scheme.

Important question!

Are we sure we do not overlap our way to perceive / represent the space with that of the ancient Egyptians?
Example: measuring the length of sloping corridors

The evolution of the slope


KV9, tomb of Ramses V and VI, Twentieth Dynasty (late New Kingdom)

WV22, tomb of Amenhotep III, Eighteenth Dynasty (early New Kingdom)
Important question!

Are we sure that we correctly understand / interpret / use the ancient (Egyptian) units of measurement?
Papyrus Reisner I

Middle Kingdom, time of Senusret I  main (surviving) mathematical sources

Implications and new directions of research

(Right) A wooden mallet found in WV24 of the type used by the stonemasons in making the royal tombs, and (below) a vivid sketch of a stonemason using a similar mallet on an ostracon from Deir el-Medina.


Recipe for further studies

- Reliable architectural surveys
- Historically correct mathematical tools

Attention not to overlap modern and ancient points of view

- Historically correct interpretations of ancient (Egyptian) buildings
Thank you