



## **Tombs of the Valley of the Kings in Luxor Ecological Consideration**

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### **Abstract**

By the eighteenth dynasty in the Egyptian Old History, funerary architecture was oriented towards a new direction in perceiving space and form, meaning and symbolizing, and pride and festivity.

As being a great city by that time, Luxor (Thebes) looked for a site that offered a similar dignified place as it was with the pyramid plateau in Giza, in the north, close to the previous Capital "IUNU". As much as the Giza plateau was worked out to receive the edifices on, the place in Thebes was chosen of highly qualified natural properties. The place was on the sacred western side of the capital of the kingdom, in a huge valley formed through millions of years where its morphology could offer the dignity that we still feel, the geological formation was much easier to work through, tombs architecture within it offered the possibilities to preserve the traditions and the bodies of the great kings safe.

The paper aims at declaring the environmental capabilities of the architecture form of tombs of the Kings Valley of the eighteenth and nineteenth dynasties of the Old Egypt History.

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### **Keywords**

Old Egypt; Tombs; Kings' Valley; Religious Festivals; Eighteenth Dynasty; Nineteenth Dynasty; Geological Formation; Egyptian Art; Egyptian Beliefs; Architecture in Ancient Egypt.

### **1. The Beginning in History**

"**Ta-ope**" or **tp** - meaning "head"- was the name of Thebes in the old history. It was also **Wase**, or **Wo'se** the main city of the fourth Upper Egyptian nome (province) of Wase.

The site shows how humanly valuable it was by knowing that the first evidence of the Paleolithic era in Africa – that lasted 500,000 years before known dynasties - was found there. In that glowing environment Thebes has been inhabited continuously for the last 250,000 years. It is known that high civilization to have existed from the 4th dynasty B.C onward as *the capital of "the earliest known empire in the history of mankind"*.

But late during the sixth dynasty and through 135 years (c. 2316-2181 B.C.) in the Old Kingdom the city was a minor trading post in Upper Egypt, which was controlled by local clans. In later time, Power was regained by the Theban rulers who reunified Egypt after they defeated the Herakleopolitans - who were governing the country from herakleopolis Magna - and started to control the entire country. Thebes emerged by that time as the **capital city** of Egypt in 2035 B.C. and remained the royal city. The city began to grow more powerful under the leadership of powerful governors. Actually the high status of the city was achieved afterwards in the Middle Kingdom due

to political and religious prominence. On the East Bank, beneath the modern city of Luxor, lie the remains of the ancient town that from about 1500 to 1000 BC was one of the most spectacular in Egypt, with a population of perhaps 50,000. Thebes had earned a reputation as one of the ancient world's greatest cities. By that time Memphis, at the apex of the Nile Delta, served as the headquarters of the Egypt's internal bureaucracy, but accordingly Egypt was freed from its enemies – the Hyksos that were dwelling in Avaris in the East of the delta- and acquired the state of the wealthiest and most powerful country in the ancient world, establishing Thebes as **“the queen of cities”**.

The capital Thebes, by the reign of Akhenaton (1367-1350 B.C.), was moved to Akhet-Aten/ El-Amarna in Al Minya. However, after seventeen years at Akhenaten's disappear, Thebes was restored as Egypt's capital city again.

As the capital Thebes was close to Nubia and the Eastern desert, with their valuable mineral resources and trade routes, it acquired a profound value in the Egyptian culture. It was a cult center and the wealthiest city of ancient Egypt at its heyday. However, the most important period in the history of Thebes was the five-century-long New Kingdom (1539-1069 B.C.), when what the ancient Egyptians called this **“model for every city”** achieved unrivalled religious, political, and architectural stature.<sup>1</sup>

## 2. The Site

Thebes was located along the banks of the Nile River in the middle part of Upper Egypt about 675 km south of Cairo. It was largely built on the alluvial plains of the Nile Valley which follows a great bend of the Nile (Fig.1).

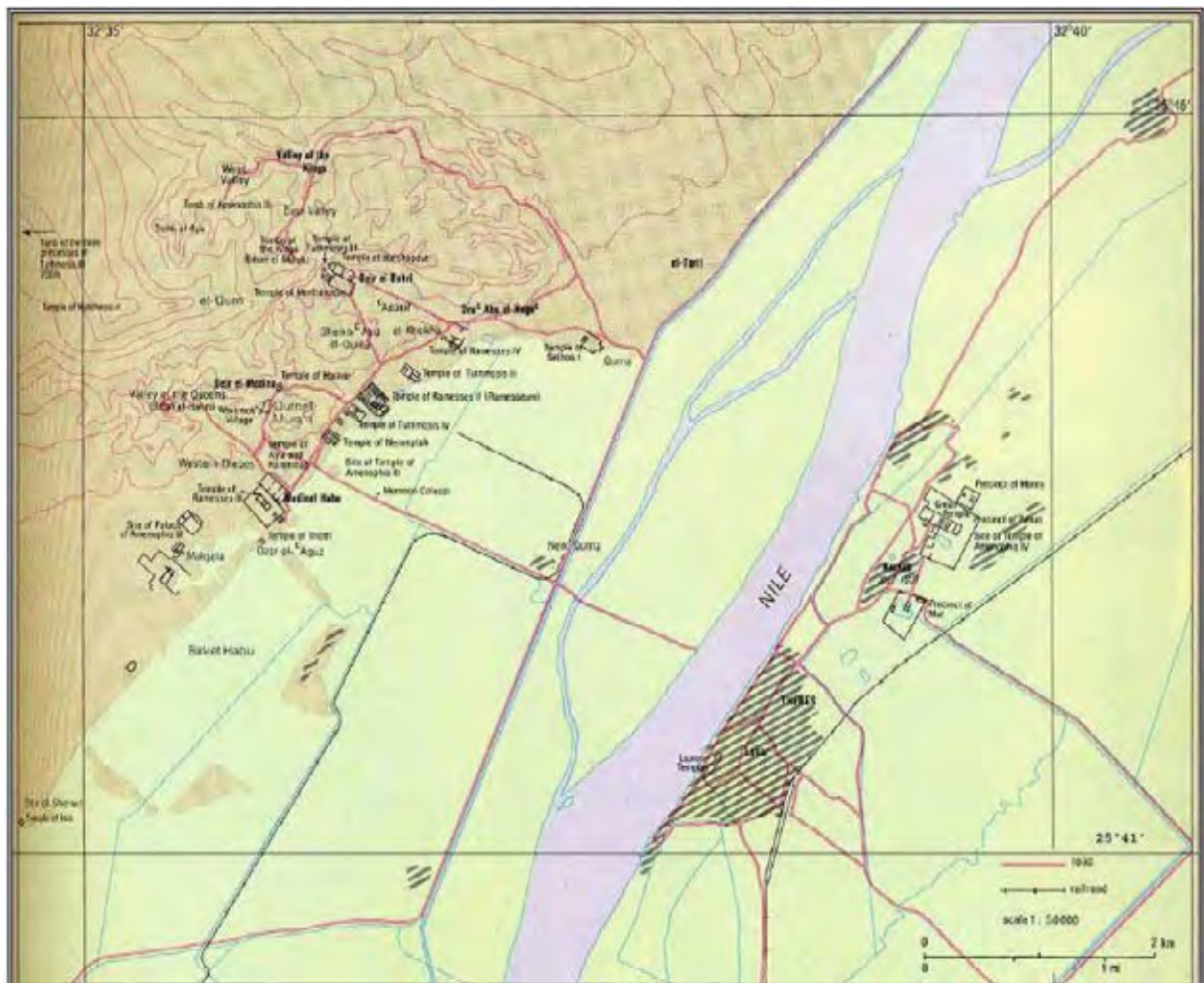


Figure 1. a- Thebes site is :Long . 32° 35'- 40' E, Lat. 25° 42'-45' N

<sup>1</sup>The information on Egyptian history is taken from a number of sources, including Sir Alan Gardiner's Egypt of the Pharaohs.

Theban Hills in the West were culminating at the sacred 420-meter al-Qurn (Fig. 2). In the East lies the mountainous Eastern Desert with its wadis draining into the valley, significant of these wadis is Wadi Hammamat near Thebes. It was used as an overland trade route going to the Red Sea coast.



Figure 2. Theban Hills in the West were culminating at the sacred 420-meter al-Qurn.

The Valley of the Kings (Fig.3) is one of two branches of a huge West Bank wady, or valley, in the desert West of the temples at Deir al-Bahari. Wady's branches are small, steeply sided valleys with arroyos, were found throughout the limestone hills of the site. They were cut into bedrock millions of years ago by heavy rains that fell almost continuously over the North African landscape, eroding bedrock created millions of years earlier when it lay beneath a great sea called Tethys, the precursor of the Mediterranean.

The Valley of the Kings lies now about one kilometer west of the Nile floodplain at Thebes (Fig.4). It is a small wady cut by torrential rains and erosion during several pluvial periods in the Pleistocene into a thick layer of limestone that lies within a discontinuous stratum of Esna shale. The Valley lies about 70m above the level of the River Nile (140m above mean sea level), and the immediately surrounding hills rise an average of 80m above the valley floor.

### 3. The geology

Virtually all exposed bedrock in this part of Egypt is limestone, except for small pieces of chert (silica mainly – quartz) embedded in the limestone stratum; its thickness was around 44.67 meters (Fig.5). That was – most probably- one of the reasons that caused all of the tombs to be within that soft limestone stratum. Accordingly slopes of the corridors leading to the tombs were between 2 degrees (as in tomb KV 15 of Seti II) which reached depth -6.25 m, and 39 degrees (as in tomb KV 38 of Thutmose I- (1493 -1481 BC)) which reached depth -14 m. But the deepest tomb was KV 57 of Horemheb which reached -30 m below the wady's floor. The underlying



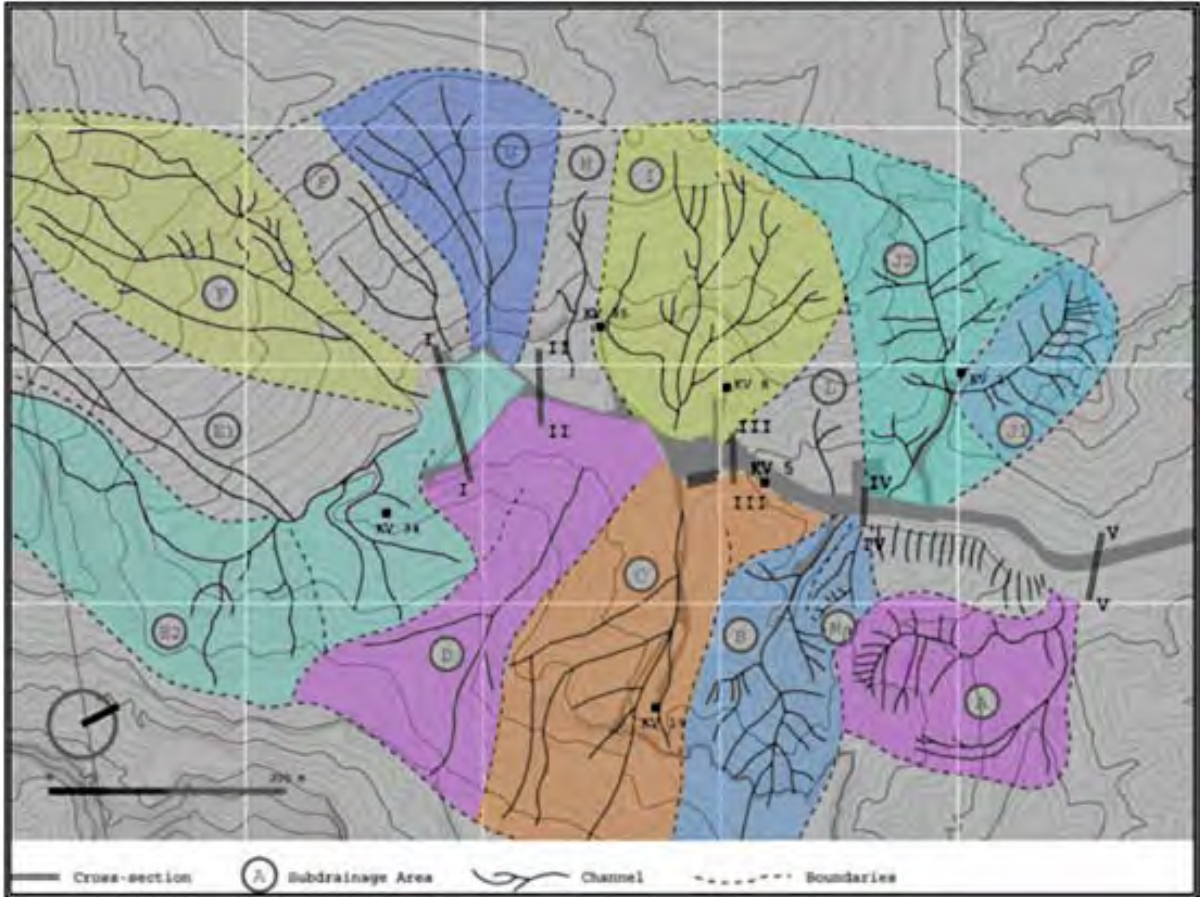


Figure 3. The valley was a basin in ancient times for a group of smaller valleys through which rains were drained.



Figure 4. Valley of the Kings lies in the West of the Nile, within a stratum composed of mainly limestone deposits from the Pleistocene era.

inaccessible stratum was of montmorillonite, a dangerously unstable stone also called Esna Shale (tafla in Arabic).

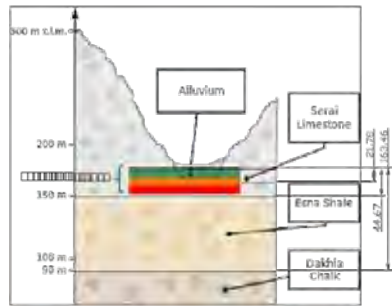


Figure 5. Geological formation of the valley with indication of the depths limits of toms within the limestone stratum.

#### 4. The Tomb Design

The second reason- the researcher proposes- was that the sun rays penetrated most of the tombs' tunnels all the way to the tombs in certain times in the morning or in the afternoon in certain days corresponding to the calendar of festivals celebrating Amun, Ptah, or Thut (Fig. 6).

FESTIVAL CALENDAR VS TOMBS				TOMBS # 14		
GRIGORIAN CALENDAR	EGYPTIAN CALENDAR			FESTIVAL	AM SUN PENETRATION	PM SUN PENETRATION
	DAY IN MONTH	MONTH IN YEAR	SEASON'S MONTH			
OCT 1	DAY 18 THOT	MONTH 1	AKHET 1	<b>WAG</b> and <b>THUT</b> festival. This event was connected with the mortuary rituals	KV 2 RAMSES IV- KV 9 RAMSES V- KV 13 BAY- KV 14 TAWSRET KV 38 THUTMES I	KV 4 RAMSES II- KV 48 YUYA & TUYA
MAR 10	DAY 1 BARAMHAT	MONTH 7	PERET 3	festival of <b>PTAH</b> ; day of return of the image of the deity in the festival ' <b>AMUN-in-the-festival-of-raising-heaven</b> '		
Oct-20	DAY 15 BABA	MONTH 2	AKHET 2	start of Ipet festival as 11-day festivities for <b>AMUN</b> in Luxor	KV 8 MERENPTAH- KV 62 TUTANKHAMUN - KV 16 RAMSES I- KV 35 AMENOPHIS II- KV 32 UNKNOWN	KV 3 SON OF RAMSES III- KV 55 UNKNOWN
Oct-23	DAY 18 BABA	MONTH 2	AKHET 2	Local Elephantine festival of <b>KHNUM</b> and <b>ANUQET</b>		
Nov-01	DAY 27 baba	MONTH 2	AKHET 2	start of 2-day local festival of <b>MONT</b> ; this may be not an annual festival, but one ceremony, perhaps at the consecration of a shrine.		
FEB 21 ? MAR 10	DAY 30 AMSHIR	MONTH 8	PERET 2	day 30 key date in a festival spanning several days, identified sometimes as <b>AMUN-in-the-festival-of-raising-heaven</b> ', and in some sources the day of bringing branches of the ished-tree (sacred tree of the sun-god at Iunu) and culminating on the next day, the first of the next month, with the ceremony of filling the sacred eye in Iunu; this is the halfway point of the year, ideal 'midwinter'		

Figure 6. Recorded festivals of the site of Thebes showed that there were 7 deities people were celebrating through certain times of the year. Wag, Thut, Ptah, Amun, Khnum, Anquet, and Mont were celebrated within times of the Spring and Autumn.

Festivals were sort of time dedicated to celebrate deities of the national and local beliefs. More than sixty annual festivals were celebrated in Thebes. The major festivals among these according to the Edfu Geographical Text were: the Beautiful Festival of Opet<sup>2</sup>, the Khoiak (Festival), Festival of I Shemu, and Festival of II Shemu. Another popular festivity was the Halloween-like Beautiful Festival of the Valley. People were used to move from the city on the East to sacred areas on the West by boats, starting with passing by Temples that were built along the edge of

<sup>2</sup>The festival was celebrated in the second month of Akhet, the season of the flooding of the Nile.

the cultivation of the Western side of the Nile, where they could be reached by religious processions that travelled from Karnak Temple by boat along canals cut through the fields.

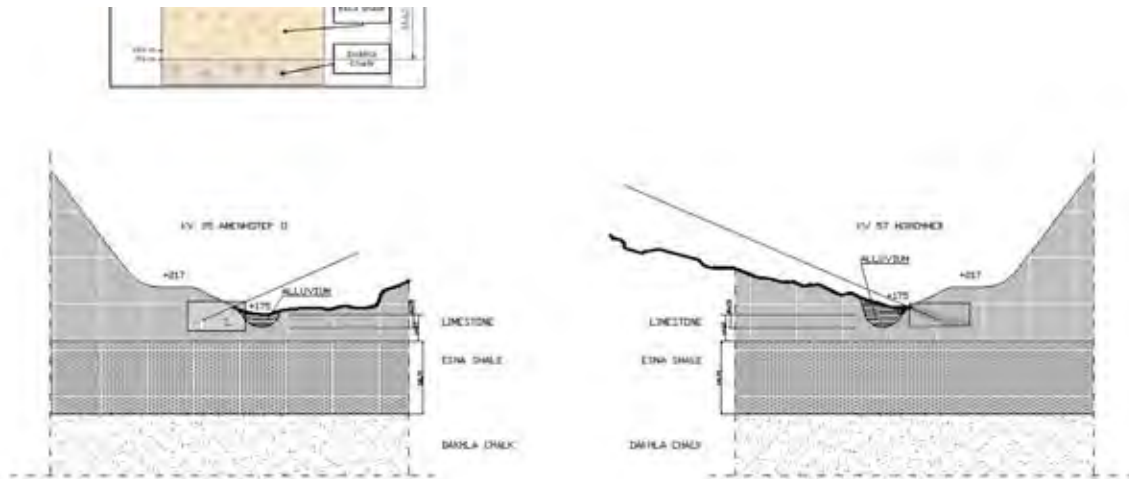


Figure 7. Section through KV 35 and KV 57 to show how much morphology was considered in design of the corridor oftombs.

The source of that consideration that the sun penetrates the tomb comes in the "Book of the Dead" which says:

*"I have opened the caves of Hapi. I have freed the path for the Aten. I have dragged Sokar on his sledge."*

That meant that Earth should be opened for the King's body to be hosted by Osiris in the underworld; by dragging his sarcophagus accompanied by Horus along with the sun Ra' to the far point down in Earth. It is the whole story of bringing the king to the safe condition, from the environmental point of view, very well hidden in a perfect condition and very well preserved and ready for the resurrection.



Figure 8. Section through the tomb of KV 14 tawsret and the the topography againstit. Section showshow it receives sunrays of the beginning of March at 6.30 am, celebratingfestival for "ptah" & "amun". Author drawing

Here the fact should be mentioned thatthe majority of toms were designed to receive morning sunrays (Fig.8), less to receive it in the afternoon, and the rest were oriented north not for a perceived to the author reason; it may need a further investigation.

The twenty eight tombs' orientations and slopes were plotted on a Luxor sun path diagram to investigate the relations to the real time of sun movements on the sky (Fig.9). Ten tombs were oriented to the morning East sun; four were to the West, two to the South, and nine to the north. But three were to the North West. Those oriented to the East and West had the sun penetrated in times corresponding to the calendar as mentioned above.



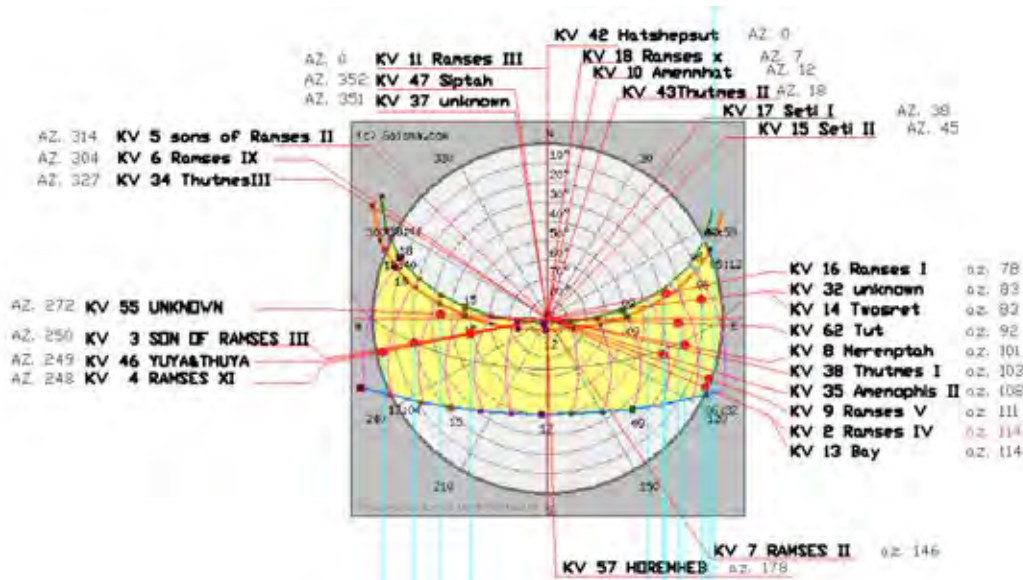


Figure 9. On the Luxor chart of sun path diagram tombs entrances are classified into the four natural orientations. Those to the East and to the West mostly receive sun rays in certain times according to their inclinations. Entrances oriented north, they only received reflected sun rays. The rest oriented south, do not receive direct sun but, might received light from some stars as was the case in the old Kingdom .

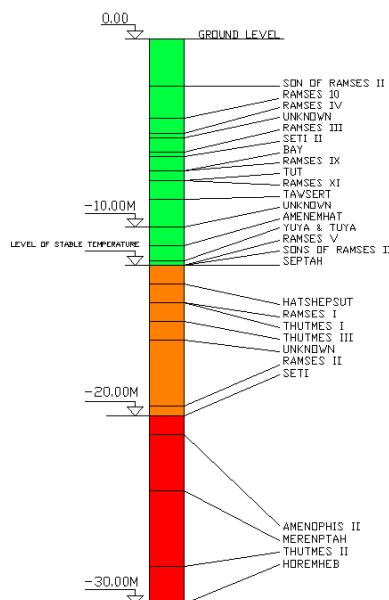


Figure 10. underground temperature lessens by getting deeper inside until level -12.00 m. which is considered the level of the stable temperature, where no oscillations happens in temperature, day / night, summer / winter; deeper than 12 m , temperature gets higher. The Author

**The fourth reason** that affected- from the researcher's point of view- the depths of the majority (seventeen tombs out of the twenty eight) of the tombs to be within the upper 12 meters is that beside the fact that depths were all within the lime stone stratum, and never exceeded that depth (Fig.10), depths of burial chambers were in three levels according to the depth temperature. Down to a depth of twelve meters, where stability of temperature occurs through seasons and day 24 hours, temperature associates with the surface temperature. Below the stable temperature level, it gets warmer, and then it becomes hotter.

Seventeen tombs were among the first level, i.e. to the depth 12 meters. Seven were in the next layer; four were in the hotter/ deepest one. Tomb of Ramses II was the nearer to the valley ground surface; Horemheb's tomb was the

deepest.

A list of the twenty eight most important tombs is shown in (Fig.11) that declares the specific characteristic features of each of them from five different considerations: death time of the king, tracks leading to the burial chamber, inclination of the entrances' corridors, tunnels' azimuths, and depth of each one of them.

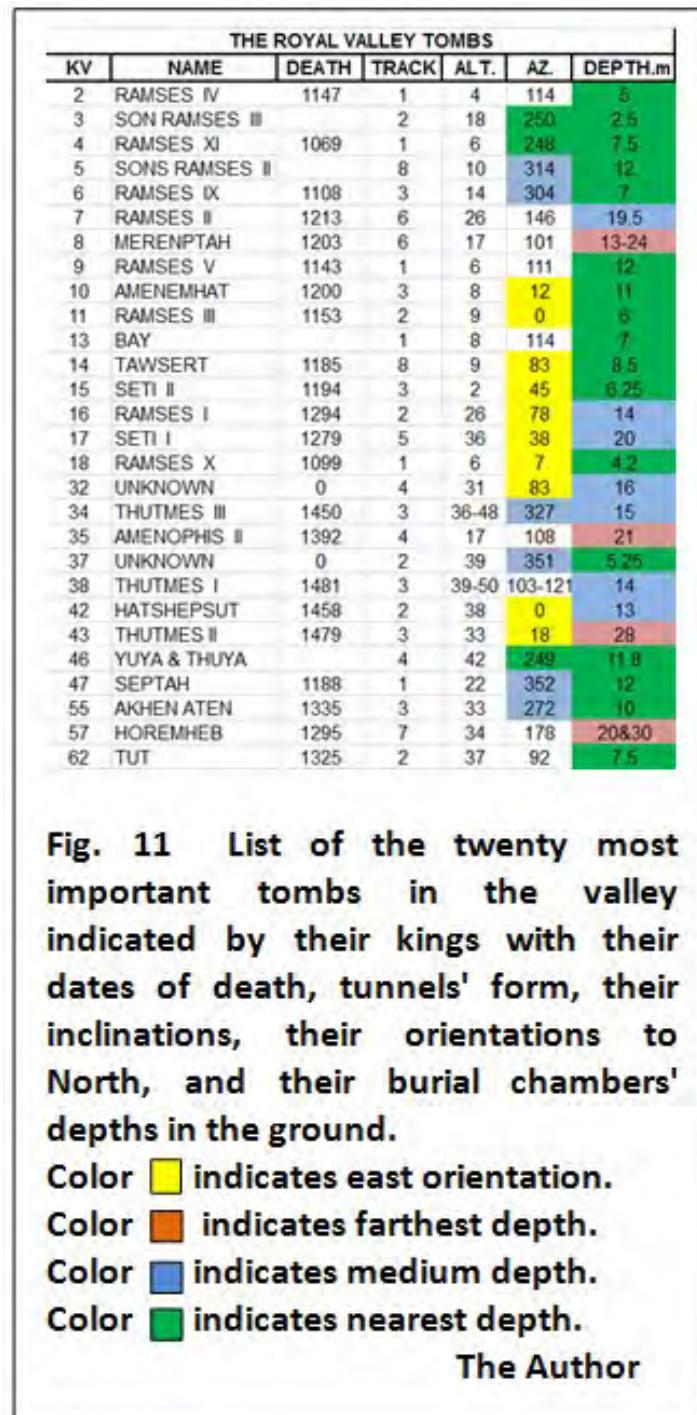


Figure 11.

Of the twenty eight tombs three tombs from the eighth dynasty were in each layer; from the nineteenth dynasty five tombs were in the first layer, three in the second, and one in the third; the six tombs from the twentieth dynasty were all in the first layer. One can here conclude that the privilege of having the tomb being in the first layer – which one can consider it the best environmentally conditioned - acquired enough care from the architects.



Distribution of the tombs within the Valley did not follow a definite policy but one factor was decisive and that was about placing the Eighteenth Dynasty tombs by almost at the end of the valley which was the higher level of the wady's floor; those of the nineteenth Dynasty around them. Tombs of the Twentieth Dynasty almost were at the beginning the wady which was at the lowest level of the wady's floor. That policy might show that there was not a collective thought about the orientation or about the tunnel inclination, or even a collective idea about the one deity to celebrate, since they were all at multi orientations and multi inclinations. Run off of rain water was much considered in the eighteenth Dynasty that the twentieth Dynasty.

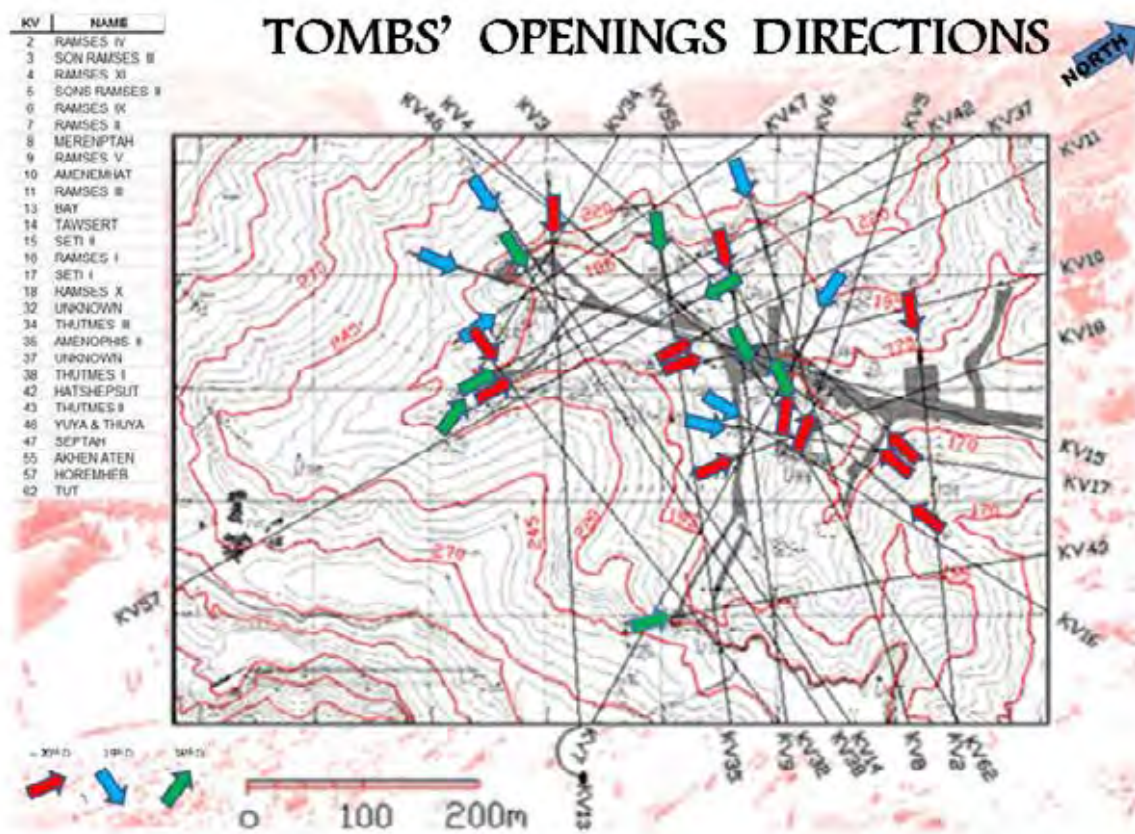


Figure 12. Distribution of the tombs within the Valley did not follow a definite policy. Run off of rain water was much considered in the eighteenth Dynasty that the twentieth Dynasty.

## 5. Conclusion

Tombs of the Valley of the Kings were environmentally designed. It means that the site was carefully chosen by its natural geological formation characteristics that it was mainly the lime stone; soft enough to be carved in and been painted to last through ages until nowadays. As the site experienced rain running off through ages, maybe it was meant to be one stage of the process of design. Tombs' entrances were all accessible from the ground of the valley. One tomb entrance, that is KV 62 of Tut Ankh Amon's tomb, was once concealed by deposits after been finished and sealed, caused by rain runoff, until it was discovered in the last century; maybe it was intended through time of construction to be hidden later on. But surely they were accessible for people to celebrate their deceased kings in the national festivals.

Slopes of the passages of most of the tunnels had inclinations permitting the Eastern early sun, and in some others Western late sun, to reach the burial chambers in due time related to their festivals.

Depths' levels of most of the burial chambers inside earth did not reach the limit where "The Thermal Equilib-

rium” happened. Thermal equilibrium is “a stable situation in which forces cancel one another”<sup>3</sup>. Four tombs’ chambers exceeded the -20 meters depth for no clear reason; they were tombs of each of AmenhotepII, Merenptah, ThutmoseII, and Horemheb. Even that tomb of Horemheb was the deepest where it reached -30m; but research could not reach a convincing answer for having the burial chamber in that theoretically higher temperature.

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## 6. References

1. Ancient Egypt online. (n.d.). *History of Thebes*. Retrieved from <https://www.ancientegyptonline.co.uk/thegods.html>
2. Encyclopedia Britannica. (n.d.). Retrieved from <https://www.britannica.com/>
3. Mark, J. J. (2016). *Thebes*. Ancient History Encyclopedia.
4. Religion in Ancient Egypt: The Gods and Goddesses. (n.d.). Retrieved from <https://www.ancientegyptonline.co.uk/thegods.html>
5. *Theban Mapping Project - Chapter One Introduction to the Site*[PDF]. (n.d.).
6. UNITED NATIONS Educational, Scientific and Cultural Organization. (2008). *Convention concerning the protection of the world cultural and natural heritage*. HERITAGE COMMITTEE, thirty-second session, Quebec City, Canada.

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<sup>3</sup><https://www.thefreedictionary.com>