

DISCOVERIES ON FORTIFICATIONS AT TELL EL-RETABA¹

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The article briefly outlines historical situation and structure of Nomes in the north-eastern periphery of the Nile Delta in the Old and Middle Kingdom. In relation to literary sources, such as the Instruction for king Merikare, the Prophecies of Neferti and the Tale of Sinuhe, the article evaluates the defensive potential of Wadi Tumilat and the Isthmus of Suez. It concludes that one of the Walls of the Ruler could have been in Wadi Tumilat, starting at Tell el-Retaba. The article also presents new military related finds of the 2017 season of the Polish-Slovak mission to Tell el-Retaba into a context of recent research of fortification structures at Tell el-Retaba: new discovered moats, Wall 1, Wall 2 and their gates.

Key words: Tell el-Retaba, Nome, fortification, moat, wall, Walls of the Ruler, gate

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Introduction

Ancient Egypt could, at first look, create the impression of a static and isolated land², protected from migration by the Mediterranean and Red Seas, deserts and cataracts. Indeed, these geographical conditions played an important role in the protection of Ancient Egypt and certainly contributed to the stability and long-lasting uniqueness of Ancient Egyptian civilisation, being so different from its contemporary civilizations.

However, these natural barriers could not protect Ancient Egypt entirely. The Nile River was also a natural “highway” between the Mediterranean and the Central and Eastern Africa and, as being the only perennial river between the Sahara and the deserts of Arabian Peninsula it was unique permanent water source within this vast region. This obviously attracted migration, long distance trade and conquests throughout the whole, long history of Ancient Egyptian civilization.

Pharaohs made lot of effort to complement and strengthen the natural barriers protecting their country by the construction of defensive structures. Ancient historical records and archaeology brought forward information on the existence of fortifications and communication systems such as walls, roads and channels supporting and controlling long-distance trade, and at the same time helping the Ancient Egyptian army to control and protect the country’s boundaries.

The critical area during the whole historical period was the Eastern Nile Delta and Isthmus of Suez. The territory between the Mediterranean and Red Sea was a wide natural gate to Egypt. Although this part of Egyptian boundary was partially protected by naturally changing³ landscape obstacles such as lakes, marches and hills, there were several open corridors for migration inflows and attacks.

On the other hand, this area was also an important base for Egyptian mining expeditions to Sinai Peninsula and military expeditions to the Syro-Palestinian territory. Therefore, the research of the Eastern Nile Delta and the Isthmus of Suez is very important for understanding the Egyptian defensive system and military logistic as well as for understanding the overall interaction of Ancient Egypt with its eastern and north-eastern neighbours.

One of the major focal points of the Eastern Delta defence and garrison system was Tell el-Retaba situated in the centre of Wadi Tumilat. The Slovak-

² SCHNEIDER, T. Foreign Egypt: Egyptology and the concept of cultural appropriation. In *Ägypten und Levante*, 2003, Vol. 13, pp. 155–161.

³ PENNINGTON, B. T. et al. The Fluvial Evolution of the Holocene Nile Delta. In *Quaternary Science Reviews*, 170, 2017. DOI: 10.1016/j.quascirev.2017.06.017.

Polish archaeological mission working at this site since 2007 has contributed to the discovering of several fortification and garrison structures at this key site.⁴

This paper proliferates results of these researches, with a focus on the western periphery of the tell where the earlier excavations identified the New Kingdom fortification walls with the large structure of Migdol gate.⁵ The excavation season in September 2017 discovered and excavated several new parts of fortification and defence facilities. The paper provides their preliminary interpretation; it also attempts to set the site into context of the Eastern Delta's defence system.

Historical situation in the north-eastern periphery of the Nile Delta

Maritime cabotage⁶ and land trade routes had passed through sea and desert distances in Egypt and its surroundings, and transferred a broad range of goods (e.g. wood, minerals, and exotic goods) already several millennia BC.⁷ Trade was also associated with efforts to control routes and resources by wars and battles, defensive or offensive. Even in these cases, "splendid isolation" did not apply, and reality on the ground led to considerably ancient ritualization of the struggle against the traditional enemies of Egypt.⁸

In the north-eastern and eastern parts of Egypt the Asiatics and Bedouins were the most threatening enemies, sworn by different epithets and names. Especially,

⁴ ČERNÝ, M., HUDEC, J. Fortifications at Tell el-Retaba. In *Asian and African Studies*, 2016, Vol. 25, No. 2, pp. 117–144, 293–308 (plates); RZEPKA, S. et al. From Hyksos Settlers to Ottoman Pipe Smokers. Tell el-Retaba 2014. In *Ägypten und Levante*, 2015, Vol. 25, pp. 108–124.

⁵ PETRIE, W. M. F., DUNCAN, J. G. Hyksos and Israelite Cities, Pl. XXXV.

⁶ VINSON, S. Egyptian Boats and Ships, p. 10; TALLET, P., MAROUARD, G. An Early Pharaonic Harbour on the Red Sea Coast. In *Egyptian Archaeology*, 2012, Vol. 40, pp. 40–43.

⁷ E.g. lapis lazuli was delivered to Egypt from Afghani Badakshan from at least 4th millennium BC, cf. NICHOLSON, P. T., SHAW, I. *Ancient Egyptian Materials and Technology*, p. 39; GOPHNA, R., BRINK, E. C. M. van den, Core-Periphery Interaction Between the Pristine Egyptian Nagada IIIB State, Late Early Bronze Age I Canaan and Terminal A-Group Lower Nubia: More Data. In BRINK, E. C. M. van den, LEVY, T. (ed.). *Egypt and Levant Interrelations from the 4th through Early 3rd Millennium B.C.E.*, pp. 280–285; CZARNOWICZ, M. Between Core and Periphery. In MLYNÁŘOVÁ, J. (ed.). *Egypt and the Near East – the Crossroads*, pp. 117–138; EICHLER E. *Untersuchungen zum Expeditionswesen des ägyptischen Alten Reiches*.

⁸ BRESCIANI, E. Der Fremde. In DONADONI, S. (Hg.). *Die Menschen des Alten Ägyptens*. p. 261; TROST, F. *Das Feindbild der alten Ägypter*.

the Asiatics had fought the Egyptians “*since the time of Horus*”⁹, i.e. since time immemorial. Epigraphy indicates that the fights might have intensified in the end of the Old Kingdom. Governor Weni mentioned that pharaoh Pepi I sent him alone five times to command a large army to fight Asiatic enemies.¹⁰ Goedicke suggested that the Weni’s fights took place in the eastern Delta, rather than in Palestine or Sinai.¹¹ Monnier wrote about southern Palestine¹² and Vandersleyen placed the fights in a territory close to the Pelusiac branch or to Wadi Tumilat.¹³ Anyway, it is unlikely that Weni would fight the enemies five times at the same area, thus wider territorial assignment, including Wadi Tumilat, could be possible. It was no wonder that due to frequency of clashes the Egyptians could have had the impression that the Asiatics are “*not conquering nor being conquered*” in the First Intermediate Period.¹⁴

The eastern Delta was apparently vulnerable to the Asiatics and/or Bedouins in particular. Besides attacks on inhabitants, they were also able to obstruct trade and expedition routes to Syro-Palestine, Sinai and beyond, which could have been reversed into invasion routes. From this point of view, two particular directions were strategically especially sensitive:

(1) The route from the mouth of the Pelusiac Nile branch eastwards alongside the Mediterranean Sea shore¹⁵; the “oldest road in the world”¹⁶;

(2) The route from the central Eastern Delta alongside the ancient Nile branch eastwards, via today’s Wadi Tumilat.¹⁷

⁹ LICHTHEIM, M. *Ancient Egyptian Literature*. Vol. I: The Old and Middle Kingdoms. p. 104.

¹⁰ LICHTHEIM, M. *Ancient Egyptian Literature*. Vol. I: The Old and Middle Kingdoms. p. 20.

¹¹ GOEDICKE, H. The Alleged Military Campaign in South Palestine in the Reign of Pepi (VIth Dynasty). In *Rivista degli studi orientali*, Vol. 38, 1963, pp. 187–197.

¹² MONNIER, F. *Les forteresses égyptiennes. Du Prédynastique au Nouvel Empire*. Bruxelles 2010, p. 20.

¹³ VANDERSLEYEN, C. “Montagne, colline, haut-plateau, etc.”, comment traduire le mot égyptien tjéset (Wb V, 401). In *Acta Orientalia Belgica*, pp. 41–54.

¹⁴ LICHTHEIM, M. *Ancient Egyptian Literature*. Vol. I: The Old and Middle Kingdoms. p. 104.

¹⁵ HOFFMEIER, J. K. “The Walls of the Ruler” in Egyptian Literature and the Archaeological Record: Investigating Egypt’s Eastern Frontier in the Bronze Age. In *BASOR*, No. 343, 2006, p. 1.

¹⁶ GARDINER, A. H. The Ancient Military Road Between Egypt and Palestine. In *Journal of Egyptian Archaeology*, 6, 1920, p. 99.

¹⁷ HOFFMEIER, J. K. “The Walls of the Ruler” in Egyptian Literature and the Archaeological Record: Investigating Egypt’s Eastern Frontier in the Bronze Age. In *BASOR*, No. 343, 2006, p. 1.

A third, more southern route, between Heliopolitan area and Clysma/Red Sea, might have been probably also in use, however, the significance of this route increased rather in later periods, when it was used by hajj pilgrims.¹⁸

Development of the Nome structure in the north-eastern periphery of Nile Delta

According to W. Helck the eastern side of the Delta probably represented originally one large Nome. The Heliopolitan (13th Lower Egyptian) Nome split off from it about in the time of Snofru. The residual Eastern (14th Lower Egyptian) Nome was subdivided in the 4th Dynasty; the 8th Nome of the Eastern Harpoon¹⁹ first appeared in the 5th Dynasty. The Nome also spread into Wadi Tumilat.²⁰

However, the 8th Nome probably did not cover the whole Wadi Tumilat of today. Similar to the area covered by the Predynastic and Early Dynastic sites²¹ the nome probably extended to Ras el-Wadi at Tell el-Retaba only, where an ancient lake/marsh finished (Fig. 1).²² The list on the Sesostri I chapel from the

¹⁸ PETERS, F. E. *The Hajj: The Muslim Pilgrimage to Mecca and the Holy Places*, p. 86f; ROBINSON, E., SMITH, E. *Biblical Researches in Palestine and the Adjacent Regions*, p. 37

¹⁹ There was an ancient Nome of Harpoon in the north-western Delta. In the “solar” 5th Dynasty this 7th Lower Egyptian Nome gained a supplementary “Western part/half”, opposite to the “Eastern part/half” (8th Lower Egyptian Nome). It seems plausible that the name of harpoon was used on the other side of the Delta due to the similar border and defensive character of the Nome; already in the Texts of Pyramids the pharaoh cuts off the heads of his enemies, supported by the god Horus with his harpoon, cf. ALLEN, T. G. *Horus in the Pyramid Texts*, p. 37. In a late tradition “*Horus nimmt seine Harpune von Erz, um die Köpfe der Feinde des Re zu zerschmettern und die Köpfe der Feinde Pharaos zu zerschmettern*”, cf. ASSMANN, J. *Magie und Ritual im Alten Ägypten*. In ASSMANN, J., STROHM, H. (Hg.). *Magie und Religion*, p. 23–43. However, there is also a different opinion, which questioned localisation of the Western and Eastern Harpoon Nomes before the Ptolemaic Period, cf. TIRIBILLI, E. *Travelling in Space and Time. The ‘West’ and ‘East’ Sides of the Harpoon: Two Geographic Divisions of the Same Name or Two Different Regions?* In ALVAREZ, Ch., BELEKDANIAN, A., GILL, A.-K., KLEIN, S. (eds.). *Current Research in Egyptology 16*, pp. 124–140.

²⁰ HELCK, W. *Zur Verwaltung Des Mittleren und Neuhen Reichs*, p. 198.

²¹ WETERING, J. van *Kafr Hassan Dawood On-Line*, Location of the site, Figure 2; available from <http://www.e-c-h-o.org/khd/location.html> [cit. 6 January 2018].

²² The lake has been corroborated by BIETAK, M. *On the Historicity of the Exodus*, p. 21, 23, Fig. 2.2.

12th Dynasty mentions that the Nome was long 4.5 iteru²³ (i.e. over 47 km). The mentioned length would roughly correspond to the extent of the 8th Nome up to Ras el-Wadi, at Tell el-Retaba.²⁴ However, the Nome's area of 6 cha²⁵ (over 16 ha, for a cultivated land?) belonged to the larger among 16 nomes of *Ta mehu* (Lower Egypt) of that time.

Epigraphy from the tomb of Nesutnefer in Giza (inter alia, the overseer of royal fortresses, fortified enclosures, and deserts in the 13th Nome of Lower Egypt) testifies to the presence of fortresses at strategic area of Eastern Delta, during the 4th Dynasty,²⁶ before the Nome of Eastern Harpoon was established. Lower Egypt may be considered a kind of a 'frontier area'²⁷ also during the 5th Dynasty and Delta seems to be directly administered from Memphis even in the 6th Dynasty, as the Upper Egyptian *Hq3w-hwt* dignitaries were buried in their provinces, but the majority of the equal Lower Egyptian dignitaries were attested only in the Memphite necropolis.²⁸

Due to their propagandistic nature, Ancient Egyptian literary works might not be fully trusted in their description of socio-political events. However, in an endeavour to justify their narrative, they might use real (e.g. topographic) details, mixed with socio-political ideas, to produce a believable blend. The *Instruction for king Merikare*, in Lichtheim translation,²⁹ mentions that "Medenyt has been restored to its nome, its one side is irrigated as far as Kem-Wer³⁰, it is the 'defense' against the Bowmen. Its walls are warlike, its soldiers many, its serfs know how to bear arms, apart from the free men within". According to other translations the king had to dig a canal (in Wadi Tumilat)

²³ LACAU, P., CHEVRIER, H. *Une chapelle de Sésostirs Ier à Karnak*, p. 234.

²⁴ The distance from Tell el-Retaba to the medieval entrance of the Wadi at el-Abbasa is about 24 km. The distance from el-Abbasa to Bilbeis, on which level the Nome could have started (BAINES, J., MALEK, J. 2005: *Atlas of Ancient Egypt*, p. 167), is about 20 km, totalling 44 km.

²⁵ LACAU, P., CHEVRIER, H., *Une chapelle de Sésostirs Ier à Karnak*. Pl. 42. Its area might have even 9 cha.

²⁶ MORENO GARCÍA, J. C. The Territorial Administration of the Kingdom in the 3rd Millennium. In MORENO GARCÍA, J. C. (ed.). *Ancient Egyptian Administration*, p. 101.

²⁷ Ibid., p. 108.

²⁸ Ibid., p. 125. However, absence of appropriate sites for popular rock-cut "houses for eternity" in the Delta should be also taken into consideration.

²⁹ LICHTHEIM, M. *Ancient Egyptian Literature*. Vol. I: The Old and Middle Kingdoms, p. 104.

³⁰ Toponym Km-Wr relates to a region between Ballah and Bitter Lakes and it also represented a fortified structure in the Eastern Delta, cf. MONTET, P. *Géographie de l'Égypte Ancienne*, Vol. I, p. 216.

and fill its half with water up to Bitter Lakes.³¹ Thus *Medenyt* is considered to be “*m denit*” – i.e. in a canal – or Wadi Tumilat.³²

However, there is a scarcity of archaeological sources (not only) in the Delta/Wadi Tumilat from this timespan and no “warlike walls” have so far been archaeologically attested in the Wadi, although the red jasper weight with cartouche of *Nebkawre Khety* (UC 11782)³³ acquired by Petrie at Tell el-Retaba (or around)³⁴ could support, in its limited way, the literary tradition on activities of the FIP pharaohs in Wadi Tumilat. Both sources might indirectly support arguments on a strategic role of the Wadi in the First Intermediate Period.

Walls of the Ruler

The prophecies of Neferti, a propagandistic piece from the 12th Dynasty, antedated to the time of pharaoh Snofru, the first ruler of the 4th Dynasty, mentions some *Ameny* (Amenemhet I), who “will build the Walls-of-the-Ruler to bar Asiatics from entering Egypt”.³⁵ Taking into consideration also information from the *Instruction for king Merikare*, it seems plausible that the Egyptians of at least First Intermediate Period /Middle Kingdom might have used a combination of marshes, lakes, canals and walls to protect their north-eastern border.

Due to the aforementioned scarcity of archaeological sources, it is difficult to provide a reconstruction of the Middle Kingdom’s defence system in the Delta. With an assessment of the contemporary geographical surface and consistent military logic, it would be possible to provide a sketch at least.

The Isthmus of Sues was a natural defence line against intrusion from the east. It would be also possible to consider a defence line between the Gulf of Aqaba and the Mediterranean, however, a half-length of the defensive line (210

³¹ VACHALA, B. *Moudrost starého Egypta* [The Wisdom of Ancient Egypt], p. 81; WARD, W. A. *Egypt and the East Mediterranean World, 2200 – 1900 B. C.*, p. 34.

³² A possible comparison between the *denit* of the First Intermediate Period and *ta denit* of Seti I (GARDINER, A. H. The Ancient Military Road between Egypt and Palestine. In *Journal of Egyptian Archaeology*, 6, 1920, p. 104, pl. 11) would deserve a separate and more substantial research.

³³ Available from <http://www.ucl.ac.uk/museums-static/digitalegypt/weights/weight.html> [cit. 6 January 2018].

³⁴ PETRIE, W. M. F., DUNCAN, J. G. *Hyksos and Israelite Cities*, p. 34; PETRIE, W. M. F. *Scarabs and Cylinders with Names*, 1917, pl. X, n. 9.2.

³⁵ POSENER, G. Littérature et politique dans l’Egypte de la XIIe Dynastie, pp. 28, 47 ff.

versus 120 km³⁶), the geomorphological character of this area and military logistics clearly favour the Isthmus defence line in antiquity.

The Isthmus was not probably covered by sea waters even in periods when the sea levels were more than 23 m above the present level.³⁷ With progressing aridification/drying up of the Holocene northern Africa, and other geological and climatic processes, the sea water sunk and might persist only in the Isthmus depressions, now known as Ballah, Timsah and the Bitter Lakes. The Manzala Lake did not exist yet; it replaced a paleo lagoon of the Mediterranean later on.³⁸ These more or less shallow lakes and/or marshes were probably irregularly flushed by excessive Nile floods via Wadi Tumilat³⁹, and via the easternmost Pelusiac Nile branch.

Between the lakes, there were slight plateaus/sills – Gisir (the highest) between Ballah and Timsah lakes (ca 20 km long), Serapeum between Timsah and the Bitter Lakes (ca 15 km long) and Shallufa between the Bitter Lakes and the Red Sea (ca 25 km long).⁴⁰

It seems that the 13 km long east-west oriented higher terrain (although with some lakes/ marshes) between Ras el-Wadi and Abu Kashab (today Tell el-Maskhuta) represented a natural separation between the two parts of Wadi Tumilat; the separation was still preserved on maps from the *Déscription*⁴¹ period: only the western part of the valley was called Wadi Tumilat, while the eastern part had the name Wadi Saba Biar, i.e. Valley of seven wells (Fig. 2).

Movement on the western side of the southern Isthmus was also obstructed by the natural barrier of several hills (although with valleys towards Delta and Wadi Tumilat), from north southwards: Gebel Geneifa/Gebel Ahmed Taher, Gebel Sabraweet, Gebel Shallufa and Gebel Ataqa.

From a military point of view, several prerequisites would have been essential for the defence of the eastern Delta in the above mentioned topographic relief:

³⁶ With lakes/marshes excluded, the land defence line would have been even shorter – total ca. 60 km (20 + 15 + 25 km).

³⁷ POR, F. D., DIMENTMAN, C. *The Legacy of Tethys: An Aquatic Biogeography of the Levant*, p. 24.

³⁸ PENNINGTON, B.T. et al. The Fluvial Evolution of the Holocene Nile Delta. In *Quaternary Science Reviews* 170, 2017. Available from DOI: 10.1016/j.quascirev.2017.06.017 [cit. 6 January 2018].

³⁹ POR, F. D. *Lessepsian Migration*, p. 28.

⁴⁰ KERISEL, J. *The Nile and Its Masters: Past, Present, Future: Source of Hope and Anger*, p. 105.

⁴¹ DESCRIPTION, Tome/Volume 23, Atlas Géographique, Canal de Suez, p. 76, planche 30, p. 78, planche 31.

- First, the lakes and/or marshes must not dry up to such an extent that they would become crossable;
- Second, the plateaus/sills between lakes/marshes should be controlled and protected against undesirable moves;
- Third, a sole defence line would not be enough.

It is not clear so far, whether the 4.2 ka BP event⁴² could have caused a drying up of lakes and marches in the Isthmus. Dried-up-lakes might have allowed and induced greater penetration by the Asiatics/Beduins into the eastern Delta, towards the Nile River, and a necessity by the Egyptians to fight them, as described by Weni (see above).

A rational/reasoned countermeasure in such a case would have been to renew lakes and marshes again by digging up canal(s) and flushing the Isthmus. Making a canal was among the suggestions to the king Merikare (see above). There are several opinions on the date and kind of defensive measures in the eastern Delta, which include excavated canals and defensive embankments constructed from their excavated material.⁴³ A canal in this area could have correlated with pharaoh Senwosret's rule, according to some ancient historians.⁴⁴

Walls could be very effective designations to restrain undesirable moves. Seemingly, walls were a usual part of the Middle Kingdom's defence system in the Upper Egyptian border zone and Nubia.⁴⁵ So far no Middle Kingdom fortress has been excavated in the Eastern Delta area⁴⁶, thus there is only indirect evidence of their existence and/or their walls.⁴⁷

The *Tale of Sinuhe* belongs to one of them, mentioning: "I ferried over in a barge without a rudder, by the help of a western breeze; and passed on by the East of the quarry in the district Mistress-of-the-Red-Mountain. I gave a road to my feet northward and attained the Walls of the Ruler, which was made to repel the Setiu and to crush the Sandfarers. I bowed me down in a thicket

⁴² RAMBEAU, C., BLACK, S. Paleoenviroments of the Southern Levant 5000 BP – present: linking the geological and archaeological records. In MITHEN, S., BLACK, E. (ed.). *Water, Life and Civilisation: Climate, Environment and Society in the Jordan Valley*, p. 99.

⁴³ HOFFMEIER, J. K. *Israel in Egypt*, pp. 164ff.

⁴⁴ HUDEC, J., FULAJTÁR, E., STOPKOVÁ, E. Historical and Environmental Determinations of the Ancient Egyptian Fortresses in Tell el-Retaba. In *Asian and African Studies*, 2015, Vol. 24, No. 2, pp. 247–261.

⁴⁵ VOGEL, C. *Ägyptische Festungen und Garnisonen bis zum Ende des Mittleren Reiches*, p. 19f, 269, 271.

⁴⁶ Ibid, p. 92–96

⁴⁷ Ibid, p. 94.

through fear lest the watcher on the wall for the day might see. I went on at time of night, and when it dawned I reached Petni. I halted at the Island-of-Kemwer.”⁴⁸

The *Tale of Sinuhe* could have propagandist purposes. However, to serve these purposes, it could have contained realistic topography. *The Wall of the Ruler* could have been assumed in Wadi Tumilat⁴⁹ (at Tell el-Retaba⁵⁰, which might be the point in the defence line/wall closest to Gebel el-Ahmar), if Sinuhe could have achieved almost 90 km⁵¹ during one November day.⁵² It would have been otherwise a very hard achievement, although a possible one:

⁴⁸ LICHTHEIM, M. *Ancient Egyptian Literature*. Vol. I: The Old and Middle Kingdoms, p. 224.

⁴⁹ REDFORD, D. B. *Egypt, Canaan, and Israel in Ancient Times*, p. 80; GRIMAL, N. *History of Ancient Egypt*, p. 160.

⁵⁰ Sinuhe was apparently versed in military and foreign affairs, thus he probably used military desert path(s) north-eastwards and did not wander almost 70 – 75 km among sand dunes and/or irrigation canals, which would have been the preferred situation if he ran northwards, toward the eastern entrance (Abbasa) of Wadi Tumilat (VOGEL, C. *Ägyptische Festungen und Garnisonen bis zum Ende des Mittleren Reiches*, p. 162). However, such an important defence against the Asiatics so deep inland of the 8th Lower Egyptian Nome does not sound plausible. Moreover, it is improbable that Sinuhe went another ca 40 – 50 km eastwards in the night to reach Petni/Peten at dawn. It seems more likely that he decided not to cross the Wadi Tumilat in Retaba and he didn't head towards Ways of Horus, but instead he followed the Wall of the Ruler eastwards in the night to reach Petni/Peten (maybe Maskhuta?; just 13 km) and Kem wer (another ca 25 km; if Kem wer, mentioned already in the Old Kingdom sources, cf. FAULKNER, R. O. *The Ancient Egyptian Pyramid Texts*, p. 120 and VOGEL, C. *Ägyptische Festungen und Garnisonen bis zum Ende des Mittleren Reiches*, pp. 30–34, was about the venue of the much later Serapeum on the island/sill between Timsah and the Great Bitter Lakes).

⁵¹ It is problematic to assess to which point Sinuhe came “in a barge..., by the help of a western breeze”, therefore the time of transfer is applied for both 84 and 90 km.

⁵² The 7th day of the 3rd month of inundation (LICHTHEIM, M. *Ancient Egyptian Literature*. Vol. I: The Old and Middle Kingdoms, p. 223) would have been in November during the rule of Amenemhet I/Senwosret I. (GERTOUX, G. *Absolute Chronology of the Ancient World from 2840 BCE to 1533 BCE*, p. 39). The length of day (between sunrise and sunset) in November is more than 10 hours, cf. Timeanddate.com, available from <https://www.timeanddate.com/sun/egypt/cairo> [cit. 6 January 2018].

Movement category	Speed (m/s)	Speed (km/h)	Total time (hours: 84 / 90 km)
Conservative walk ⁵³	1.22	4.4	19.1 / 20.5
Race walk ⁵⁴	3.00	10.8	7.8 / 8.3
Marathon run ⁵⁵	3.33	12	7 / 7.5
Run ⁵⁶	5.00	18	4.7 / 5

There are also other indications that one of the Walls of the Ruler could have been in Wadi Tumilat, starting at Tell el-Retaba. As mentioned above, the western part of the wadi extended from the Delta only to Ras el-Wadi; an ancient lake/marsh in this part of the wadi probably terminated close to Tell el-Retaba. The eastern part of the wadi was probably also partly under water, between Timsah Lake and Tell el-Maskhuta, as recorded still at the end of the 18th century AD.⁵⁷

It is plausible that ancient military needed a permanent ability to operate and move in the country all the year around, regardless of the seasons and seasonal limits to operation. Due to the aforementioned topography, the only space for military to move in the south-north direction across Wadi Tumilat, without wading in morass (swimming was probably not so common), was in a ca 13 km long distance/space between Tell el-Retaba and Tell el-Maskhuta (Fig. 2). By building a wall between these two places a strategic defensive line could have arisen, effective during most of the year and protecting access to all historic Ancient Egyptian residences from the north(-east), in case enemies fought their way through the first defensive line in the northern part of the Isthmus (Ways of Horus).

Long defensive walls were not an extraordinary feature among the Middle Kingdom's military construction, as demonstrated by a several-kilometres-long wall between Aswan and Philae⁵⁸, or the wall between Semna-West and

⁵³ GARBER, N. J., HOEL, L. A. *Traffic and Highway Engineering*, SI Edition, p. 59.

⁵⁴ ENOKA, R. M. *Neuromechanics of Human Movement*, 4th edition, p. 141.

⁵⁵ CHAPMAN, A. E. *Biomechanical Analysis of Fundamental Human Movements*, Age 50–54.

⁵⁶ ENOKA, R. M. *Neuromechanics of Human Movement*, 4th edition, p. 141.

⁵⁷ DESCRIPTION, Tome 2, Antiquités, Descriptions, Paris 1818, p. 6.

⁵⁸ JARITZ, H. *The Investigation of the Ancient Wall Extending from Aswan to Philae: Second Preliminary Report*, pp. 108–132; VOGEL, C. *Ägyptische Festungen und Garnisonen bis zum Ende des Mittleren Reiches*, Abb. 37, p. 269.

Uronarti.⁵⁹ The northern end of the defensive wall on the eastern side of the first cataract was even fortified, as well as its southern end.⁶⁰ Such arrangements could have been expected also on the western and eastern ends of the supposed wall in Wadi Tumilat, where smaller (?) fortified ends could have developed into Tell el-Retaba and Tell el-Maskhuta forts.⁶¹ It is possible that similar walls were risen by Amenemhet I also on other sills between the Isthmus' lakes (as he was so famous because of the walls constructions); however, clear archaeological evidences are absent so far. Traces of Middle Kingdom settlement at Tell el-Retaba are missing as well.

Recent research of fortification structures in Tell el-Retaba

Recent archaeological excavations at Tell el-Retaba significantly contributed to the knowledge of defensive constructions of the 19th and 20th Dynasties. During rescue excavations in 2010 – 2011 (directed by Mustafa Nur el-Din)⁶² and 2017 (directed by Khaled Fareed), two, ca 214 m long, parallel (ca 9 – 11 m from each other), approx. N – S oriented sections were cleaned in a construction area for new road lines, on the eastern side of the Salheya-Dawaweez road, already constructed across the western part of the tell in the 1970's. Petrie's Walls 1 – 3 were recorded in the eastern section, and the last traces of Wall 2 in the western section close to the southern end of the sections (Fig. 3/Map) in Area 9.

⁵⁹ MILLS, A. J. The Archaeological Survey from Gemai to Dal. Report on the 1965 – 1966 season. Kush 15, 1973, p. 206, pl. XXXVIIIb; VOGEL, C. *Ägyptische Festungen und Garnisonen bis zum Ende des Mittleren Reiches*, Abb. 38, s. 271.

⁶⁰ JARITZ, H. The Investigation of the Ancient Wall Extending from Aswan to Philae: Second Preliminary Report, MDAIK, 49, 1993. pp. 108–132; VOGEL, C. *Ägyptische Festungen und Garnisonen bis zum Ende des Mittleren Reiches*, Abb. 37, p. 269.

⁶¹ The hypothesis on the complementary existence of settlements at Retaba and Maskhuta seems to be obsolete cf. KITCHEN K. A. *On the Reliability of the Old Testament*, pp. 257–259. Recent excavations at Retaba confirms an almost uninterrupted settlement from the SIP to the Greco-Roman Period. The hiatus of the New Kingdom settlement in Maskhuta was also partly fulfilled by the discovery of the Ken-Amun tomb of 19th Dynasty (ABD EL-MAQSUD, M.) and finds from other recent excavations (NOUR EL-DIN, M.).

⁶² RZEPKA, S. et al. Egyptian Mission Rescue Excavations in Tell el-Retaba. Part 1: New Kingdom Remains. In *Ägypten und Levante*, 2012 – 2013, Vol. 22/23, pp. 253–287; NOUR EL-DIN, M. et al. Egyptian Mission Rescue Excavations in Tell el-Retaba. Part 2: The Second Intermediate Period Cemetery. In *Ägypten und Levante*, 2016, Vol. 26, pp. 75–114.

In 2017 season traces of so far unknown parts of Petrie's Wall 1 and 2 were recognised close to the northern end of the sections, i.e. in Area 2. Wall 1 was so far previously attested only from the western (Area 4) and southern side (Area 9) of the tell and in the water-pipeline's trench in 1981.⁶³ The continuance of the Wall 2 on the northern side was previously identified by geophysics⁶⁴ and in several short test pits alongside its length⁶⁵ (Fig. 3/Map).

Construction characteristics of Wall 1

The dimensions of Wall 1 and dimensions and material of its mud-bricks in the eastern section of Area 2 were rather similar to the core of Wall 1 on the western side of the tell (Area 4).⁶⁶

In general, more types of mudbricks were used in wall construction. Wall 1 in Area 4 (Fig. 4) consists of a core (width at the bottom ca 1.85m), internal extension (width ca. 2.05 m) and external extension (width ca 1.40 m). Fine yellow sand was in the footing bottom of both extensions. According to the same dimensions of mudbricks and also greenish and black mudbricks used in both extensions and due to the same bonding pattern of bricks, it is possible to assume that both extensions were probably made at the same time to widen and heighten the defence wall of the fortress. These greenish and black bricks were, however, not used in the foundations or the edge, probably due to their fragility and enhanced water sensitivity.

Wall 1 in Area 9 (Fig. 5) also consisted of a core (width at the bottom ca 1.80 m), internal extension (width 1.30 m) and external extension (width 1.40 m). At the footing bottom of the internal extension was a gravel bed with shards; it was about 20 cm higher than the foundation level of the wall's core. The external extension was at a lower level than the core, about a brick height,

⁶³ Sheet no. 10 available from <http://users.stlcc.edu/mfuller/Retaba/Retaba1981/profiles.html> [cit. 6 January 2017] drawn by M. J. FULLER. The loci 113 and 117 are very probably the residua of the Wall 1, as the distance from the internal side of L.113 to the external side of Wall 2 (ca 42 m) corresponds to such distance between Wall 1 and 2 on Petrie's map (cf. PETRIE W. M. F., DUNCAN, J. G. *Hyksos and Israelite Cities*, Pl. XXXV) in the place of the water-pipe trench's eastern profile (Fig. 3).

⁶⁴ RZEPKA, S. et al. Tell el-Retaba 2007 – 2008. In *Ägypten und Levante*, 2009, Vol. 19, p. 249, Fig. 7.

⁶⁵ Ibid., p. 252.

⁶⁶ RZEPKA, S. et al. New Kingdom and the Third Intermediate Period in Tell el-Retaba. In *Ägypten und Levante*, 2011, Vol. 21, pp. 143–145, Fig. 19.

on a sand layer about 5 cm thick. The core of the wall was built on a sand layer about 15 cm thick; a rusty coloured gravel was below the sand layer.

Several samples of mudbrick and soil have been examined on the ground during archaeological seasons. The particle size distribution of a soil (mudbrick composition) was analysed as a grain-size curve. The general slope and shape of the distribution curve can be described by means of the coefficient of uniformity C_u and the coefficient of curvature C_c . The higher value of the C_u the larger the range of particle sizes in the soil.⁶⁷ A soil that has $C_u < 4$ contains particles of uniform size (approximately one size). The minimum value of C_u is 1 and corresponds to an assemblage of particles of the same size. Higher values of $C_u > 4$ describe a well-graded soil and such material is very suitable for mudbricks. The coefficient of curvature C_c is between 1 and 3 for well-graded soils. The absence of certain grain sizes, termed gap-graded, is diagnosed by a value of C_c outside the range 1 to 3 and sudden change of slope in the particle size distribution curve.⁶⁸

A comparison of mudbrick Wall 1 in Area 4 (sample S-MB1) and in Area 9 (sample S-MB4) indicates slightly different dimensions of mudbricks, but probably also different soil materials used, according to the preliminary evaluation of the coefficients C_u , C_c and γ ; thus, it is possible to assume that mudbrick S-MB1 ($C_u = 18$, $C_c = 0.6$, $\gamma = 2010 \text{ kg/m}^3$) has better quality than S-MB4 ($C_u = 7.5$, $C_c = 3.3$, $\gamma = 1650 \text{ kg/m}^3$). The material of mudbricks from Area 4 was comparatively better and more proper for mudbrick use than the material in Area 9, confirmed also by values of brick density.⁶⁹ Analyses of mudbrick in the core of Wall 1 and in its extensions (internal and external) in Area 4 show that they were made of different mudbrick material, despite the core and extension mudbricks having the same dimensions.

In Area 2 the dimensions and material of mud-bricks were similar in both sections, and in the structure of the wall black and greenish mudbricks were used also. Wall 1 in the eastern section of Area 2 (Fig. 6) consisted only of the core, its width was ca 1.45m at the wall's bottom. However, the wall in the western section (Fig. 7) was wider (ca 3.20 m). It seems that either the wall was cut aslant (when it changed direction in this area), or there was a bastion connected to the wall in this very place, similar to bastions identified by Petrie⁷⁰ (Fig. 3/Map). Unfortunately, due to heavy traffic above the section, further

⁶⁷ CRAIG, R. F. *Soil Mechanics*, pp. 7–8.

⁶⁸ BUDHU, M. *Soil Mechanics and Foundations*, p. 45.

⁶⁹ In the opinion of K. Smoláriková it is perhaps because of the fact that the wall in Area 4 is connected to the gate of the fortification and architects might accent the best quality of used mud-bricks, while the wall in Area 9 represents only a part of an ordinary wall.

⁷⁰ PETRIE, W. M. F., DUNCAN, J. G. *Hyksos and Israelite Cities*, pp. 28f, Pl. XXXV.

research was not possible to make. Individual samples of mudbricks of Wall 1 for various sections are shown in Tab. 1 below.

Tab. 1 Mudbrick samples for Wall 1

Name	Type	Location	Description	Position	Dimensions
S-MB1	mudbrick	Wall 1 (section in Area 4)	regular brown mudbrick	core, 4th row	9x19x38cm
S-MB2	mudbrick	Wall 1 (section in Area 4)	regular brown mudbrick	external extension, 5th row	9x19x39cm
S-MB3	mudbrick	Wall 1 (section in Area 4)	regular brown mudbrick	internal extension, 9th row	9x19x39cm
S-MB4	mudbrick	Wall 1 (eastern profile, Area 9)	regular brown mudbrick	core, 2nd row	9x15x34cm
S-MB5	mudbrick	Wall 1 (section in Area 4)	black mudbrick	core, 5th row	9x19x39cm
S-MB6	mudbrick	Wall 1 (section in Area 4)	greenish mudbrick	external extension, 10th row	9x19x33cm
S-MB25	mudbrick	Wall 1 (eastern profile, Area 2)	black mudbrick	core, 1th row	8x20x38cm
S-MB26	mudbrick	Wall 1 (eastern profile, Area 2)	greenish mudbrick	core, 2nd row	8x19x38cm
S-MB27	mudbrick	Wall 1 (western profile, Area 2)	black mudbrick	core, 4th row	8x19x35cm
S-MB28	mudbrick	Wall 1 (western profile, Area 2)	greenish mudbrick	core, 2nd row	9x19x38cm

It seems plausible that bricks of some older structures were also reused in Wall 1 or some other constructions. Dimensions in Wall 1 do not exactly fit the dimensions of older structures⁷¹, however, the mud bricks might be damaged by secondary usage. The coloured bricks were always bound by brown mortar.

Characterization of moats related to Wall 1 and their infillings

The investigation of the moat infillings was based on experience of field investigation into the morphology developed in soil science and Quaternary geology. The experience gained especially in studies of soil genesis and classification brought a lot of information about the soil morphology. It is known that the geological processes responsible for the formation of the soil parent materials as well as most soil forming processes leave in the soil their 'signature' in a form of specific morphological features which are used in soil classification.⁷² These features are well known and their classification may involve also the anthropogenous processes dominant in urban soils of recent cities and at archaeological sites. This knowledge can be useful for archaeology as enabling the distinguishing of different types of natural and man-made loose earth materials. During the pedological surveys the following categories of loose earth materials were distinguished:

- 1) Natural alluvial soils characterised by fluvial stratigraphy and red-oximorphic features. Alluvial soils at the Tell el-Retaba site are comprised of fine gravel, separated apart by fluvial morphology, also by weathering indicated by the rusty colour of the well-developed soil weathering (and eventually also illuviation) horizons. This natural soil material underlies the whole complex of archaeological cultural layers of Tell el-Retaba (Fig. 8&9/2, 3).
- 2) Natural eolian (wind-blown) sandy layers characterized by relatively a homogeneous thin stratification of fresh or slightly humiferous sands (Fig 10/4). This type occurs in small patches across the site forming either thin local covers (usually less than 1 m, exceptionally up to 150 cm thick), or infilling of depressions. The wind material can be easily distinguished from fluvial because of a characteristic sandy texture much finer from the alluvial gravels, and it is characteristic also of a frequently oblique inclination of the layers and the cross-like stratification originating when winds blow from different directions during different periods.

⁷¹ Black House 1: 12x17x36cm, 12x17x36cm, 9x19x39cm, 9x17x36cm; black mud bricks of granary SU 2414: 9x13x38cm; Green House: 9x19x34cm, 9x16x38cm.

⁷² KUBIĚNA, W. L. *Micromorphological Features of Soil Geography*.

- 3) Simple, usually intentional anthropogeneous deposits represent the material dug and replaced by man for one purpose and during one event. This means, for example, that people decide to close some artificial pit or natural depression and to level the land surface. Such activity is done in one go or over a short period, and this is seen from the limited variability of the material, which is patchy but not stratified because it is usually taken from one source and has limited variability. This type usually refers to small micro-relief features (Fig. 11/5).
- 4) Complex, usually incidental and consequential anthropogeneous deposits refer to large accumulations of man-transported material which is deposited over a long time and results from multiple depositional events. The primary purpose is not the deposition of the material but cleaning of some other area, and the deposition is only a consequence of the primary intention. The major characteristic morphological features are rough irregular stratification (oblique strata, lenses, patches, etc.) and great variability of the material in terms of texture, colour, chemical compositions, coarse fraction and artefact content. This great variability results from a large spatial and temporal differentiation of the material. It frequently may contain charcoal, ash layers or lenses, bricks and ceramics (if originating during older historical periods) or glass, metal and plastic materials and chemical contaminants if more recent (Fig. 12/6).

The above mentioned basic types of infillings occurring at Tell el-Retaba can be clearly distinguished as demonstrated by Fig. 13/7. This morphological classification was used for characterizing the infillings of the investigated moat profiles.

After closer examination of the sections, traces of a moat were identified in both of them. According to evident stratigraphy, the moat was related to the 19th Dynasty wall (Petrie's Wall 1), running an approx. E – W direction ca 7 m northwards from Wall 1. In coincidence of circumstances the southern edge of the moat (closer to Wall 1) was in both sections disturbed by younger human activities. The maximum width of the moat in the eastern section was ca 7.5 m, maximum depth ca 95 cm (Fig. 14); width in the western section it was ca 6.5 m, and depth ca 140 cm (Fig. 15). The northern edge of the moat was slightly deeper than the level at the southern edge. The sections of the moat were not exactly opposite each to other, indicating that the moat profile cut by the archaeological section is slightly aslant to the direction of the moat, and thus the moat was oriented NEE – SWW.

The filling of the moat (Profile 1) is shown on Fig. 15/8. The colour of the material (several hues of greyish and brownish), the texture (sandy), content of irregularly scattered coarse fraction (natural gravel as well as artefacts, mainly

ceramic fragments) and rough irregular stratigraphy with varying inclinations not corresponding to a mechanism of natural sedimentation agents suggest that this moat infilling results from a dump site, which occupies this part of the moat after it lost its defence function.

In 2017 season a double moat of the 19th Dynasty fortress was also discovered by the Polish – Slovak mission in the squares Y65X200, Y65X205, Y65X210, Y70X200, Y70X205 and Y70X210 (Fig. 3/Map). The moat run from NNW to SSE, apparently alongside the western side and/or NW corner of the Wall 1. It consists of two depressions: the shallower one is ca 30 cm deep (90 cm from Wall 2 bottom) and ca 6 m wide, situated further from the wall (more westward); the deeper one is ca 1.3 m deep (190 cm from Wall 2 bottom) and ca 5 m wide, situated closer to the wall (more eastward), (Figs 16–18).

The shallower moat was probably a continuation of the above mentioned northern moat (identified in both sections) on the western side of the 19th Dynasty fortress. Beside the similar shape in section (depth and width) it is supported also by similar distance from Wall 1.

Three profiles were investigated at cross section of these moats. Their positions are shown on Fig. 3. The stratigraphy of the excavated profiles 2 and 3 of moats infillings showed that they were filled to large extent naturally by sandy material, which might be in some places after its deposition by wind locally redeposited by water. However, a minor component of coarse fragments in both profiles indicate that during the eolian deposition also some settlement was present nearby and people were contaminating the deposited material occasionally by dumping stones, sherds, etc.

Profile 2 (Fig. 16/9) in the deeper moat represents typical eolian sandy deposits with oblique oriented fine stratification. The layers are associated with the original bottom of the moat which was relatively steep at this place when the sand sedimentation began.

The best view of the moat infilling is seen in profile 3 (Figs. 18, 19/10, 11) of the shallower moat. In this profile there can be seen the rusty weathered alluvial gravel of natural soil in the basement of the cultural layers (similar as at Fig. 8/2). The gravel is covered by a complex of archaeological cultural layers, including the Wall 2 mud bricks. The moat infillings comprise of stratified eolian sand deposits with several layers of fresh yellowish sand and slightly humiferous greyish sand. The sand layers at this place were most probably locally redeposited by water because the oblique microstratification and cross-orientation of strata typical for the wind deposits are not well pronounced here. The strata are very smooth and in the lowest part of the profile they copy the convex bottom of the moat and in the upper part of the profile they became gradually horizontal. This morphology suggests the impact of local redeposition by water, either smooth flowing or stagnating. The moat represented a

depressional form of microrelief which may serve as a temporal collector of surface water runoff after rarely happening extreme rainfall events. The moisture from rainfall and from lateral subsurface penetration from the surroundings accumulated in the moat and supported the vegetation growth. This is indicated by the occurrence of weakly developed humiferous horizons resulting partially from the deposition of slightly humiferous sand, but partially also by new organic matter formation after the deposition of the sand in the moat. However, the depression was not oversaturated by excess moisture because no red-oximorphic features were observed.

The reason, why is the moat on the western side geminated could be explained by the presence of a gateway to the 19th Dynasty fortress. The presence of the gateway in Wall 1 was already indicated by Petrie⁷³ (Fig 3) on the eastern side of the northern Migdol's tower. The arrangement of the moats on the northern side of the Migdol indicates the occurrence of a passage to the gateway from the western side. The passage was later covered by the Migdol, however, the cessation of the shallower moat in the area of the squares Y65X190 and Y65X195 where the moat rises up southwards from Y65X205 and Y65X200, shows that it respected the passage. The elevation of the shallower moat, from the profile 3 to its disappearance close to Black House 1, makes 1 meter up on ca 7 m length.

The deeper moat cut at least one large massive mud-brick tomb architecture of the Second Intermediate Period date, when it was ditched in the time of 19th Dynasty. It was probably contemporary with the shallower moat, as is demonstrated by the same fill of fine yellow Eolic sand (Fig 16B, 18). The fill of the deeper moat covered on its eastern side cultural layers from the 18th Dynasty; this stratigraphy also supports its date to the 19th Dynasty. The continuation of the deeper moat to the south was not interrupted (as it was in the case of the shallower moat), as corroborated by the previous discoveries of the Polish – Slovak excavations in the so called Naville's trench⁷⁴ (Fig. 20). The deeper moat was apparently intended for strengthening the defence of the gateway to the 19th Dynasty's fortress. It is also worth considering whether particularly the shallower moat could not also serve as a mud source for bricks used to construct the defensive walls. The constructors took the material from the source situated close to the construction site, e.g. along the external site of the wall. This approach had a double effect:

⁷³ PETRIE, W. M. F., DUNCAN, J. G. *Hyksos and Israelite Cities*, Pl. XXXV.

⁷⁴ RZEPKA, S. et al.: Tell el-Retaba from the Second Intermediate Period till the Late Period. Results of the Polish–Slovak Archaeological Mission, Seasons 2011 – 2012. In *Ägypten und Levante*, 2014, Vol. 24, p. 50.

- 1) minimizing the effort of man labour needed for the construction of the wall and
- 2) strengthening the defence efficiency of the wall as digging of the moats increased the elevation which attackers would have to overcome.

This reasoning is supported by the fact that one of the few known New Kingdom moats in the region, the moat at Tell-Borg dated to the 18th Dynasty⁷⁵, was made by a completely different building process. The sides of the moat at Tell-Borg were strengthened by 8 rows of burned bricks at the bottom, and higher the sides were overlaid by mud bricks at a 45 degree angle.⁷⁶

Future excavations could be probably able to determine the deeper moat's southern extent; unfortunately, its northern extent will not be most likely determined. It is already overbuilt by recent buildings, which are constructed over an area, where the moat(s) probably turned eastwards.

Closer examination of the southern end of the above mentioned long sections (Area 9) in 2017 confirmed that the defence moat of Wall 1 is present also in this part of the tell, at least in the eastern section (Fig. 21). The fill of the moat, made of fine yellow eolian sand, had already been noticed earlier, however, it was not interpreted. Due to presently-working building mechanisms it was neither possible to excavate the moat, nor to clean its profile in the western section. The shape of the moat in the eastern profile indicated rather a continuation of the shallower one; its southern end/edge was disturbed by a pit with a large amount of Greco-Roman ceramics.⁷⁷ Similar to Wall 1, also the moat was cut aslant in this part of the site, as it runs NW – SE.

Possible presence of the moat in the eastern profile of the water-pipeline's trench (cf. note 63) is not possible to attest due to unexcavated and covered section on the supposed spot of the moat (Fig. 22).

From the infillings of the moats investigated in profiles 1–3, it can be assumed that some parts of the moats underwent natural geomorphological development (filling by sand deposited by wind and eventually water), while other parts were filled by dumps. This indicates that during the ca 100 years' period of their existence (roughly between Ramses II and Ramses III) there was probably a period when the moats were not maintained but abandoned and filled

⁷⁵ HOFFMEIER, J. K. *Akhenaten and the Origins of Monotheism*, p. 185.

⁷⁶ Ibid. p. 185; HOFFMEIER, J. K. Reconstructing Egypt's Eastern Frontier Defense Network in the New Kingdom (Late Bronze Age). In JESSE, F. and VOGEL, C. (eds.). *The Power of Walls – Fortifications in Ancient Northeastern Africa*, pp. 172–179, figs. 6–8, 12, 14.

⁷⁷ For a rough estimation of the ceramics on the ground we are grateful to Květa Smoláriková. According to workers' information the buried ceramics resulted from a SCA excavation, probably accomplished in the 1990's.

mostly by natural geomorphological processes. However, some local settlement sustained at the site of the former fortress is indicated by dump infillings of some parts of the moat. When, during the rule of Ramses III the Wall 2 was constructed atop the shallower moat from the 19th Dynasty, the moat was already naturally filled and it was not necessary to make its substantial filling.⁷⁸

Situation and construction characteristics of Wall 2

The moat examined in Area 9 was to a lesser or larger extent overbuilt by Wall 2 of Ramses III of 20th Dynasty (Fig. 21). A similar arrangement, with Wall 2 built above the moats, was recorded in Area 4 (Fig 18), where Wall 2 was constructed mainly above the shallower part of the moat, however, with some extent of its internal side over the deeper moat. Some other features were recorded on the internal side of Wall 2 in Area 4, which could be related to the construction of the internal sand rampart/embankment⁷⁹ (Fig 22). During the excavation on the internal side of Wall 2 an irregularly high and wide, muddy-stoned layer was discovered running alongside the internal side of Wall 2. The purpose of the layer might emphasise the border of the rampart's bottom line. Different elevation, distance from the wall and also width of the starting mud-sand layer point out that this layer could be an auxiliary structure, which helped during the construction of the Wall's fundaments/platform, considering the uneven terrain. However, a mud brick material washed of Wall 2 down the rampart could not be excluded as well.

According to the information of sand samples from the wall foundations footing bottom testing at the site, and also by the measuring of a friction angle with approximate correlations⁸⁰, an effective friction angle for the cohesion less soil (sand) in range $\phi = 28 - 42$ degrees for very loose to very dense condition was determined. So the natural windblown sandy slope could have maximum inclination of about 30 degrees and a slope constructed by building activity could reach most likely a maximum of inclination about 40 degrees.

At the eastern section view (Fig. 23a/4 MC) in Area 9 is shown a relation between Walls 2 and 3, where there is an evident sand slope at the internal side

⁷⁸ The observation of Petrie that at Retaba "Any pit in this region is quickly filled up with sand from the desert, and the holes made in one year are levelled up again in the next" (PETRIE, W. M. F., DUNCAN, J. G. *Hyksos and Israelite Cities*, p. 28) is worth of consideration.

⁷⁹ ČERNÝ, M., HUDEC, J. Fortifications at Tell el-Retaba. In *Asian and African Studies*, 2016, Vol. 25, No. 2, pp. 125, 300, pl. 17.

⁸⁰ DAY, R. W. *Foundation Engineering Handbook*, pp. 3–24.

of Wall 2 (yellow dot line) with an angle of about 38 degrees. When considering of shear strength soil parameters and the above mentioned facts, it could be assumed that the slope is a result of a building activity. A similar situation of the relation between Walls 2 and 3 has already been examined by Goedicke's mission (Fig. 23b/5 MC), situated about 150 m eastwards from the section in Area 9.

Based on the information on sand friction angle, it is possible to assume that the sand rampart in Area 4 had about 30–40 degrees minimum and maximum inclination, from the muddy-stones layer as a starting line of the slope towards to Wall 2. The height of the slope at Wall 2 could be about 1.65 – 2.35 m for a distance of the muddy-stones layer from the wall of about 2.80 m. If the slope were similar as with the rampart in Area 9, i.e. ca 38 degrees, the height of the slope at Wall 2 could be about 2.15 m.

Also in the sections at the northern end of the road construction area (i.e. in Area 2) it was determined that Wall 2 of 20th Dynasty was constructed mainly over the moat of the 19th Dynasty. The last remains of Wall 2 were preserved here, without traces of an internal sand rampart. Due to research conditions, it is too early to conclude whether the absence of a sand rampart in Area 2 was caused by another construction pattern, or local situation on the spot of the section, or potentially by later occupation activities. The sand rampart was not attested also in Area 1.⁸¹

Gates

The Migdol gate was part of defence Wall 2. Wall 3, if any on the western side of the fortress, has not been attested. The Migdol's gateway and slightly into the "V" arranged Migdol's towers of the 20th Dynasty fortress (Ramses III) were cleaned in 2010.⁸² Back then a question arose of how the external walls of the Migdol towers had been designed: how they were sloped and whether they were covered with plaster, or stones (and to what extent). However, only a few rows of mud bricks remained above the foundations and no traces of the wall's surface treatment were preserved.

The dimensions of the towers were measured and the lengths of the niches in the towers' bodies, outside the gateway's threshold, fit fairly with half of the gateway's width (Fig. 24). Thus the niches were apparently intended as slots for

⁸¹ RZEPKA, S. et al. Tell el-Retaba 2007 – 2008. In *Ägypten und Levante*, 2009, Vol. 19, pp. 252–255, Fig. 9.

⁸² RZEPKA, S. et al. New Kingdom and the Third Intermediate Period in Tell el-Retaba. In *Ägypten und Levante*, 2011, Vol. 21, p. 141.

opened door wings, so as not to impede a gateway. This was not the case in the Migdol's gateway at Medinet Habu, which was a bit wider than the sum of the two lengths of the niches/door wings⁸³ (Fig. 25).

However, the dimension of niches does not leave space for wall casing in the bottom line. Though, if the towers' walls narrowed upwards, a thin casing or another surface treatment would be possible at the walk level. It would be plausible to expect that the door wings were installed in worked stone blocks, both down and up, what would indicate a presence of a lintel beam built into the superstructure above the gate.

The results of the geophysical survey indicate that there is another gate or even gates on the eastern side of the 20th Dynasty fortress (Fig. 26).⁸⁴ Approx. 10 m wide discontinuity seems to be in the middle of the eastern Wall 2 length⁸⁵, almost opposite to the Migdol gate. The arrangement recalls the situation in Medinet Habu (with reversed orientation, off course).⁸⁶ The discontinuity seems to be V-shaped, the wider side is in the internal side of the wall. It is also necessary to take into account the fact that the azimuth of Wall 1 is directed right into this area.

Northward, ca 10 m of the discontinuity, there is a change in Wall 2 course. There seems to be "a thickening" of Wall 2 (a tower or a bastion? with dimensions ca 11 x 8 m), and then a slight bulge of Wall 2 eastwards. The wall continues further towards the north-eastern corner of the Wall 2 fortress, being adjacent to another wall on its external side.

There is also a gate in this "adjacent external" wall. The gate did not have such large dimensions as the Migdol; it seems that the gate had also two towers, ca 8 m long x 5 m wide each, in the ground plan. The gateway between the towers could be about 5 m wide; the total width of the gate was ca 15 m, according to the outlines visible on the magnetic map. The outlines does not indicate any interruption in Wall 2 in the area of the gate's entrance; Wall 3 is usually on the internal side of Wall 2 and there is not any younger defence wall so far attested on the site. Thus, the wall with the gate should be older than Wall

⁸³ HÖLSCHER, U. *The Excavation of Medinet Habu – Volume I: General Plans and Views*, Plate 25.

⁸⁴ RZEPKA, S. et al. Tell el-Retaba 2007 – 2008. In *Ägypten und Levante*, 2009, Vol. 19, p. 277, Fig. 33.

⁸⁵ However, an earlier excavation, similar to one in the southern Migdol's tower (cf. RZEPKA, S. et al. *From Hyksos Settlers to Ottoman Pipe Smokers*. Tell el-Retaba 2014. In *Ägypten und Levante*, 2015, Vol. 25, p. 127), with unpublished documentation, could not be excluded here so far.

⁸⁶ HÖLSCHER, U. *The Excavation of Medinet Habu – Volume I: General Plans and Views*, Plate 1.

2, because Wall 2 might complicate a usage of a younger gate. The gate could not be clearly associated with a specific fortress so far and neither the previous archaeological work, nor the limits of the geophysical survey allow associate the wall with Wall 1.

The Migdol gate covers an older gateway into the 19th Dynasty fortress, which had rather eccentric location in relation to the Wall 1 fortress (Fig. 3). The older gate on the other side is also placed rather eccentrically, northwards from a possible axis of the fortresses. However, further archaeological research will be only able to answer questions related to the arrangement of the gates in the fortresses and their prospective relations to the walls.

Conclusions

The Tell el-Retaba, situated on an elevated position (Arabic “Ras”) on the eastern margin of an ancient lake/marshes, could be the ancient strategic place useful to the defence of the eastern Delta, from directions of Gisir and Serapeum sills, and at the same time able to control the north-south movement throughout the central part of today’s Wadi Tumilat.

The results of excavations at Tell el-Retaba contributed to the understanding of the defence system along the eastern periphery of the Nile Delta. The research brought information on construction characteristics of the fortifications of the 19th and the 20th Dynasty, including recently discovered moats related to the 19th Dynasty fortress. The moats are relatively shallow (approx. 30–135 cm). They follow the external site of Wall 1 at a distance of ca 5–7 m.

An investigation of the soil morphological properties of the selected profiles of the moats infilling enabled the distinguishing of two main genetically contrasting types of infillings – naturally formed infillings accumulated by wind, and the dump infilling created by the inhabitants after the moat lost its function. This information may suggest that between the 19th and the 20th Dynasty there was some period when the fortress might have been abandoned by state authorities and its military (and administrative?) function was loosened. However, smaller population groups might have been sustained in the (abandoned) fortress and/or its closest neighbourhood and maintained the settlement’s continuity at a lower intensity.

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Electronic resources

Website of Michael J. FULLER, Ph.D, Professor Emeritus of Anthropology, St. Louis Community College, available from <http://users.stlcc.edu/mfuller/> [cit. 6 December 2017].

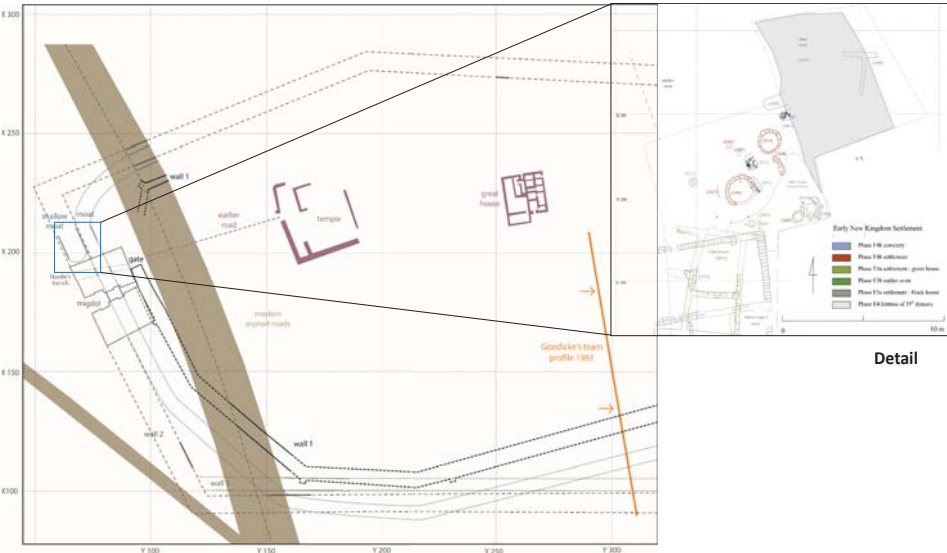
WETERING, Joris van, *Kafr Hassan Dawood On-Line*, Location of the site Figure 2: Map of the Nile Delta, c. 3,000 BC. Available from <http://www.e-c-h-o.org/khd/location.html> [cit. 6 December 2017].

PLATES





Hudec, Fig. 2. The western and eastern parts of Wadi Tumilat (DESCRIPTION de l'Égypte, Atlas géographique, Paris 1826).



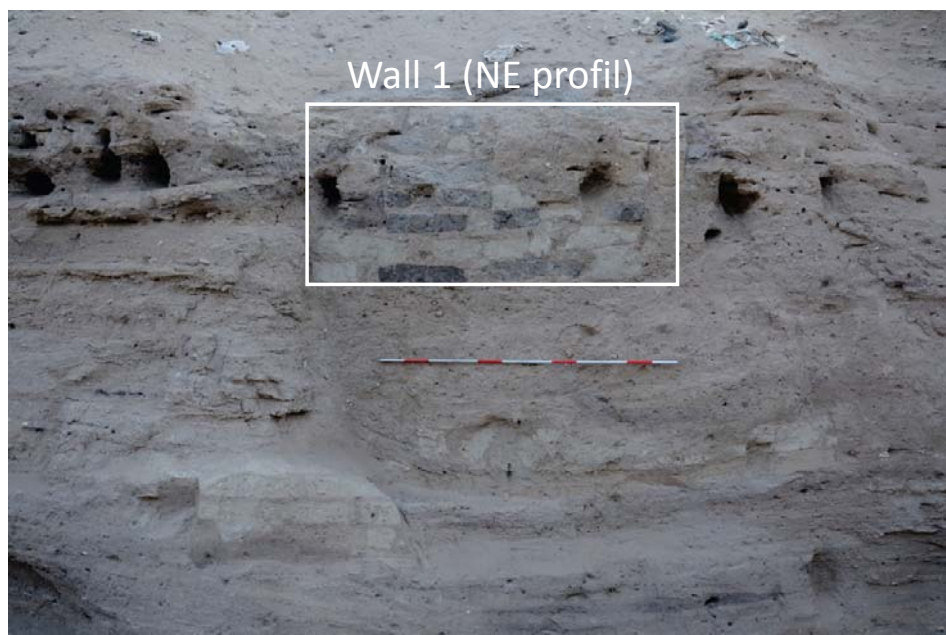
Hudec, Fig. 3. Map of Tell el-Retaba (Data: Eva Stopková; Drawing: Lucia Hulková; Jozef Hudec)



Hudec, Fig. 4. Section of Wall 1 in Area 4 (Photo: Jozef Hudec)



Hudec, Fig. 5. Section of Wall 1 in Area 9 (Photo: Miroslav Černý)



Hudec, Fig. 6. Section of Wall 1 in the eastern section of Area 2 (Photo: Lenka Horáková)



Hudec, Fig. 7. Section of Wall 1 in the western section of Area 2 (Photo: Lenka Horáková)



Hudec, Fig. 8. Original soil developed on fluvial gravel (Photo: Emil Fulajtár)



Hudec, Fig. 9. Natural deposition of eolian sand (Photo: Emil Fulajtár)



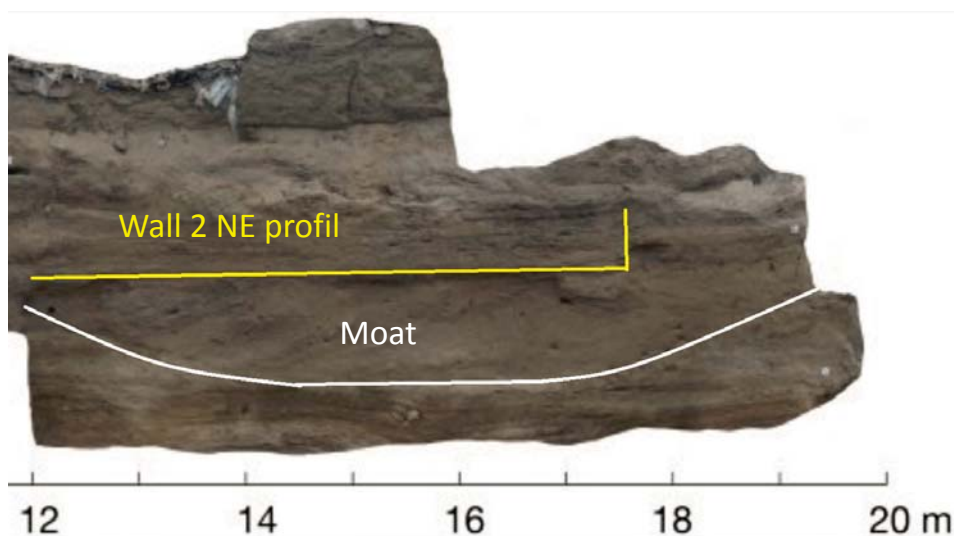
Hudec, Fig. 10. Simple man-made deposit (Photo: Emil Fulajtár)



Hudec, Fig. 11. Composed man-made deposition complex (Photo: Emil Fulajtár)



Hudec, Fig. 12. Typical morphology of A) natural alluvial soil on gravel, B) natural eolian sand, C) simple man-made deposit, D) composed man-made deposition complex. (Photos: Emil Fulajtár)



Hudec, Fig. 13. Moat in the eastern section of Area 2 (Photo: Lenka Horáková)



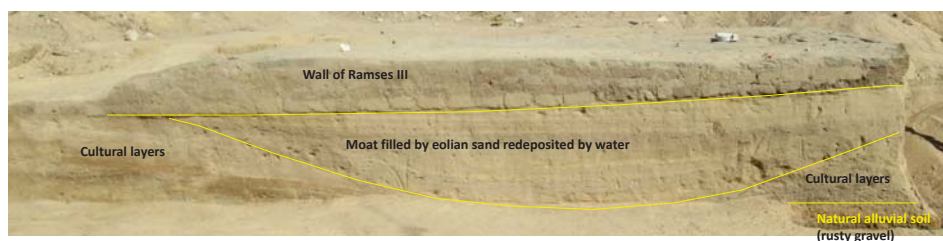
Hudec, Fig. 14. Profile 1: the moat in the western section of Area 2; infilling comprising of composed man-made deposition complex (Photo: Lenka Horáková)



Hudec, Fig. 15. A) Profile 2: Southern section of the deeper moat in Area 4; edge infilling by eolian sand. B) Northern section of the deeper moat in Area 4 (Photos: Emil Fulajtár)



Hudec, Fig. 16. Southern section of the deeper moat in Area 4 (Photo: Lenka Horáková)



Hudec, Fig. 17. Profile 3: the shallower moat in Area 4; infilling by eolian sand redeposited by water. (Photo: Emil Fulajtár)



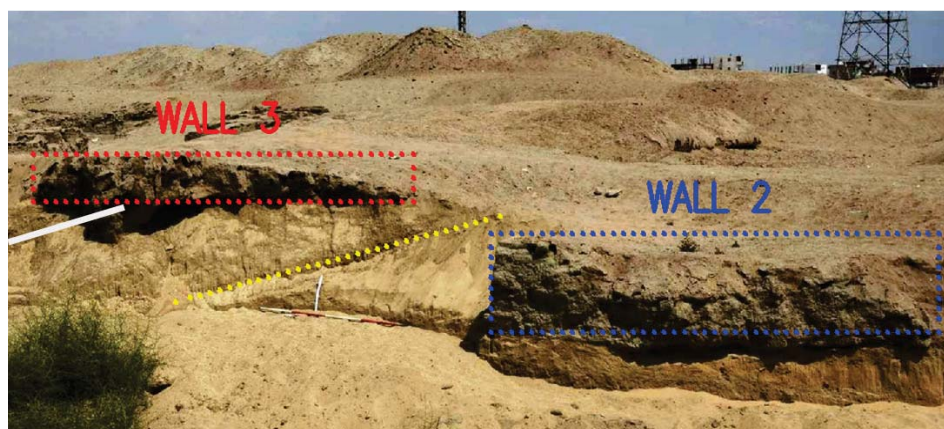
Hudec, Fig. 18. Profile 3: the detailed view of eolian infillings redeposited by water with weakly developed humiferous horizons of initial soils. (Photo: Emil Fulajtár)



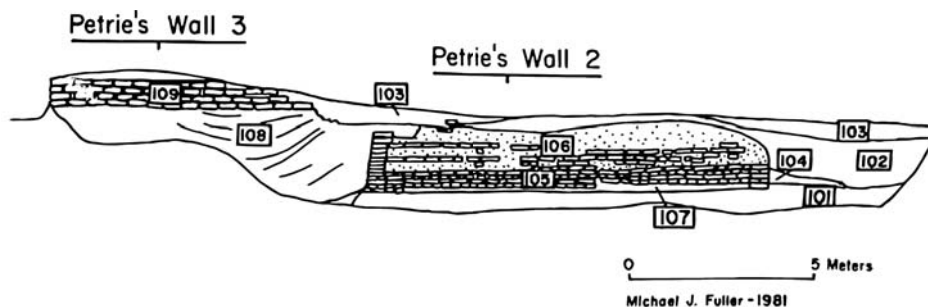
Hudec, Fig. 19. A) Left: deeper moat in so called Naville's trench; B) Right: deeper moat in the Migdol's gateway (Photos: Jozef Hudec)



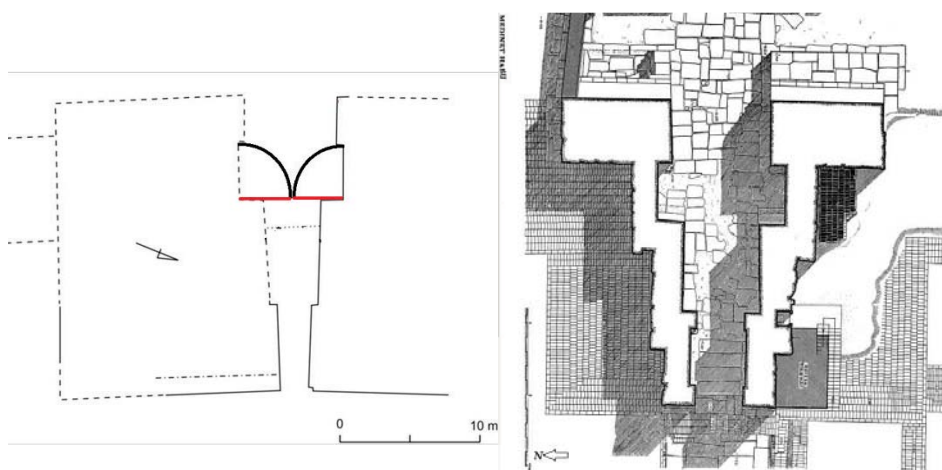
Hudec, Fig. 20. Moat of the Wall 1 in the eastern section, Area 9 (Photo: Lenka Horáková)



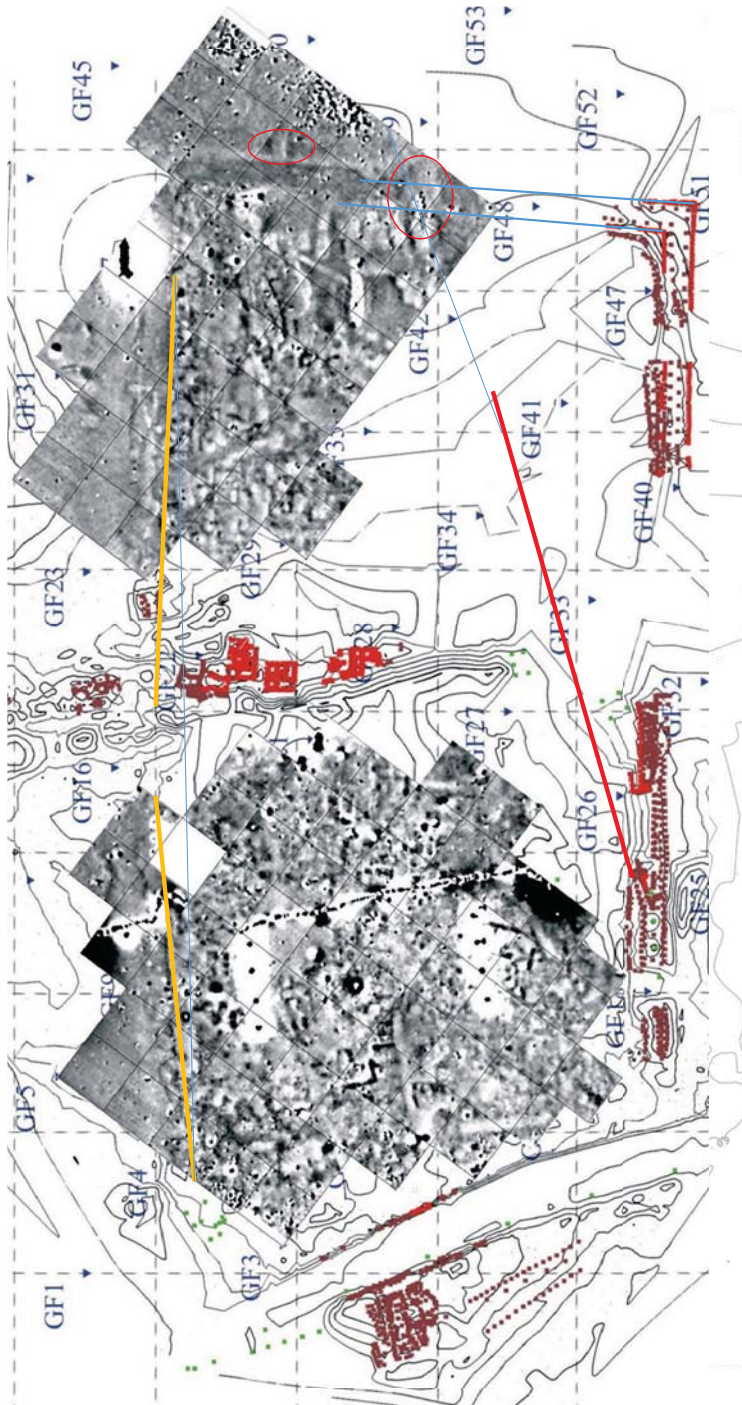
Hudec, Fig. 21. View of a relation between Wall 2 and Wall 3 in Area 9 (Photo: Jozef Hudec)



Hudec, Fig. 22. Sections of defensive Wall 2 and Wall 3 (Drawing: M. J. Fuller, 1981; <http://users.stlcc.edu/mfuller/Retaba/Retaba1981.html>)



Hudec, Fig. 23. A) Left: Migdol's gateway at Tell el-Retaba (Drawing: Jozef Hudec); B) Right: Migdol's gateway at Medinet Habu (HÖLSCHER, U. The Excavation of Medinet Habu – Volume I: General Plans and Views, Plate 25)



Hudec, Fig. 24. Gate(s) on the eastern side of the Retaba fortress(es); Geophysics: Tomasz Herbich (RZEPKA, S. et al. Tell el-Retaba 2007 – 2008. In: Ägypten und Levante 2009, Vol. 19, p. 277, Fig. 33)