

THE ARCHAEOLOGY OF COLLAPSE AND RESILIENCE: TELL ES-SULTAN/ANCIENT JERICHO AS A CASE STUDY

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1. Introduction

The site of Tell es-Sultan/ancient Jericho, around 7 km north of the Dead Sea, is a brilliant example of human response to natural and human-brought catastrophes, for its long-lasting life, extending over roughly ten millennia¹, constellated by dramatic events, crisis and recoveries. Social dynamics and material culture transformations, connected with the catastrophes challenge, are illustrated in the following brief essay, considering the archaeological history of Jericho a case study (fig. 1).



Fig. 1 - Satellite view of the Jericho Oasis with the site of Tell es-Sultan and the main geomorphological features.

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¹ For an overview on the enduring occupation at Tell es-Sultan across the eras of human civilizations see Kenyon 1957; Helms 1988; Taha - Qleibo 2010; Nigro 2014. More in general, on the long-lasting settlement history in the Jericho Oasis from the Epipaleolithic to the modern times, see Nigro - Sala - Taha eds. 2011.

The geomorphological setting of the site is noteworthy: at the foot of Jebel Quruntul (Mount of Temptations), on the border of the limestone plateau which flanks the alluvial valley of the Jordan River, the human settlement of Tell es-Sultan arose on the head of a blooming source of fresh water, feeding a luxuriant oasis (fig. 2).

The Spring of ʿAin es-Sultan, with its 4,000-5,000 liters of fresh water each minute made possible the early development of animal breeding and agriculture, the domestication of sheep, goats and also cattle, as well as the growing of cereals and horticultural products, thus launching Jericho among the most advanced centres of the so-called Neolithic Revolution at westernmost tip of the Fertile Crescent.

Nonetheless, this natural generosity was counterbalanced by the geological instability of the Dead Sea fault, at the junction of Asia and Africa, which continuously generated earthquakes heavily striking the early community settled by the spring². If water and land control was one of the issues stimulating social stratification and hierarchy within the early Jericho community³, also facing the earthquake risk was a factor deeply influencing its social organization.

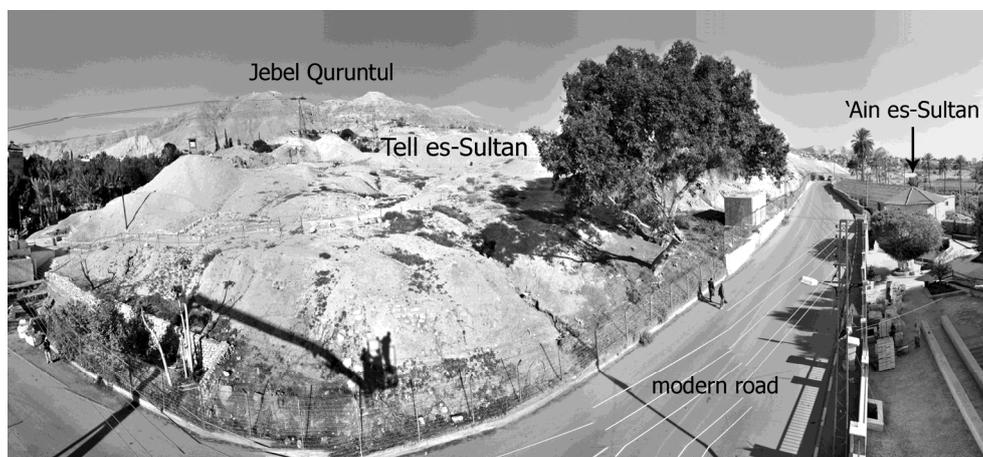


Fig. 2 - View of the site of Tell es-Sultan and of the nearby Spring of ʿAin es-Sultan, cut off in between by the modern road.

² Tell es-Sultan/ancient Jericho was located only few kilometers west of the Dead Sea fault (Lazar *et al.* 2010) and thus, since the beginning of its long-lasting occupation (ca. 10,500 BC), experienced the recurrent action of earthquakes (Hamiel - Amit - Begin 2009).

³ Nigro 2014.

2. Jericho in Pre-Pottery Neolithic A (8500-7500 BC): the perils of earthquakes and human violence

In the Mesolithic, or Natufian Period (10,500-9000 BCE; Sultan 0), groups of gatherers and hunters started to camp on the limestone plateau overlooking the spring of ^cAin es-Sultan⁴. Their diet was based upon the hunting of the gazelle, which was widely spread in the Jordan Valley; they lived in tents or huts, capable to resist to earthquakes.

During the Proto-Neolithic Period (9000-8500 BC; Sultan Ia), the campsite gradually became a hamlet⁵, which started to experiment agriculture, until it reached already in Pre-Pottery Neolithic times (8500-6000 BCE) a distinctive peak in cultural growth: the establishment of a huge village of a sedentary community (stretching even beyond the limits of the Bronze Age city), which deemed necessary at its flourish to build the earliest communal structures. The houses of this earliest settlement (PPNA, 8500-7500 BCE; Sultan Ib) had a round womb-like plan on stone-made basements⁶, supporting walls and a dome made of loaf-shaped mudbricks (figs. 3-4)⁷.

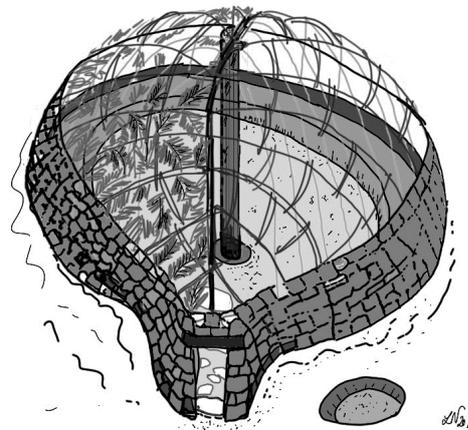


Fig. 3 - Reconstruction drawing of PPNA womb-like plan round hut excavated by Kenyon in Square EI.

⁴ Remains of camping were identified by Kenyon over the bedrock in Squares EI, EII and EV (Kenyon 1981, 268, 271-274, pls. 144b-145, 299a). Scattered flint and bone tools, retrieved also in Trench I, are attributable to the so-called Natufian culture.

⁵ The earliest Neolithic layers were excavated by Kenyon in all her trenches, in Squares FI, DI and DII, Squares EI, EII and EV, and Square MI. In the latter spot clay lumps (probably the earliest rudimentary bricks), serving as bases for shelters made of branches or skins, delimited a surface, pointing to a somewhat steady occupation (Kenyon 1981, 274-275, pls. 129, 295).

⁶ Kenyon 1957, 70-72; 1981, pls. 27a, 131, 146, 149b.

⁷ Kenyon 1981, 60, pls. 44a, 152.



Fig. 4 - PPNA womb-like plan round hut in Kenyon's Square EI; note the wall built with the characteristic loaf-shaped mudbricks (after Kenyon 1981, pl. 149b).

They were apt to face earthquakes struck. For the same static reason, the main building of the town, the massive Round Tower with a base diameter of 8.5 m, had roughly tapering walls (up to 8 m high), and employed apparent anti-seismic devices (as a skin wall encircling it)⁸; an inner vertebral column consisting of a slabs-made staircase, with 22 steps, lead from inside the town on top of the Tower⁹. According to the excavator, Kathleen M. Kenyon, the Tower accomplished defensive purposes¹⁰. Actually, inside it, a layer of destruction (Stage VI A, DI.x-xi) was found

⁸ Kenyon 1981, 29-31.

⁹ Kenyon 1957, 67-69; 1981, 18-43, pls. 5-11, 203-12.

¹⁰ According to Bar-Yosef the main purpose of the Tower and related Town-Wall was, instead, to raise the settlement from the surrounding landscape and protect it from flash floods and mudslides: Bar-Yosef 1986, 159-160. The sloping plain in which Jericho is located is, in fact, subjected to the natural floods from Jebel Quruntul. Moreover, climatological indicators testifies that in the 7th millennium BC the climate was much wetter than today (Stuart *et al.* 2006): thus, the seasonal flooding of the region had in the Neolithic a more destructive power than nowadays, and could represent a real threat to the human settlement (Bar-Yosef 1986, 158).

containing the skeletons of twelve people who had apparently been killed during a fight or a riot (fig. 5)¹¹. Hence, whether the Tower was able to resist to earthquakes¹², it and the contemporary PPNA town were not able to survive to the earliest fights arisen inside the community or between it and an external enemy. Human violence makes its appearance in the archaeology of Jericho, as one of the most dangerous threat to life and development.

Having domesticated plants (especially cereals: wild barley, emmer wheat, and einkorn) and animals (caprovines), and developed new time-resistant building techniques, was not enough to overcome the problem of setting human relationship far away from violence and disrespect. Thus, technological enhancement, even basic for the first step towards civilization, was not as decisive for the community as ideology and social organization (including communal enterprises, the most immediate way to grant peace and development).

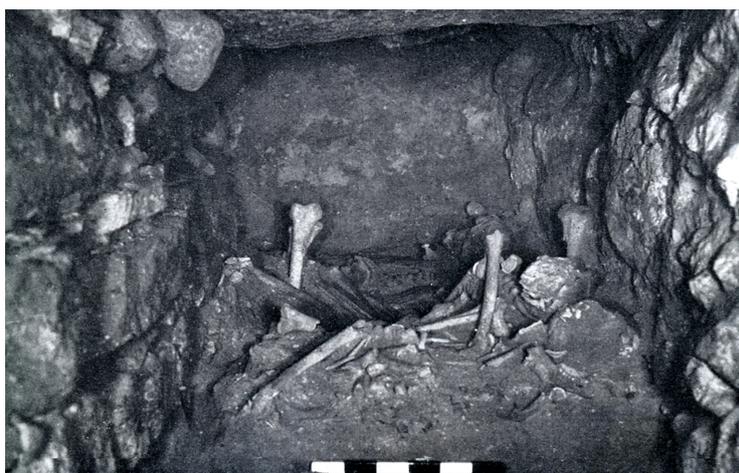


Fig. 5 - Skeletons in the passage within the PPNA Round Tower (after Kenyon 1981, pl. 21b).

¹¹ According to Kenyon's interpretation there was an internal riot: Kenyon 1981, 32-33, pls. 21-22a. However, signs of a terrific conflagration and tumbling are registered in Kenyon's in Stage VIA in Squares DI-DII (phases DI.x-xi, DII.vii; Kenyon 1981, pls. 238-239), also pointing to possible earthquake effects.

¹² Many episodes of conflagrations, toppling of walls, severe burning and subsequent rebuilding, affected the Tower and Town-Wall during the PPNA. They can be ascribed to earthquakes or, more generally, to pursuant external phenomena of ground shaking due to seismic activities: Kenyon 1981, 36-37, 42-43, 48-49 (pl. 31a), 56-58 (pl. 38).

3. Collapse and destruction in Pre-Pottery Neolithic B (7500-6000 BC)

A wadi deposition with gravel accumulation, and intense erosion and washout effects detected on the northern part of the site (which followed spread evidence of destructions in the latest phase of PPNA)¹³ mark the passage to the next stage of the Pre-Pottery Neolithic B (7500-6000 BC; Sultan Ic). The site was immediately reoccupied, testifying the resilience attitude of the inhabitants of Jericho, adopting a new strategy in architecture, to face earthquake risk again. Houses become rectangular in order to make easiest to add domestic units one to the others. The shift from round to rectangular houses¹⁴, however, exposed again these buildings to collapse risk in case of earthquake struck. This was one reason prompting the definitive affirmation of mudbricks in architecture: cigar-like mudbricks, tied up with mud, fronds and twigs (fig. 6), and coated with a fine plaster¹⁵, guaranteed an acceptable range of resistance to telluric movements.

PPNB is not only characterized by the diffusion of modular architecture, but also by the first appearance of distinguished finds (plastered skulls) hinting at ancestors' cult¹⁶, a basic development in the ideology which played the role of binding agent in the Neolithic community.

Finally, to the end of PPNB (Garstang's level X) is dated the earliest cult place so far identified in Tell es-Sultan, a shrine (Locus 202) excavated by John Garstang, in the nearby of which two pits each concealing a group of clay statues (190, 195) were found¹⁷. Such personages were possibly a triad, and a couple of deified ancestors, pointing to the development of a

¹³ Kenyon 1981, 55-58, 114, 124-125, 175, 181, 235, 269-270, 288-289, pls. 156b, 259, 311. This washout was associated by Kenyon to the Town Wall collapse encircling the site, as a consequence of a destructive earthquake acting in the latest stage of the PPNA: all over the site, in fact, the wadi deposition was laying above underlying levels of considerable collapse and destruction.

¹⁴ Kenyon 1957, 53-56; 1981, pls. 46a, 49, 98, 115, 117, 139, 159-161, 168.

¹⁵ Kenyon 1981, pls. 116a, 138b-c, 170a.

¹⁶ Kenyon 1957, 60-64. The largest group was found underneath the floor of a house in Square DI: Kenyon 1981, 77, pls. 48-59, 220. Plastered human skulls with eye sea-shell inlays and painted decorations are also known in other PPNB sites in the Levant: Beisamoun, Tell Ramad, Yiftahel, Kfar Hahores and 'Ain Ghazal (Milevski *et al.* 2008; Marchand 2011-2012).

¹⁷ Garstang 1935, 355-356; Garstang - Droop - Crowfoot 1935, 166-167, pls. LIa, LIIa-b, LIII, LIVb; Sala 2006, 275-276. The statues are similar to the famous examples from 'Ain Ghazal (Rollefson 2000).

“family” ideology, making more complex the religious panorama of this period¹⁸. Not far away from the two pits, a terracotta model of a house or a temple was found, showing a three stories building, quite unusual for the site, due to the telluric risk¹⁹. Actually, a temple might considerably differ in height from domestic houses.

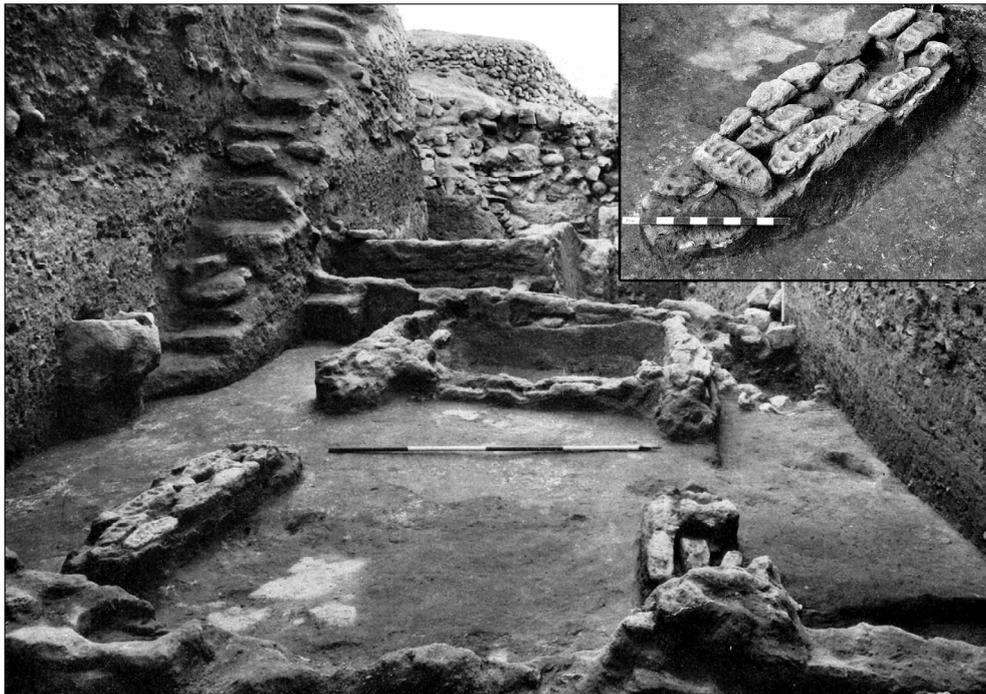


Fig. 6 - PPNB rectangular house excavated by M.K. Kenyon in Trench III, built with the characteristic thumb-impressed cigar-like mudbricks (after Kenyon 1981, pls. 115-116a).

Kenyon recorded two major collapse events during PPNB in Trench I and Squares DI, DII, FI²⁰: one dating around 7000 BC in Stage XVII of Trench I and Squares DI-FI²¹, preceding the construction of the last Town-Wall (TW. IV)²², and possibly to be equated with the earthquake cracks of Stage

¹⁸ A simple stylized human bust was also found on the east side of Square DII in the upper PPNB layers (Kenyon 1981, 531, pls. 72, 242a).

¹⁹ Garstang - Ben-Dor - Fitzgerald 1936, 71, pl. XLb.

²⁰ Alfonsi *et al.* 2012.

²¹ Respectively, phases XVII.xxi-xxii in Trench I, XVII.xliiii in Square DI, and XVII.xxx in Square FI (Kenyon 1981, 75).

²² Kenyon 1981, 79, pl. 222.

XIII.liii in Square EI (fig. 7)²³, and Stage XI.lxiv in Square M²⁴; and the second major earthquake, which occurred within 6200-6000 BC, in Stage XXIII-XXIV of Trench I²⁵.



Fig. 7 - The earthquake crack of Stage XIII.liii in Kenyon's Square EI (after Kenyon 1981, pl. 160b).

The latter might be the same documented by Garstang in the latest PPNB layer (level X) of his North-Eastern Trench, illustrated by widespread collapses and a deep crack, also cutting through a burial between units 453-297 (figs. 8-9)²⁶. This terrible earthquake marked the end of the Pre-Pottery Neolithic B settlement. It produced deep cracks on the ground, perhaps triggering the interruption of the spring flow. It seems noteworthy that the site could not immediately recover from the destruction: PPNB Jericho suffered a drastic crisis and the site was abandoned for a while.

²³ Kenyon 1981, 298, pl. 160b.

²⁴ Kenyon 1981, 243, pl. 297. A further destructive event is documented in Stage IX.xxi-xxii of Trench III, but no explicit earthquake evidence is mentioned (Kenyon 1981, 187-188).

²⁵ Respectively, phases XXIII-XXIV.xlvi-xlvii in Square DI, XXIII-XXIV.xxxiv-xxxv in Square DII, and XXIII-XXIV.xxxvii-xxxviii in Square FI (Kenyon 1981, 87-88, pl. 71a).

²⁶ Garstang - Ben-Dor - Fitzgerald 1936, 69-70, pl. XLa; Garstang - Garstang 1948, 58-62, pl. VI [right end of the section, loci 453/297], VIIb, IXb).

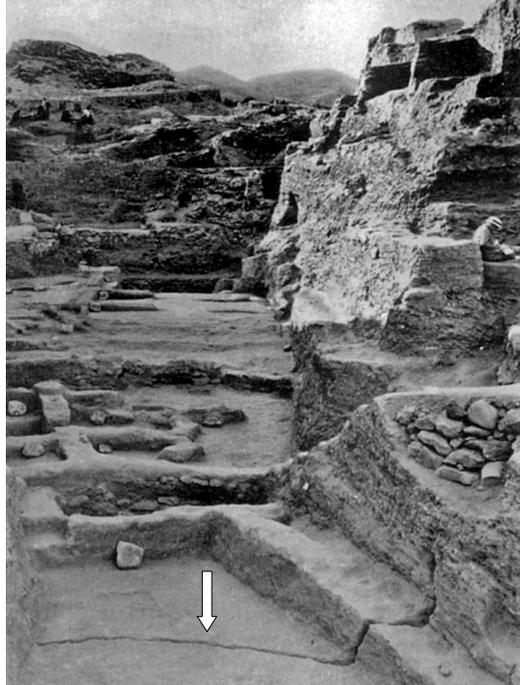


Fig. 8 - The earthquake crack in Garstang's North-Eastern Trench (after Garstang - Garstang 1948, pl. VIIa).



Fig. 9 - PPNB burials in Garstang's North-Eastern Trench cut through by the earthquake crack of Layer X (after Garstang - Garstang 1948, pl. IXb).

4. Jericho in Pottery Neolithic (6000-4500 BC): resilience to nature and man

The following period of life of the site, characterized by the introduction of pottery (Pottery Neolithic A; Sultan IIa), was indeed labelled by Kenyon as a phase of cultural regression²⁷. A new human group settled on the up to 12 m high tell, already formed by previous occupations. Social organization and agricultural production changed in this period, affecting several aspects of material culture. Actually, the archaeological interpretation of Pottery Neolithic in Palestine is still largely debated, and Jericho with its two major phases of life (PNA and PNB, Garstang's strata IX and VIII of his North-Eastern Trench)²⁸ is a key-site for its interpretation²⁹.

Lithic and pottery allow the firm diachronic distinction fixed by Garstang. Earliest pottery (PNA) was either coarse, characterized by the presence of chopped straw in clay and a thick mat brownish slip; or fine, exhibiting a burnished red-on-cream painted decoration, with diamonds and triangles leaving chevrons and zigzags on the underlying cream slip³⁰. PNA flint and stone tools exhibit a cruder and less refined treatment in respect of those of Pre-Pottery Neolithic Period³¹.

Pottery of the advanced phase (PNB) incorporates much less straw and was better fired; it was finished with a mat red slip and decorated by incised herringbones motives; shapes were characterized by bowed-rims³². PNB flints basically recall types also known in the Ghassulian-Beersheba culture of the Chalcolithic Period³³. These two horizons were variously connected to regional groups or chronological *facies* by scholars.

The PNA newcomers settled, after a period of camping on top of the PPNB ruins, and used to build their circular huts (with a medium diameter of 3 m) by digging them (up to 2 m in depth) into previous PPNB strata (fig. 10):

²⁷ Kenyon 1957, 77-85.

²⁸ See Sala 2006, 275, and tab. 1, for the stratigraphical correlation.

²⁹ A conspicuous lack in documentation is the absence of any PN burial or tomb. This prevent from depicting a complete picture of Pottery Neolithic Jericho.

³⁰ Kenyon - Holland 1982, figs. 1-19.

³¹ Flint industry was described as "Yarmoukian" by Crowfoot-Payne as regards PNA, including axe/adzes partly flaked and polished, arrowheads, coarsely denticulated sickle blades, knives and scrapers; a distinctive tool is the denticulated flint blade, which took the place of the finely cut PPNB sickle blades (Crowfoot-Payne 1983, figs. 332-342).

³² Kenyon - Holland 1982, figs. 21-33.

³³ A relevant example is offered by a deposit found by J. Garstang in his North-Eastern Trench (Crowfoot 1937, 40-41, pls. 7B:1, 8A: 14-17).

thus, the way of living changed from the previous Pre-Pottery Neolithic occupation. Pit dwellings³⁴ were walled with mud and stones; roofing consisted of irregular domes tied up with branches and mud; and mudbricks were frequently recovered from earlier strata and reemployed. This housing technique corresponds to a regional tradition typical of PNA, however, it might be interpreted as another preventive solution against earthquakes dramatic effects.

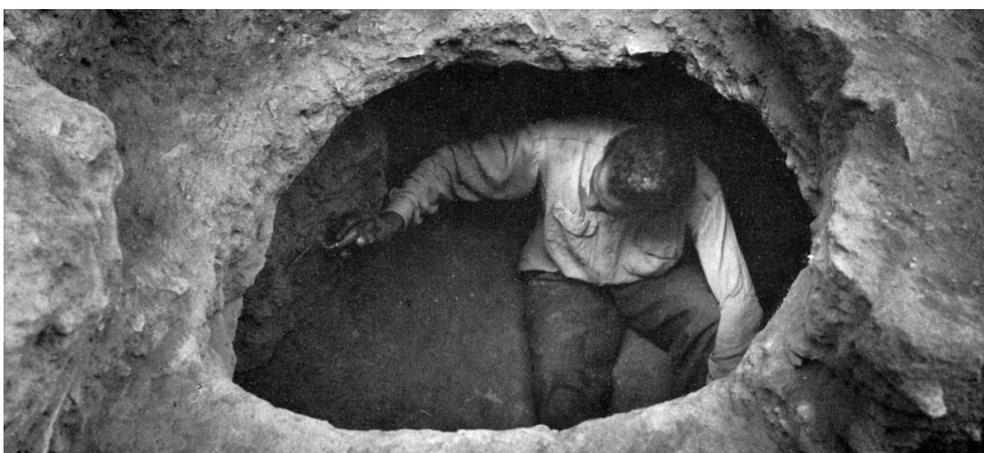


Fig. 10 - PNA pit dwelling (after Kenyon 1981, pl. 118b).

In the following PNB (Sultan IIB), houses were rectangular (sometimes with curvilinear walls, or curved corners; fig. 11)³⁵, and mudbricks were again employed, but in a different format: bun-shaped (or plano-convex) set in mud mortar (fig. 12)³⁶. Such bricks were deliberately created to have a range of scrolling within the walls, thus conveying the necessary flexibility to structures, which presumably also incorporated wooden chains.

Pottery Neolithic is, thus, view as a regressive period, during which natural and human factors push the Jericho community economy back to sheep and goat farming and gazelle hunting, leaving agricultural at a very low level of production³⁷.

³⁴ They were initially considered grain pits by J. Garstang (Garstang - Droop - Crowfoot 1935, 163), Kenyon eventually interpreted them as sunken pit dwellings (Kenyon 1993, 677; *contra* her first interpretation as quarry pits: Kenyon 1957, 77-81).

³⁵ Kenyon 1957, 85-92; 1981, pl. 74.

³⁶ Kenyon 1957, 86; 1981, 94-95, pls. 75-77.

³⁷ PNA and PNB layers produced a few remains of plants and charcoal, thus suggesting to Hopf (Hopf 1983, 578) that the Jerichoans in Pottery Neolithic were mainly herdsmen and hunters.



Fig. 11 - PNB stone-built houses (after Kenyon 1981, pl. 74b).



Fig. 12 - PNB wall built with the characteristic bun-shaped mudbricks (after Kenyon 1981, pl. 77a).

To sum up, Pottery Neolithic is viewed as a culturally recessive period, when the site was slightly reduced in size and hosted a less developed village in respect of the preceding Pre-Pottery Neolithic.

The end of PNB was an abrupt event, and the site was abandoned for a long time after³⁸. A major earthquake was probably responsible for the collapse of the rural settlement lasting from one millennium and a half: it has been convincingly surmised that the desertion of Tell es-Sultan at the end of 5th - beginning of 4th millennium BC was due to an interruption or a shift of the water supply in the spring of ^cAin es-Sultan, which deprived the inhabitants of Jericho of their basic resource.

Kenyon identified both in Trench I and in other spots of the site a thick layer of turf/erosion including rubble and pebbles³⁹. This natural accumulation, variously attributed to the long lasting erosive activity of wind and rain, or to single dramatic events, like floods precipitating from the nearby foot of the Mount of Temptations, witnesses an occupational hiatus, which transformed the prominent Neolithic settlement into a heap of ruins.

5. The spring shift or extinguishment and the Chalcolithic hiatus at Tell es-Sultan

The extinguishment of the Spring of ^cAin es-Sultan at the end of the 5th millennium BC compelled the inhabitants of the oasis to find other favourable sites for settling down. Other generous water resources were the twin springs of ^cAin Duyuk and ^cAin el-Auja, some 2.3 Km north of Tell es-Sultan, flowing into to the Wadi en-Nueima. On the eastern bank of this river, some 2 Km downstream, a major Chalcolithic settlement arose in the 4th millennium BC, at Tell el-Mafjar (around 1.7 km north-east of Tell es-Sultan)⁴⁰. Another Late Chalcolithic settlement was along a major river to the south, the Wadi el-Qelt, at Tulul Abu el-^cAlayiq⁴¹.

Hence, the Jericho community probably faced its major challenge, i.e. the extinguishment or shift of the major spring within the oasis (^cAin es-Sultan), by looking for other favourable sites in the area. This was in some ways facilitated by the fact that also Ghassulian groups were basically newcomers, which chose their sites along new routes crossing Judea and the Jordan Valley (connected with the copper mines of Wadi Feinan).

³⁸ The so-called Chalcolithic hiatus: North 1982; Garfinkel 1999.

³⁹ Kenyon 1957, 93.

⁴⁰ Taha *et al.* 2004.

⁴¹ Pritchard 1958, 17-21, 42-48; Foerster 1993; Nigro - Sala - Taha eds. 2011, 7-9.

During the 4th millennium BC, possibly again in connection with seismic instability, the spring flow of ^cAin es-Sultan restarted. Probably for this reason a small Ghassulian group resettled the tell just aside the spring in the Late Chalcolithic Period (Sultan IIc)⁴².

6. The agriculture revenge: the Early Bronze I (3400-3000 BC)

However, a huge rural village arose on Tell es-Sultan only during the Early Bronze I (Sultan IIIa), in the second half of the 4th millennium BC (fig. 13). People bearing a different culture in respect of the previous Ghassulian one settled Jericho again⁴³: funerary tradition, domestic architecture and material culture were largely new. The EBA community rediscovered the original agricultural vocation of Jericho, developing intense horticultural production in the oasis, as well as animal breeding. Shepherds and farmers found a good deal of integration during this period, which was labelled by Kenyon "Proto-Urban", because it laid the groundwork for the birth of the 3rd millennium BC city.



Fig. 13 - Northern sector of the EB IA village (after Nigro 2005, fig. 3.16).

⁴² A few Chalcolithic diagnostic lithic and pottery items were retrieved, among tabular scrapers (Nigro 2005, 120, note 22), cornets (Kenyon - Holland 1983, fig. 108:12) and a churn from Trench I (Kenyon - Holland 1983, fig. 12:22; Holland 1987, 22).

⁴³ Kenyon 1957, 95-102; 1979, 66-83; Hennessy 1967, 26-48; Nigro 2005, 199.

The EB I community, not only was able to face natural hazard (earthquakes, famine and epidemics), but started also to set up its inner organization, in order to strengthen inner solidarity through a fair and balanced distribution of goods, land, and sheep and goats flocks. Enlarged families were the basic cell of the EBA Jerichoan society, assuring protection and sustenance to each individual, and composing their mutual interests into a community shared agenda.

This was basically due to raw materials control and exchange⁴⁴, and to what it has been called the "metal revolution" which took place during the 4th millennium BC. The trade of salt from the Dead Sea, as well as the need of metal (copper) extracted from the ores and mines of Wadi Feinan⁴⁵ and possibly Timna in the ^cArabah⁴⁶, prompted the Early Bronze Age inhabitants of Tell es-Sultan to make Jericho an active centre of exchange. This meant that the community had to show up a unique façade, represented by a ruling institution. The development of a more complex social organization, which necessarily involved also water and cultivable land control, was at the beginning a positive factor defending the community from both inner and outer systemic risks of enemy attack and intestine riot. The economic and social growth distinguishing Early Bronze I, thus, initially represented a resilience factor in respect of human brought about catastrophes. This is clearly detectable in the progressive development of the site from Early Bronze IA (Sultan IIIa1) to Early Bronze IB (Sultan IIIa2), both within the settlement, which gradually takes on the layout of a complex rural village⁴⁷ and, then, of town⁴⁸; and in the necropolis, where significant changes in the burial custom are noticed in the EB IB strata of the major familiar tombs⁴⁹, and dead treatment let progressively recognize the emergence of a ruling class, with its eminent personages bearing status symbols (calcite/limestone mace-heads, metal items, personal ornaments)⁵⁰.

⁴⁴ Nigro 2005, 4-6.

⁴⁵ Levy 2007, 27-46.

⁴⁶ Indeed, at present state of research, it is not possible to differentiate between ores from Wadi Feinan and ores from Timna: both belong to the same geological mineral deposit (Khalil - Riederer 1998).

⁴⁷ Garstang - Droop - Crowfoot 1935, 153, pl. LIa; Garstang - Garstang 1948, 81; Nigro 2005, 23-32, figs. 3.15-3.17, plan I; 2008, 647-648.

⁴⁸ Nigro 2005, 35-41, 115-119, 122-124, 197-200, plan III; 2008, 650-651.

⁴⁹ Kenyon 1960, 4-51; 1965, 3-32.

⁵⁰ In Garstang's Tomb A (Garstang 1932, 19-22), a distinguished burial in primary deposition (n. 24, layer 3) shows a personage with raised arms and flexed legs (Garstang 1932, pl. XVI), and a mace-head in between his legs (Garstang 1932, pl.

The wealth and complexity of the village increased during the last centuries of the 4th millennium, as well as commercial exchange and interregional trade, culminating with the stimulating contact with Egypt⁵¹, which further pushed social stratification and economic growth. Such a socio-economic development was a positive factor in the light of the urban rise. However, on a long-distance, it also represented a threat, since the progressive accumulation of agricultural products and raw material meant a polarizing attraction for nomads tribes living in the Wilderness of Judah, and beyond.

7. Facing enemy attack: city-walls and the achievement of the urban status in the Early Bronze II (3000-2700 BC)

Again, the more threatening agents called the community wealth into hazard, the more such danger factors prompted a further decisive development of the Jerichoan society. Goods accumulation within the huge village, which reached its maximum extension during the Early Bronze IB (Sultan IIIa2), became a risk for the community, which was exposed to enemy attacks⁵². It is not possible to determine who were the enemies at the end of the 4th/beginning of 3rd millennium BC, whether nomadic groups flatterling between the Jordanian desert and the Jordan Valley, or people living in other pristine urban centres of the region. Nonetheless, they did represent a real danger for the small town and its riches (agricultural goods, accumulated precious stuffs [salt, bitumen, sulphur, copper, wood]). The erection of a massive city-wall, thus, was a mean to face this risk, undertaken by an emerging ruling class at the beginning of Early Bronze II (3000 BC)⁵³.

The city-wall was a majestic building enterprise (fig. 14), involving a labour force possibly borrowed from the same semi-nomadic shepherds who were

VII:5): the gesture of the arms, as well as the general position of the dead, and the association to this distinguished burial of a piriform mace-head, clearly state the rank and the lineage of chief for the dead, at least within the familiar group, if not within the whole community.

⁵¹ Sala 2012.

⁵² A severe destruction is recorded by K.M. Kenyon in Squares EIII-IV, Phase M, in the latest phase of the EB IB village (Kenyon 1981, 325), and it was ascribed to an earthquake, though such an evidence is confined to this sector. Actually, similar destructions are referred to, for instance, also at Bab edh-Dhra^c (between Stratum IV and Stratum III; Rast - Schaub 2003, 129-130), and Beth Shan (Mazar ed. 2012, 43-51, figs. 2.17-2.24), in the transition between the EB IB village and the EB II fortified town (see Gallo in this volume, 154-157).

⁵³ Nigro 2006a, 355-361; 2010, 11-36.

a potential threat for the site. Furthermore, also ideological-symbolic institutions had to be protected: i.e. temples, and other public buildings and installations connected with the community identity. For this reason, the earliest city-wall encircled not only the majority of the already settled area of the rural village (on the northern plateau and the southern slope of the site), but also the Spring Hill, with the main public buildings of the newborn city, and the spring itself at its foot, the most precious resource for Jericho. The earliest EB II city developed not only its outer physical defenses, but also its inner social organization in order to properly answer inner and outer challenges. The emergence of a distinguished ruling class, basically evidenced by funerary customs in tombs⁵⁴, as well as the functional differentiation of public areas within the city (namely on the Spring Hill, with the main buildings on its eastern flank and the temple on its western side)⁵⁵, point to an increased social complexity within, however, the framework of a strong concentration of wealth, power and ideology in the hands of the emerging élite. At its early stage (EB II; Sultan IIb), this model apparently strengthened the community and protected it from enemies attacks and inner riots.



Fig. 14 - The EB II city-wall and semicircular tower excavated by K.M. Kenyon on the western side of the site (after Kenyon 1981, pl. 79b).

⁵⁴ Nigro 2010, 209-228.

⁵⁵ Sellin - Watzinger 1913, figs. 19-20; Nigro 2010, 51-61.

However, when man-brought about catastrophes were reduced for a while under control, nature was to hit again, and a terrible earthquake struck, a common event along the Jericho Fault, brought to a sudden end the earliest EB II city. The city-wall, and the majority of buildings, ruinously collapsed (figs. 15-16)⁵⁶, letting this event to be classified between degrees IX-XI of the Mercalli-Cancani-Sieberg intensity scale.

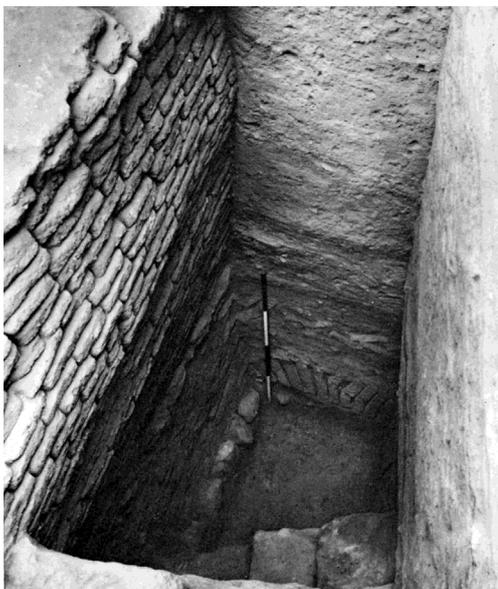


Fig. 15 - EB II city-wall at the bottom of Kenyon's Site A, with the collapsed bricks of the superstructure (after Kenyon 1981, pl. 200a).

Fig. 16 - Dune-yellowish mudbricks tumble down from the EB II city-wall at Kenyon's Site A (after Kenyon 1981, pl. 200b).

⁵⁶ Kenyon 1957, 175-176, pl. 37a; 1981, 373, pls. 200, 343a; Nigro 2006a, 359-361, 372-373; 2009a, 182; 2010, 326-327. Evidence of such a tremendous earthquake, and related widespread destruction, was detected by Kenyon all over the site, namely in Trench I (Stage XXXV.xli; Kenyon 1981, 97-98), Trench II (Stage XVIII.lxii; Kenyon 1981, 161), Trench III (Stage XVII.lxxi; Kenyon 1981, 207-209), Square M (Stage XXI.ci; Kenyon 1981, 261), Site A (Stage B.Fii-Fi; Kenyon 1981, 373), and in the houses on the northern plateau (Squares EIII-IV, Phase C; Kenyon 1981, 335-336; Nigro 2010, 86). The same dramatic event also occurred at the nearby ^cAi/et-Tell (Callaway 1993, 42), at Tell el-Mutesellim (Finkelstein - Ussishkin - Peersmann 2006, 49-50), and at Khirbet Kerak (Greenberg *et al.* 2006, 247), Pella/Tell el-Husn (Bourke 2000, 233-235), Tell Abu Kharaz (Fischer 2008, 31, 34, 71, 181, 383-385) and Tell es-Sa^cidiyeh (Tubb 1998, 42-43) in the Jordan Valley, up to Khirbet ez-Zeraqon (Douglas 2007, 27-28) and Khirbet al-Batrawy (Nigro 2009c, 437; Sala in this volume, 175) in Transjordan.

8. Reconstructing a stronger city: the EB III floruit (2700-2350 BC)

Notwithstanding the intensity of the EB II destruction, which occurred around 2700 BC⁵⁷, Jericho raised again, and the city-wall and the other buildings of the city were more massively reconstructed. As a difference in respect of human brought about catastrophes, earthquake dramatic effects could be nevertheless overtaken, whether the productive chain and the basic resource (the spring) of Jericho were not destroyed. As a matter of fact, a few people were killed by the EB II final earthquake, probably due to the time of the telluric struck. This made it possible to accomplish the overall reconstruction of the city in a relatively short time, with an enormous economic and organizational effort in terms of labour and building material.

Furthermore, there were other positive outcomes to such a catastrophic event. Architectural innovations in the city-wall⁵⁸, and in other public buildings, show how the earthquake hazard continued to stimulate the development of Jerichoan architecture. The Main Inner City-Wall was doubled with the addition of an Outer Wall connected by transversal walls to the former, and blind rooms or casemates were created in between the two structures (fig. 17)⁵⁹. This double defense line was aimed at better standing both against enemy attacks and earthquakes. Similar strengthening interventions are also visible, in this phase, on the Palace erected on the eastern flank of the Spring Hill, where terrace-walls were erected to further support the building, connected by transversal walls oblique in respect of maximum declivity⁶⁰.

Also building techniques were further upgraded as an outcome of the big earthquake: in EB III (Sultan IIIc) constructions, bricks composition and dimensions varied, walls widths were increased, openings were at a certain extent further reduced and moved onto the upper parts of walls in order to lighten without weakening them, wooden beams and reeds rugs were inserted within mudbrick structures to act as chains distributing weights and absorbing stressing movements.

⁵⁷ Between 3000-2900 BC, if one rely upon newly calibrated radiocarbon dating (Bruins - van der Plicht 1998, 623-627; 2001, 1327-1328).

⁵⁸ Kenyon 1957, 175-176; Nigro 2006a, 370-371.

⁵⁹ Kenyon 1957, 173-175, 180-182; 1981, 98-103, 161-165, 209-213, 261-265; Marchetti - Nigro 1998, 32-36, 81-94; Nigro 2006a, 361-372; 2006b, 8-9; Nigro - Taha 2009, 738-739.

⁶⁰ Nigro *et al.* 2011, 586-593.



Fig. 17 - EB III double city-wall excavated on the northern side of the site by the Austro-German Expedition (after Sellin - Watzinger 1913, pl. 4A).

8.1. Epidemics in Jericho

Another threat made its appearance in EB III Jericho, descending from one of the basic growth factors of the urban rise: intensive breeding of cattle. Cows domestication in Jericho from the Neolithic to the Early Bronze Age made available a strong and tame cattle (a small size but robust *Bos Taurus*), which in the Early Bronze II-III was intensively bred, thanks to the fresh hay made available by oasis canalization (it cannot even be excluded that canalizations were made possible, in turn, thanks to the help of this animal). Thus, bovines rapidly provided the Jerichoan community an extra food supply (meat, milk, and dairy cheese), leather, as well as labour force for agriculture, transportation and construction activities, possibly allowing a substantial increase of local population (and of human average lifespan). However, cows breeding also caused the spread of tuberculosis, which softened the "boom effect" of cattle intensive breeding over the Jericho population. This was a quite unique kind of epidemics affecting Jerichoan people: the richness of the spring and the availability of salt and sulfur from the Dead Sea, as well as fresh horticultural products, in fact, hampered the wide diffusion of recurrent illnesses, such as plague or leprosy, and also contrasted common diseases of the digestive system connected with poor nutrition.

8.2. The EB IIIA destruction

Also the EB IIIA (Sultan IIIc1) city occurred an abrupt and violent destruction towards the mid of the 3rd millennium BC. In Area B and B-West, at the southern side of the city, the EB IIIA double line of fortifications was dramatically set on fire. The EB IIIA South Gate was burnt⁶¹, and its ceilings, supported by tamarisk beams⁶², collapsed (fig. 18). This destructive event was possibly due to an enemy attack, as it heavily involved the city fortifications all around the city-walls perimeter, while it is not apparently attested to in other areas inside the city. For the first time, goods and riches gathered in it had attracted military organized entities which attacked and conquered the city. The 2500 BC destruction took place in a moment of maximum floruit of Early Bronze Age Jericho, suggesting that a fast and noticeable economic growth might have unexpected effects. The second half of the 3rd millennium BC was, in facts, characterized in Palestine by increasing infighting between urban centres and/or semi-nomadic tribes, and violent destructions became common events⁶³.



Fig. 18 - EB IIIA Inner Gate L.1800, filled up with collapsed mudbricks and burnt beams, from north-east.

⁶¹ Nigro *et al.* 2011, 580-581.

⁶² Paleobotanic analysis was carried out by Alessandra Celant (Rome "La Sapienza" University). Kenyon's Expedition identified the *Tamarix* as the predominant species among charcoal samples (Hopf 1983, 577; Western 1983).

⁶³ See Gallo in this volume, 157-161.

9. The apogee of the EB III city

After the EB IIIA destruction the city defenses were again reconstructed, the city-walls raised again and the casemates in between them filled up (for this reason the South Gate was abandoned) with inert materials (powdered chalk or limestone)⁶⁴. The EB IIIB (Sultan IIIc2) reconstruction shows once more Jericho's capability in recovering both from natural and human-brought about destructions. It depended on the accumulated reserve of wealth and people.

The apogee of the urban period at Jericho occurred during the Early Bronze III, and it was characterized by hoarding agricultural surplus, including, in addition to the basic intensive cultivation of barley, also horticultural and oasis products, namely legumes (such as lentils, chickpeas, and broad bean), olives and olive oil, and, especially, fruits with high nutritional value (dates, figs, and almonds), which were dried and exchanged, as well as farm animals products (wool, leather, milk and cheese), also easy to trade. Increasing wealth, reflected into technological progress, material culture standardization and functional specialization (fig. 19)⁶⁵, supported the city interaction on an extra-regional scenario, enhancing exchange of typical Jericho products with prestigious items both from Egypt (on a route active since EB I)⁶⁶, and Northern Levant (Syria and the Lebanese coast)⁶⁷. The extended control over Dead Sea salt, sulfur and bitumen, moreover, provided again Jericho with valuable raw material to be traded at a regional and interregional level. Copper weapons and tools were also commonly used during this period⁶⁸, thus testifying the high economic rank of Jericho, which had become a pivotal centre on the road to copper descending from

⁶⁴ Marchetti - Nigro 1998, 36-39, 81-94; Nigro 2006a, 372-375; 2006b, 18.

⁶⁵ Nigro 2006b, 13-17.

⁶⁶ De Miroschedji 2002; Nigro 2005, 199-200; Sala 2012.

⁶⁷ The northern-oriented interactions are also evidenced in the Jerichoan material culture by the substantial diffusion of either imported or local manufactured KKW Ware (Sala 2008; Nigro 2009b, 69-74), and by the presence of cylinder seals whose decorative motifs find parallels in specimens from Byblos, Sidon, Tell Fadous and, more recently, Tell Arqa (Thalman 2013).

⁶⁸ A metal pin (from Area H; Holland 1982, 567, fig. 229:1, reg. 2921) and copper axe (from Site L; Kenyon 1981, fig. 15:4, reg. 80; Holland 1982, 564; Nigro 2010, 60, fig. 3:15) were retrieved by Kenyon on the Spring Hill; a copper dagger was found in EB IIIB Palace G on the eastern slope of the Spring Hill by the Italian-Palestinian Expedition (Nigro *et al.* 2011, 592); while a crescentic axe from Tomb A114 (Kenyon 1960, 179, fig. 66:1, reg. A 114:1), and a copper dagger from Tomb F5 (Kenyon 1960, 174, fig. 66:3, reg. F5:1) were recovered in the necropolis.

the Jordan Valley down deep into the ʿArabah up to Wadi Feinan (and perhaps Timnah).

Such a flourishing city, full of riches collected in public buildings on the Spring Hill, undoubtedly exercised an attraction for other organized groups which lived according semi-nomadic customs in the Jordan Valley and in the nearby wildernesses. They, indeed, represented a major threat, as the archaeologically documented destructions eloquently show.

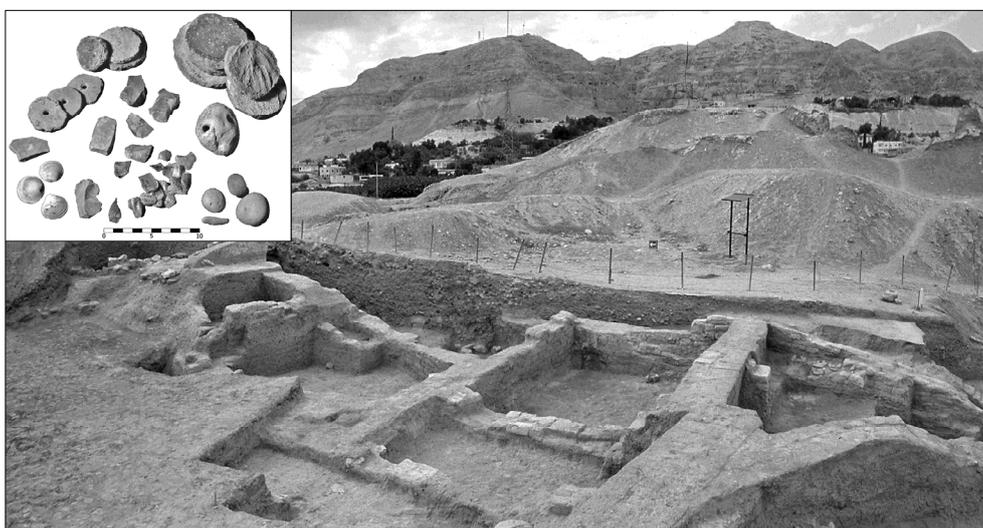


Fig. 19 - EB III domestic quarter on the northern plateau; its finds illustrate a typical material culture of the EB III flourishing city of Jericho.

10. The end of EB III city

However, external (climate, routes towards raw material sources increasingly controlled by semi-nomadic groups of the Syro-Arabic Desert) and internal (fast growth of number of people at the bottom of the social pyramid) factors were going to extinguish the city flourishing life, also as an effect of Egyptian Pharaohs driving towards Lebanon (especially Byblos) of their import/export enterprises⁶⁹. These changes would have deeply influenced the reactive spirit of the Jerichoans in the third quarter of the 3rd millennium BC. Especially the interruption of international trade routes had the outcome of reducing alternative markets where to find and to exchange goods, thus pushing the city back into a regional, or even a cantonal restricted horizon, within which recover and resilience were difficult, or even

⁶⁹ As evidenced by both petrographic analysis (Köhler - Ownby 2011) and textual evidence (Marcolin - Espinel 2011).

impossible, when one or more resources were cut off by destructive “unpredictable” events, as enemy attacks, inner riots or natural catastrophes. Around 2350 BC one of this dramatic attack occurred and the city of Jericho was again ruinously destroyed. All of the excavated areas gave back ashy fillings with charcoals and carbonized structures, evidence of a fierce fire which burned the whole city and its content. After roughly a millennium of continuous development, Jericho did not recover and on the ancient tell only smoking ruins were kept. This last dramatic event was detected by all of the four expeditions excavating Tell es-Sultan on several spots of the site (figs. 20-23)⁷⁰. Notwithstanding the wide spatial impact of the destruction, which did not spare any place within the city, the absence of human victims underneath collapsed structures, and the detected rapping of huge wooden beams from the city-walls and from the Palace structures on the Spring Hill, suggest that the city was deliberately set on fire after having been sacked, as the last dramatic outcome of a military conquest. The plausible deportation of its population also hampered the city to recover, letting the huge ruin abandoned for at least two generations.



Fig. 20 - Evidence of the EB IIIB final destruction in Palace G.

⁷⁰ Garstang - Garstang 1948, 135-140 (where the collapse of the EB III city-walls is erroneously attributed to Joshua's conquest), pls. XVII-XVIII; Kenyon 1957, 176-177; 1981, 102-104, 165-166, 213; Nigro 2006b, 20-22; 2009a, 187-188; Nigro *et al.* 2011, 587-592.



Fig. 21 - The tumbled down EB III city-wall (after Garstang - Garstang 1948, pl. XVIIa).

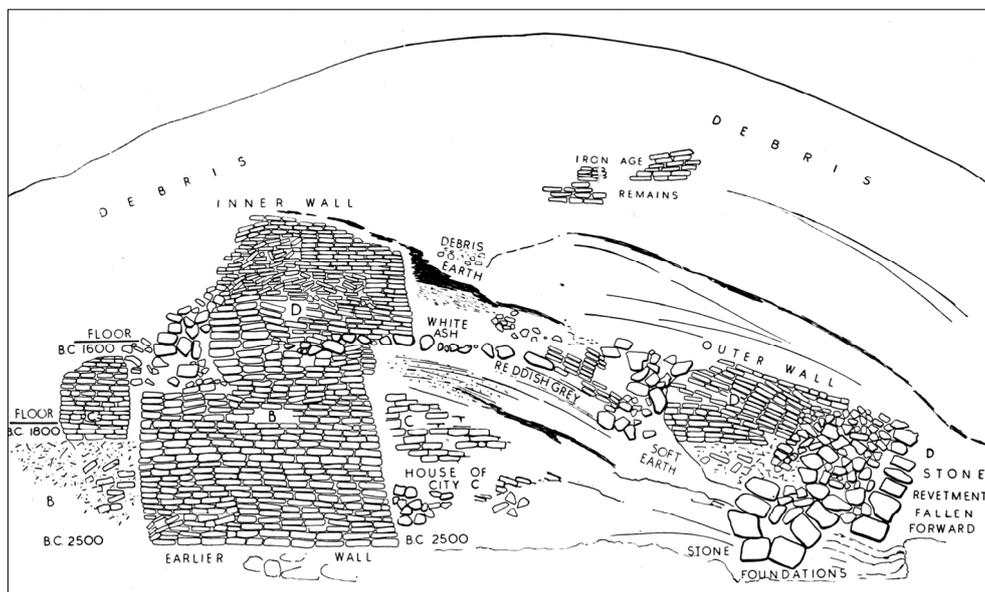


Fig. 22 - Section of the tumbled down EB III city-wall at time of Garstang's excavations (after Garstang - Garstang 1948, pl. XVIII).



Fig. 23 - Evidence of the EB IIIB final destruction in Building B1, built at the south-western corner of the EB III city, just inside the EB III city-wall.

11. Conclusions

The occupational oscillations of the human settlement at Tell es-Sultan summarized in this paper may epitomize the resilience capability of Humankind facing the challenges of nature and the perils of human cohabitation. Hazards and catastrophes produced a constant and strong incentive towards what in the last centuries was called "Human Progress", the indefatigable tendency to growth, overcoming obstacles first posed by nature and, successively, generated by humans and their institutions.

When basic steps, "progresses", such as animals and plants domestication, were accomplished, new hindrances raised up against the Jerichoan community, stimulating its prompt reaction. Social organization, ideological consensus and wealth distribution, as well as technological innovations and cultural exchange, were the levers with which develop responses to continuous threats. Such a narration is a sort of "embryonic history" of the rise, growth and collapse of an early Levantine community. It depicts the dialectic relationship which opposed the community to the environment where it chose to live. The feeling of belonging to a familiar group, and the communal goal of outliving to lethal challenges were ideological tools helping the group to survive or, at least, to psychologically and socially

accept the unavoidable defeats which any human group encounters, as well as the imposition of a hierarchy and the selection of a leader.

The "Story of Jericho", as it was called once by John Garstang, not only thoroughly illustrates such dynamics, but definitely shows that the most dangerous threat for a human community is what it can self-generate when disorganized and subversive forces gain the upper hand.

Bibliography

- ALFONSI, L. - CINTI, F.R. - DI MAURO, D. - MARCO, S.
2012 "Archaeoseismic Evidence of Two Neolithic (7,500–6,000 B.C.) Earthquakes at Tell es-Sultan, Ancient Jericho, Dead Sea Fault", in *Seismological Research Letters* 83 (July/August 2012), pp. 639-648.
- BAR-YOSEF, O.,
1986 "The walls of Jericho: an alternative interpretation", in *Current Anthropology* 27 (1986), pp. 157-162.
- BOURKE, S.
2000 "Pella in the Early Bronze Age", in G. PHILIP - D. BAIRD (eds.), *Ceramic and Change in the Early Bronze Age of the Southern Levant* (Levantine Archaeology 2), Sheffield 2000, pp. 233-253.
- BRUINS, H.J. - VAN DER PLICHT, J.
1998 "Early Bronze Jericho: High-Precision 14C Dates of the Short-Lived Palaeobotanic Remains", in *Radiocarbon* 40/2 (1998), pp. 621-628.
2001 "Radiocarbon Challenges Archaeo-Historical Time Frameworks in the Near East: the Early Bronze Age of Jericho in Relation to Egypt", in *Radiocarbon* 43/3 (2001), pp. 1321-1332.
- CALLAWAY, J.A.
1993 "Ai", in E. STERN (ed.), *The New Encyclopedia of Archaeological Excavations in the Holy Land*, Vol. 1, Jerusalem 1993, pp. 39-45.
- CROWFOOT, J.
1937 "Notes on the flint implements of Jericho, 1936", in *Liverpool Annals of Archaeology and Anthropology* 24 (1937), pp. 35-52.
- CROWFOOT-PAYNE, J.
1983 "Appendix C. The Flint Industries of Jericho", in K.M. KENYON - T.A. HOLLAND 1983, pp. 622-759.
- DOUGLAS, K.
2007 *Die Befestigung der Unterstadt von Ḥirbet ez-Zeraqōn im Rahmen der frühbronzezeitlichen Fortifikationen in Palästina* (Abhandlungen des Deutschen Palästina-Vereins 27,3), Wiesbaden 2007.
- FINKELSTEIN, I. - USSISHKIN, D. - PEERSMANN, J.
2006 "Area J (The 1998-2000 Seasons)", in I. FINKELSTEIN - D. USSISHKIN - B. HALPERN (eds.), *Megiddo IV. The 1998-2002 Seasons* (Tel Aviv Monograph Series 24), Tel Aviv 2006, pp. 25-74.
- FISCHER, P.M.
2008 *Tell Abu al-Kharaz in the Jordan Valley. Volume I: The Early Bronze Age* (Österreichische Akademie der Wissenschaften, Denkschriften der Gesamtakademie, Band XLVIII), Wien 2008.

- FOERSTER, G.
1993 "Tulul Abu el-^cAlayiq. The Chalcolithic Settlement", in E. STERN (ed.), *The New Encyclopedia of Archaeological Excavations in the Holy Land*, Vol. 3, Jerusalem 1993, p. 683.
- GARFINKEL, Y.
1999 "Ghassulian Chalcolithic Presence at Jericho", in *Levant* 31 (1999), pp. 65-69.
- GARSTANG, J.
1932 "Jericho: City and Necropolis", in *Liverpool Annals of Archaeology and Anthropology* 19 (1932), pp. 3-22, 35-54.
1935 "L'art néolithique à Jéricho", in *Syria* 16 (1935), pp. 353-357.
- GARSTANG, J. - DROOP, J.P. - CROWFOOT, J.
1935 "Jericho: City and Necropolis (Fifth Report)", in *Liverpool Annals of Archaeology and Anthropology* 22 (1935), pp. 143-184.
- GARSTANG, J. - BEN-DOR, I. - FITZGERALD, F.M.
1936 "Jericho: City and Necropolis (Report for the Sixth and Concluding Season, 1936)", in *Liverpool Annals of Archaeology and Anthropology* 23 (1936), pp. 67-100.
- GARSTANG, J. - GARSTANG, J.B.E.
1948 *The Story of Jericho*, London 1948.
- GREENBERG, R. - EISENBERG, E. - PAZ, S. - PAZ, Y.
2006 *Bet Yerah: The Early Bronze Age Mound I: Excavations Reports 1933-1986* (Israel Antiquities Authority Reports 29), Jerusalem 2006.
- HAMIEL, Y. - AMIT, R. - BEGIN, Z.B.
2009 "The Seismicity along the Dead Sea Fault during the Last 60,000 Years", in *Bulletin of the Seismological Society of America* 99/3 (2009), pp. 2020-2026.
- HELMS, S.W.
1988 "Jericho which was once a little city, but is now destroyed, and is but a little village", in S. SHAATH (ed.), *Studies in the History and Archaeology of Palestine* (Proceedings of the First International Symposium on Palestine Antiquities), III, Aleppo 1988, pp. 83-102.
- HENNESSY, J.B.
1967 *The Foreign Relations of Palestine during the Early Bronze Age*, London 1967.
- HOLLAND, T.A.
1982 "Appendix D. The Metal Objects", in K.M. KENYON - T.A. HOLLAND 1982, pp. 564-569.
1987 "Jericho and the Proto-urban period", in S. SHAATH (ed.), *Studies in the History and Archaeology of Palestine* (Proceedings of the First International Symposium on Palestine Antiquities), II, Aleppo 1987, pp. 17-25.
- HOPF, M.
1983 "Appendix B. Jericho Plant Remains", in K.M. KENYON - T.A. HOLLAND 1983, pp. 576-621.
- KENYON, K.M.
1957 *Digging up Jericho*, London 1957.
1960 *Excavations at Jericho. Volume One. The Tombs excavated in 1952-1954*, London 1960.
1965 *Excavations at Jericho. Volume Two. The Tombs excavated in 1955-1958*, London 1965.
1979 *Archaeology in the Holy Land*, London 1979.

- 1981 *Excavations at Jericho. Volume Three. The Architecture and Stratigraphy of the Tell*, London 1981.
- 1993 "Tell es-Sultan", in E. STERN (ed.), *The New Encyclopedia of Archaeological Excavations in the Holy Land*, Vol. 2, Jerusalem 1993, pp. 674-681.
- KENYON, K.M. - HOLLAND, T.A.
1982 *Excavations at Jericho. Volume Four. The Pottery Type Series and Other Finds*, London 1982.
- 1983 *Excavations at Jericho. Volume Five. The Pottery Phases of the Tell and Others Finds*, London 1983.
- KHALIL, L. - RIEDERER, J.
1998 "Examination of copper metallurgical remains from a Chalcolithic site at el-Magass, Jordan", in *Damaszener Mitteilungen* 10 (1998), pp. 1-9.
- KÖHLER, E.C. - OWNBY, M.J.
2011 "Levantine Imports and their Imitations from Helwan", in *Ägypten und Levante* 21 (2011), pp. 31-46.
- LAZAR, M. - BEN-AVRAHAM, Z. - GARFUNKEL, Z. - PORAT, N. - MARCO, S.
2010 "Is the Jericho Escarpment a tectonic or a geomorphological feature? Active faulting and paleoseismic trenching", in *The Journal of Geology* 118 (2010), pp. 261-276.
- LEVY, TH.E.
2007 *Journey to the Copper Age: Archaeology in the Holy Land*, San Diego 2007.
- MARCHAND, F.
2011-2012 "The Modelling Skulls in the Ancient Near-East", in *Tiempo y sociedad*. 6 (2011-2012), pp. 5-41.
- MARCHETTI, N. - NIGRO, L.
1998 *Scavi a Gerico, 1997. Relazione preliminare sulla prima campagna di scavi e prospezioni archeologiche a Tell es-Sultan, Palestina* (Quaderni di Gerico 1), Roma 1998.
- MARCOLIN, M. - ESPINEL, A.D.
2011 "The Sixth Dynasty Biographic Inscriptions of Iny: More Pieces to the Puzzle", in M. BÁRTA - F. COPPENS - J. KREJČÍ (eds.), *Abusir and Saqqara in the Year 2010*, Prague 2011, pp. 570-615.
- MAZAR, A. (ed.)
2012 *Excavations at Tel Beth-Shean 1989-1996. Volume IV. The 4th and 3rd Millennia BCE*, Jerusalem 2012.
- MILEVSKI, I. - KHALAILY, H. - GETZOV, N. - HERSHKOVITZ, I.
2008 "The Plastered Skulls and Other PPNB Finds from Yiftahel, Lower Galilee (Israel)", in *Paléorient* 34/2 (2008), pp. 37-46.
- DE MIROSCHEDJI, P.
2002 "The socio-political dynamics of Egyptian-Canaanite interaction in the Early Bronze Age", in E.C.M. VAN DEN BRINK - T.E. LEVY (eds.), *Egypt and the Levant. Interrelations from the 4th through the Early 3rd Millennium B.C.E.*, London - New York 2002, pp. 39-57.
- NIGRO, L.
2005 *Tell es-Sultan/Gerico alle soglie della prima urbanizzazione: il villaggio e la necropoli del Bronzo Antico I (3300-3000 a.C.)* (Rome "La Sapienza" Studies on the Archaeology of Palestine & Transjordan, 1), Rome 2005.

- 2006a "Sulle mura di Gerico. Le fortificazioni di Tell es-Sultan come indicatori della nascita e dello sviluppo della prima città di Gerico nel III millennio a.C.", in F. BAFFI - R. DOLCE - S. MAZZONI - F. PINNOCK (eds.), *Ina Kibrāt Erbeti. Studi di Archeologi orientale dedicati a Paolo Matthiae*, Roma 2006, pp. 349-397.
- 2006b "Results of the Italian-Palestinian Expedition to Tell es-Sultan: at the Dawn of Urbanization in Palestine", in L. NIGRO - H. TAHA (eds.), *Tell es-Sultan/Jericho in the Context of the Jordan Valley: Site Management, Conservation and Sustainable Development* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan, 2), Rome 2006, pp. 1-140.
- 2008 "Tell es-Sultan/Jericho from Village to Town: A Reassessment of the Early Bronze Age I Settlement and Necropolis", in J.M. CORDOBA *et al.* (eds.), *Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East (5-8 April 2006)*, Madrid 2008, Volume II, pp. 645-662.
- 2009a "When the Walls Tumble Down. Jericho: Rise & Collapse of an Early Bronze Age Palestinian City", in A. CARDARELLI (ed.), *Le ragioni del cambiamento. Reasons for Change. 'Nascita', 'declino' e 'crollo' delle società tra fine del IV e inizio del I millennio a.C.* (Scienze dell'Antichità 15), Roma 2009, pp. 173-192.
- 2009b "Khirbet Kerak Ware at Jericho and the EB III Change in Palestine", in L. PETIT - E. KAPTIJN (eds.), *A timeless Vale. Archaeological and related essays on the Jordan Valley in honour of Gerrit van der Kooij on the occasion of his sixty-fifth birthday* (Archaeological Studies Leiden University 19), Leiden 2009, pp. 69-83.
- 2009c "Khirbet al-Batrawy: a Case Study of 3rd millennium BC Early Urbanism in North-Central Jordan", in F. AL-KHRAYSHEH (ed.), *Studies in the History and Archaeology of Jordan X*, Amman 2009, pp. 657-677.
- 2010 *Tell es-Sultan/Jericho in the Early Bronze II (3000-2700 BC): the rise of an early Palestinian city. A synthesis of the results of four archaeological expeditions* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan, 5), Rome 2010.
- 2014 "Aside the Spring: Tell Es-Sultan/Ancient Jericho: The Tale of an Early City and Water Control in Ancient Palestine", in T. TVEDT - T. OESTIGAARD (eds.), *A History of Water, Series 3, Vol. 1. From Jericho to Cities in the Seas: A History of Urbanization and Water Systems*, London 2014, pp. 25-51.
- NIGRO, L. - TAHA, H.
2009 "Renewed Excavations and Restorations at Tell es-Sultan/Ancient Jericho. Fifth Season – March-April 2009", in *Scienze dell'Antichità* 15 (2009), pp. 731-744.
- NIGRO, L. - SALA, M. - TAHA, H. - YASINE, J.
2011 "The Early Bronze Age Palace and Fortifications at Tell es-Sultan/Jericho. The 6th - 7th seasons (2010-2011) by Rome "La Sapienza" University and the Palestinian MOTA-DACH", in *Scienze dell'Antichità* 17 (2011), pp. 571-597.
- NIGRO, L. - SALA, M. - TAHA, H. (eds.)
2011 *Archaeological Heritage in the Jericho Oasis. A systematic catalogue of archaeological sites for the sake of their protection and cultural valorization* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan, 7), Rome 2011.
- NORTH, R.
1982 "The Ghassulian lacuna at Jericho", in A. HADIDI (ed.), *Studies in the History and Archaeology of Jordan I*, Amman 1982, pp. 59-66.

- PRITCHARD, J.B.
1958 *The Excavation at Herodian Jericho 1951* (Annual of the American Schools of Oriental Research 32-33), New Haven 1958.
- RAST, W.E. - SCHAUB, R.T.
2003 *Bâb edh-Dhrâf: Excavations at the Town Site (1975-1981). Part 1: Text, Part 2: Plates and Appendices* (Reports of the Expedition to the Dead Sea Plain, Jordan, Volume II), Winona Lake 2003.
- ROLLEFSON, G.O.
2000 "The Statuary from 'Ain Ghazal, Jordan", in A. WEYER (ed.), *Saving Cultural Heritage. Projects Around the Mediterranean* (Hornemann Institute Series 3), Hamburg 2000, pp. 101-110.
- SALA, M.
2006 "Garstang's North-Eastern Trench. Archaeological Evidences and Potential", in L. NIGRO - H. TAHA (eds.), *Tell es-Sultan/Jericho in the Context of the Jordan Valley: Site Management, Conservation and Sustainable Development* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan, 2), Rome 2006, pp. 267-287.
2008 "Khirbet Kerak Ware from Tell es-Sultan/ancient Jericho: a Reassessment in the Light of the Finds of the Italian-Palestinian Expedition (1997-2000)", in J.M. CORDOBA - M. MOLIST - C. PÉREZ - I. RUBIO - S. MARTÍNEZ (eds.), *Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East, Madrid, April 3-8 2006, Madrid 2008*, Volume III, pp. 111-133.
2012 "Egyptian and Egyptianizing objects from EB I-III Tell es-Sultan/ancient Jericho", in *Vicino Oriente* 16 (2012), pp. 277-303.
- SELLIN, E. - WATZINGER, C.
1913 *Jericho. Die Ergebnisse der Ausgrabungen* (Wissenschaftliche Veröffentlichung der Deutschen Orient-Gesellschaft 22), Leipzig 1913.
- STUART, A.R. - STUART, B. - SELLWOOD, B.W. - VALDES, P.
2006 "A Review of paleoclimates and palaeoenvironments in the Levant and Eastern Mediterranean from 25,000 to 5000 years BP: setting the environmental background for the evolution of human civilisation", in *Quaternary Science Reviews* 25 (2006), pp. 1517-1541.
- TAHA, H. - ANFINSET, N. - YASIN, J. - ZAWAHIRA, M.
2004 "Preliminary report on the first season of the Palestinian-Norwegian excavation at Tell el-Mafjer, Jericho", in *Orient Express* 2004/2, pp. 40-44.
- TAHA, H. - QLEIBO, A.
2010 *Jericho, A Living History, Ten Thousand Years of Civilization*, Ramallah 2010.
- THALMANN, J.-P.
2013 "Le Lion, la Chèvre et le Poisson. À propos d'une jarre à empreintes de sceaux-cylindres de Tell Arqa (Liban)", in *Syria* 90 (2013), pp. 255-312.
- TUBB, J.N.
1998 *Canaanites*, London 1998.
- WESTERN, C.
1983 "Appendix F. Catalogue of identified charcoal samples", in K.M. KENYON - T.A. HOLLAND 1983, pp. 770-773.

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