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Egypt and Ancient Near East – Perceptions of Alterity
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Ancient Near Eastern Traditions
vs. Hellenization/Romanization
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Eco-Systems or «Socio-Systems»? The Case of the Chalcolithic of the Southern Levant

The Chalcolithic Ghassulian culture of the southern Levant lasted for about 800 years starting in the second half of the 5th millennium BC. A great deal of research has been involved in the southern *facies* of this culture, mainly in the Northern Negev. Changes in settlement patterns at the end of Ghassulian Chalcolithic and the collapse of this culture has been interpreted in relation to the influence of eco-systems on the material culture of the southern Levant in that particular semi-desertic area. In this paper we will offer our interpretation on the developments concerning the end of the Chalcolithic from a socio-economic context, without ignoring the influence of the environment and natural sources on the development of the rural communities of the southern Levantine Chalcolithic.

Introduction

Some scholars have discussed the existence of a possible crisis in the sites of the southern Levant, particularly in the Northern Negev at the end of the Chalcolithic period. The interpretation of archaeological evidence concerning this phenomenon deserves special attention because from a theoretical and methodological point of view it represents an issue that, in our understanding, cannot be solved by disregarding human and social aspects in favor of a external determinism. Hence the question we pose: eco-systems or socio-systems?

With the aim to explaining the end of the Chalcolithic in the southern Levant and the transition to the Early Bronze Age (EBA) I, researchers have proposed several possible scenarios. Some scholars have considered variables external to Chalcolithic society, one is the possible ecological degradation of the environment and the collapse of the Chalcolithic society due to a change in climate during the second quarter of the 4th millennium B.C. (Goldberg/Rosen 1987; Levy 1998; Burton/Levy 2011: 187–188; contra Blackham 2002: 100–102). Lovell (2002) pointed out that: «The majority of Chalcolithic sites come to an

abrupt end with no reoccupation in the ensuing Early Bronze Age». Meanwhile, Joffe (1993: 41) estimated that only 21% of the Chalcolithic sites in low-lying areas were reoccupied in EBA I.

It has been suggested that whereas climatic conditions had been more favorable at the beginning of the Chalcolithic, towards the end of it climate gradually evolved into present-day conditions (Sanlaville 1996). As the Negev was always a marginal area, its inhabitants had already developed a survival strategy and mechanisms to cope with the aridity of the environment, including pastoralism in periods of extreme drought, and were, therefore, successful in addressing climate fluctuations. In fact, this would amount to delegitimizing the determinant nature of the assumption concerning the collapse of Chalcolithic societies in the southern Levant as a result of ecologic degradation brought about by a change in climate. We intend to address this topic based on the evidence at our disposal.

Chronology

From a chronological point of view, our study is located in what some authors have defined as the Ghassulian (e.g. Gilead 2011) or Late Chalcolithic period (e.g. Garfinkel 1999) (ca. 4500–3800/3700 BC). According to these researchers, there must have been a hiatus between the latest stages of the Chalcolithic and the first stages of the EBA I.

From a methodological point of view, we could consider two approaches to address the study: on the one hand, according to Butzer's (1982) approach, human history is a continuation of natural history; on the other hand, in the nineties, some scholars suggested that this argument could be inverted in the sense that human beings could, in fact, modify the landscape through their activities causing, for instance, the desertification of large expanses of land by cutting down the trees (e.g. Bottema et al. 1990). Polanyi (1966) asserted that the relationship between a specified culture and its environment is equivalent to a complete entity and its constituent parts. Consequently, culture would depend on the natural habitat including all its social and economic components.

This paper intends to discuss the proposal according to which the end of the Chalcolithic period was brought about by a climate trend towards greater dryness which had a particular impact on the sites in the Beersheva Valley where annual rainfall nowadays is under 200mm. This area was inhabited during the Chalcolithic period but not during the ensuing EBA I, unlike other semiarid regions such as the Jordan Valley.

The collapse of the Chalcolithic settlements at the beginning of the 4th millennium B.C. may help to illustrate the problems associated with the attempt to establish a causal relationship between the widespread degradation of the land and human activities. In fact, it is unlikely that these activities had a negative impact on the landscape as some authors suggest

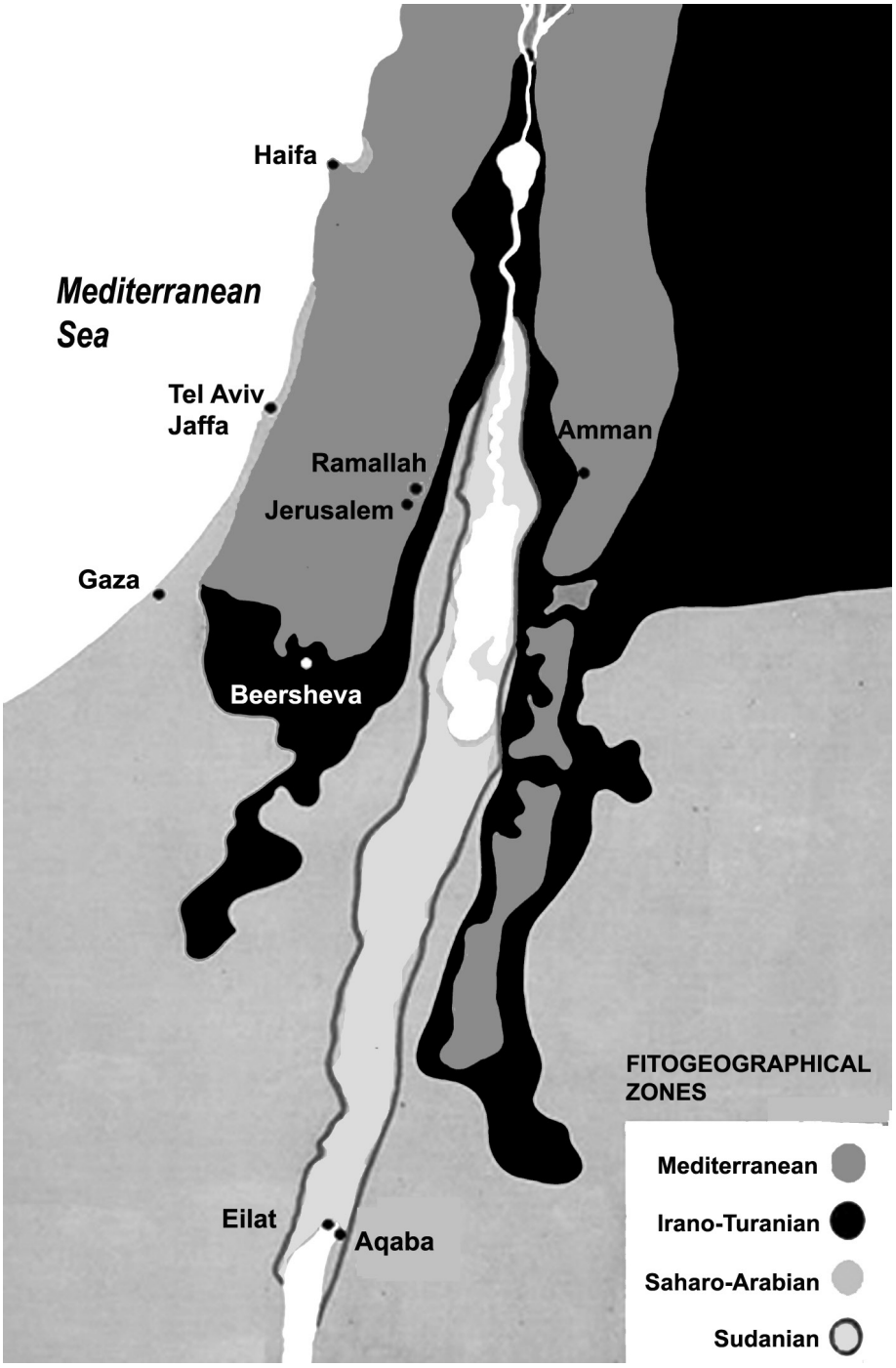

Fig. 1. Today's phytogeography and rainfall in the southern Levant.

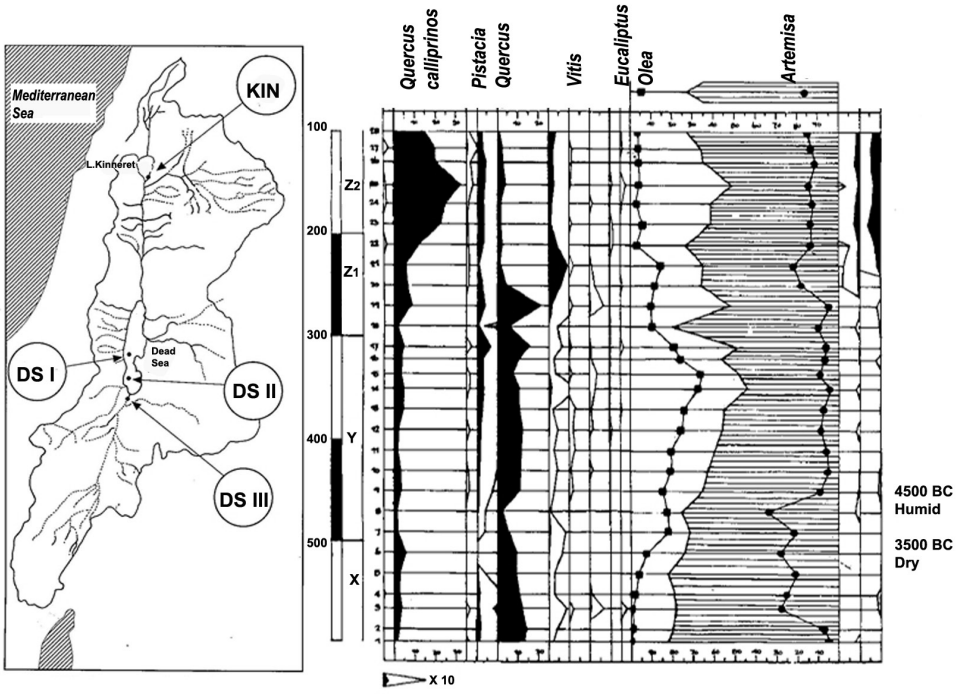

Fig. 2. Palynological diagram of core DI from the Dead Sea. Adapted from Baruch (1992: figs.1–2).

regarding the Beersheva area (Levy 1981; Gilead 1988; Lovell/Rowan 2011), this being a region with a relatively dense line of farming villages along the main drainages. Rosen (2011) suggested that this settlement system was originated by a colonization event towards the middle of the 5th millennium over a span of hundreds of years.

We suggest that this phenomenon is associated with the first metal smelting industries and their sources in Wadi Feynan. Around 3800/3700 BC, and perhaps even earlier, all the settlements throughout the length of Nahal Beersheva were abandoned. There is no apparent continuity between these settlements and the EBA I few hundreds of years later (Gilead 1995, 2011).

Climate and Habitat

Phytogeographical areas in Palestine are well-defined nowadays (**fig. 1**) and the main problem lies in determining whether the same situation existed approximately 6500 years ago. The area under study is the semi-desertic Irano-Turanian region with under 200 mm. annual rainfall. One of the methods that provides an outline of climate change is the study

of speleothems, i.e. the study of stalactites and stalagmites in caves that reflect the volume of rainfall in cycles of years. The work by Bar-Matthews and Ayalon (2011) in the Soreq cave shows a peak in the curve stretching from the middle of the 5th millennium up until the beginning of the 4th millennium BC, a period identified with the Chalcolithic.

Another method used to study climate change is palynology that measures the amount of pollen grains deposited during certain periods and enables the determination of the botanical activity in one period or another. This method involves the creation of several cores, i.e. deep excavations performed with drills to recover evidence of the botanical history of specified sites. We unfortunately lack a core that is an exact match for the Negev. The Ein Gedi pollen core on the shores of the Dead Sea is the closest core in the area north of the Negev labeled D I (**fig. 2**). According to studies conducted by Baruch (1991), by 4500 BC one can observe an increase in the amount of olive tree pollen. We can conclude that there must have been a colder and humid period during the Chalcolithic throughout the entire southern Levant. The same situation can be observed in the palynological core of the eastern Mediterranean published by Langgut and others (2011). Naturally, each core reflects the climate situation of the surrounding areas. However, based on the speleothemic studies for the north and center added to the information furnished by the two palynological cores, we can suggest that climate changes did occur during the Chalcolithic, throughout the southern Levant.

Flora and Fauna

One central issue in this period is the culmination of the process known as the «secondary products revolution» (Sherratt 1980), including the production of dairy goods and horticulture and the probable domestication of some trees, particularly olive trees (e.g. Lovell 2008).

Grigson (2007) shown that the distribution of animal husbandry (sheep, goats, cattle and pigs), coincides approximately with present-day phytogeographic regions. Pigs, which are animals that require large amounts of water, are found in the Mediterranean area whereas they are practically absent in the semiarid Irano-Turanian area. Pigs are also to be found in the sites located in the area extending between these two regions (Gilat, Grar, Ghassul).

Now, if we observe the map of the Chalcolithic sites (**fig. 3**), we shall see that below the 150 mm yearly rainfall line archaeological pig remains amount to less than 2%. If we rely on this information, we can infer that the situation during the Chalcolithic period was similar to present-day conditions, perhaps with a slightly higher rainfall pattern.

If we were to conduct a study of the faunal remains over time comparing general data with data from the semiarid areas (Grigson 1998), we would see two things: the Chalcolithic and EBA maintain the same trends –with a few slight differences – both in general and in

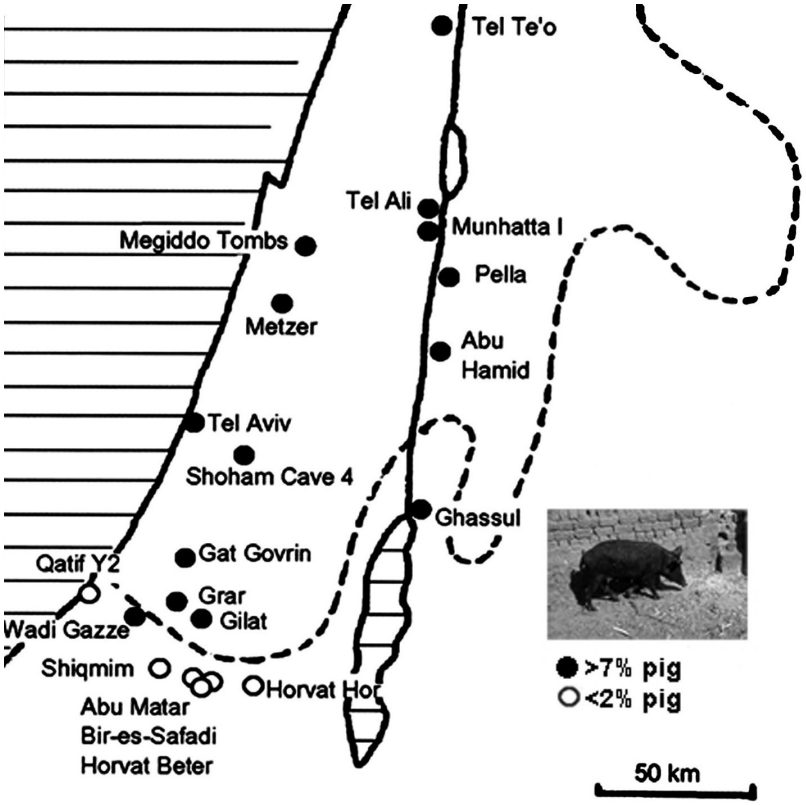

Fig. 3. Distribution of 5th–4th millennium BC sites of the southern Levant with more than 7% (black circles) and less than 2% (white circles) pigs. The dotted line represents the limit of dry farming. Adapted from Grigson (2007).

the semiarid areas, while in the case of pigs, differences are barely noticeable. Differences are more visible in the relationship between cattle and sheep and goats which increase in the EBA. Changes can also be observed even between different Chalcolithic sites within the same sub-areas, as in the case of Grar and Gilat (Grigson 1998, 2006). The same occurs in the different phases of Teleilat Ghassul (Bourke 2001), but the general trends persist: a high number of sheep and goats followed by cattle, pigs and other animals.

However, this last site, in both phases, has produced a considerable amount of botanical remains and seeds including wheat, barley and others (Bourke 2001; Meadows 2005). We emphasize this because barley is sensitive in areas with an annual rainfall below 200 mm.

In fact, wheat, barley and vegetable remains have been found in the Beersheva sites, particularly in storage pits (Perrot 1963: 373; Paz et al. 2014). This seems to prove that a heavier rainfall favored grain farming or that these products were traded with neighboring areas in the Shephela and the high, damper area of Hebron, such as occurred in the EBA (Milevski 2011).

Society and Metallurgy

We shall now address the analysis of Chalcolithic society. We intend to open the subject to achieve a broader view of the ongoing discussion: Did the Chalcolithic period in the Beersheva area come to an end as a result of climate change or rather as a result of changes in social structure or behavior? On the one hand, there are those who suggest a chiefdom society (e.g. Levy 1998). On the other, there are those who support the existence of an egalitarian society (e.g. Gilead 1988; Joffe et al. 2001). Our approach suggests defining Chalcolithic as a society with a community -patriarchal system of production, similar to that proposed by Suret-Canale (1974); a mode that would be based on the organization of villages as social units (Jaruf et al. 2013; Milevski 2013).

Chalcolithic society has some form of continuity with the Neolithic. However, there are certain aspects that mark differences between one and another such as the standardization and greater production of pottery, the improvement of wool and particularly dairy product processing, and the invention of metallurgy including two different technologies applied to copper. All this involves a greater division of labor, even within the framework of villages or communities that have not yet achieved a complex level of social development.

The birth of metallurgy marked the beginning of a new branch of production and, hence, greater specialization. Two metalworking industries have been defined: a simple technology involving the use of clay casting moulds and crucibles, and open installations, using pure copper for the production of simple «tools» such as axes and chisels (e.g. Golden 2010), and another more complex technology that used the lost-wax casting technique and arsenic-rich copper to create more elaborate objects such as those found at Nahal Mishmar and other sites (e.g. Levy 2007) (**table 1**).

The copper sources were mainly to be found in Wadi Feynan, Transjordan, whereas the pure copper mining, smelting and melting sites and those where cast metal objects were produced are located in the area of Beersheva (Golden 2010). A separation between extraction and production in technological and geographical terms is also a characteristic of the EBA (Shalev 1994). Crucibles and moulds were made of clay. There is a larger variety of tools and weapons; the production of daggers, for instance, required a greater degree of dexterity since the blades are finer yet more resistant. The lost-wax casting technique dissapeared during the EBA (Genz 2001).

	Chalcolithic	*EBA I*
1. Raw Material		
Mineral	Copper +	Copper +
Sources	Surface collection	Surface collection
Geological sources	Feynan (Timna?)	Feynan (Timna?)
2. Extraction		
Place	The ores are transported to Nahal Beersheva, 150 km from the sources	Feynan, near the sources, copper blocks («cakes»)
Process	Ovens, crucibles	Ovens, clay blowers
3. Production		
Casting	Clay moulds/open installations, bifacials and awls	«Cakes» are transported to production sites, melting in crucibles, casting in clay moulds/ stone installations
Additional processes	Heating and hammering of the blades	Heating and multiple hammering of the blades

Table 1. Metallurgical production during the Chalcolithic and the EBA in the southern Levant.

By EBA III there is evidence that some of the objects are produced directly at Feynan, at the site of Hamra Ifdan, and that part of the copper is stored in the form of ingots and copper blocks. These pieces were possibly sent to other sites where the material was cast in moulds to produce tools and weapons (Levy 2007).

A comparison between the location of the extraction and production sites and the distribution of copper objects during the Chalcolithic and EBA (**fig. 4)** shows two key changes, aside from the disappearance of the Beersheva sites. Firstly, the lost-wax casting technique disappears during the EBA. Secondly, the sites in the Beersheva area are very few and seem to have gone through all the stages of the metallurgical industry. The domestication of donkeys in the EBA may have enabled a larger circulation of copper objects from Feynan throughout the rest of the southern Levant.

If we compare the Chalcolithic with the EBA I, the evidence points to the fact that while in the first period the material was brought from the raw material sources and processed exclusively in the Beersheva area, during the EBA I there were sites near the copper sources at Feynan where the material was smelted, impurities were removed and copper blocks or cakes were produced. These were then transported to different sites to be used in the manufacture of tools and weapons by casting in moulds.

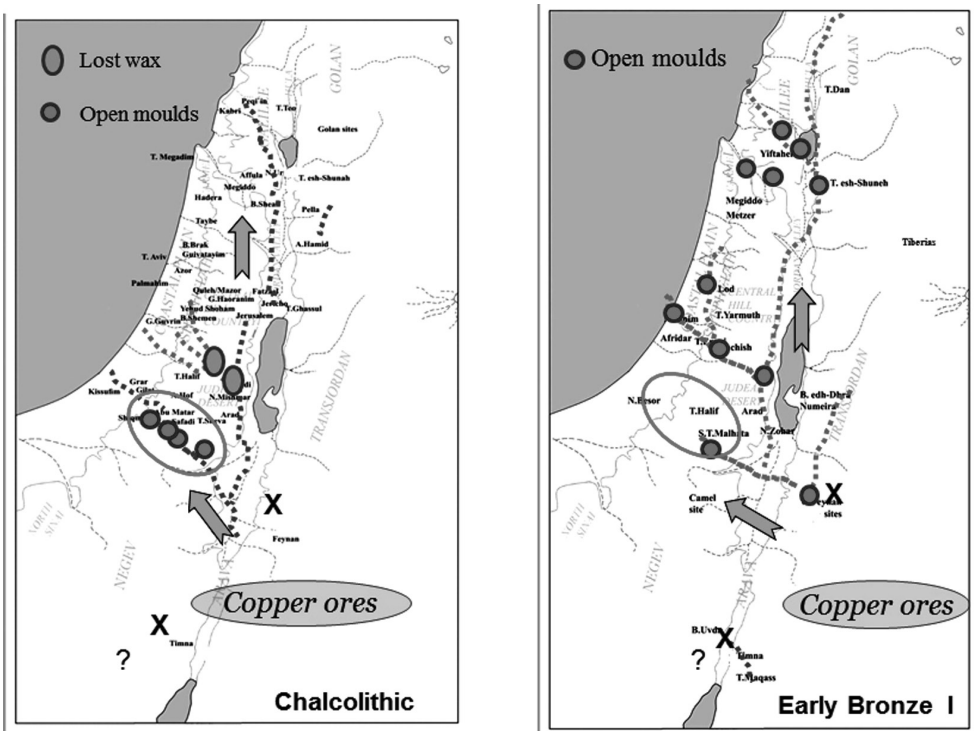

Fig. 4. Centers of production and distribution of copper implements during the Chalcolithic and the Early Bronze Age I of the southern Levant.

The components of metallurgical production in the EBA indicate a key change in the structure and level of craft expertise. This change may be recognized principally by the unity of the repertoire of objects and the use of the same source-metal for a wide range of products. The separation between extraction and production in technological and geographical terms is also characteristic of the period (Milevski 2011).

Conclusions

The changes in the settlement patterns towards the end of the Chalcolithic and its collapse were associated with the influence of climate change, particularly in the semi-desertic area of the Negev, i.e. the Beersheva valley. Our analysis has proved that in other semi-desertic areas such as the Jordan Valley, the Chalcolithic did not come to an abrupt end and that the EBA IA–IB developed in sites like Jericho (Anfinset et al. 2011; Kenyon 1981), Fazael (Bar 2014), and even further north. Moreover, the area of Nahal Habesor also shows evidence of

settlement continuity from the Chalcolithic to the EBA IA (Gophna 1995). The same applies to the southern coastal plain. Contrarily, in Wadi Feynan sites associated with copper extraction and production only began to appear in the EBA IA (Levy 2007).

Nevertheless, our interpretation is focused on the socio-economic context. Though we do not disregard the environmental influence and the existence of possible changes in climate towards the end of the period, the exceptions pointed out in the paragraph above are signs that, perhaps in the case of the Beersheva sites, changes may have occurred in the extraction, production and distribution of raw material and copper objects that contributed to the abandonment of these sites.

It is true that it may be suggested the contrary, i.e. that the disappearance of these sites affected the production and distribution of copper objects. Or, that the production of copper required water as well as wood as fuel to function. However, this hypothesis fails to explain why the sites where metallurgical activities were practiced in the Feynan copper mine area and in the semi-desertic Irano-Turanian region, with similar or worse climate conditions than in the Beersheva Valley, only came into being after the end of the Chalcolithic, during the EBA IA, when the sites in that valley had disappeared. It is based on these arguments that we prefer to explain these changes not in terms of changes in the eco-systems but rather as a product of changes in «sociosystems».

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Bibliography

Anfinset, N./Taha, H./al-Zawahra, M./Yasine, J., 2011. Societies in Transition: Contextualizing Tell el-Mafjar, Jericho. Lovell/Rowan 2011: 97–113.

Bar, S., 2014. The Dawn of the Bronze Age: The Pattern of Settlement in the Lower Jordan Valley and the Desert Fringes of Samaria during the Chalcolithic Period and Early Bronze Age I. Leiden.

Bar Matthews, M./Ayalon, A., 2011. Mid-Holocene Climate Variations Revealed by High-resolution Speleothem Records from Soreq Cave, Israel, and their Correlation with Cultural Changes. The Holocene 21.1, 163–171.

Baruch, U., 1990. Palynological Evidence of Human Impact on the Vegetation as Recorded in the Late Holocene Lake Sediments of Israel. S. Bottema et al. (eds.), Man's Role in the Shaping of the Eastern Mediterranean Landscape. Rotterdam, 283–293.

Blackham, M., 2002. Modeling Time and Transition in Prehistory: The Jordan Valley Chalcolithic (5500–3500 BC. Oxford

Bottema, S./Entjes-Nieborg, G./van Weist, G. (eds.), 1990. Man's Role in the Shaping of the Eastern Mediterranean Landscape. Rotterdam

Bourke, S., 2001. The Chalcolithic Period. B. Macdonald et al. (eds.), The Archaeology of Jordan. Sheffield, 107–163.

Burton, M. M./Levy, T. E, 2011. The End of the Chalcolithic Period (4500–3600 BC) in the Northern Negev Desert, Israel. Lovell/Rowan 2011: 78–191.

Butzer K. W., 1982. Archaeology as Human Ecology: Method and Theory for a Contextual Approach. Cambridge.

Garfinkel, Y., 1999. Neolithic and Chalcolithic Pottery of the Southern Levant. Jerusalem.

Genz, H., 2001. The Organization of Early Bronze Age Metalworking in the Southern Levant. Paléorient 26.1, 55–65.

Gilead, I., 1988. The Chalcolithic Period in the Levant. Journal of World Prehistory 2, 397–443.

– 1995. Grar, a Chalcolithic Site in the Northern Negev. Beersheva

– 2011. Chalcolithic culture history: Ghassulian and other entities in the southern Levant. Lovell/Rowan 2011: 12–24.

Goldberg, P./Rosen, A., 1987. Early Holocene Paleoenvironments of Israel. T. E. Levy (ed.), Shiqmim I. Oxford, 23–35.

Golden, J., 2010. Dawn of the Metal Age: Technology and Society during the Levantine Chalcolithic.London.

Gophna, R., 1995. Excavations at `En Besor. Tel Aviv.

Grigson, C., 1998. Plough and pasture in the early economy of the southern Levant. T. E. Levy (ed.), The Archaeology of Society in the Holy Land. London, 245–268.

– 2006. Farming? Feasting? Herding? Large Mammals from the Chalcolithic of Gilat. T. E. Levy (ed.), Archaeology, Anthropology and Cult: the Sanctuary at Gilat, Israel. London, 215–319.

– 2007. Culture, Ecology and Pigs from the 5th to the 3rd millennium BC around the Fertile Crescent. U. Albarella et al. (eds.), Pigs and Humans: 10000 Years of Interaction. Oxford, 83–108.

Jaruf, P./Gandulla, B./Milevski, I., 2013. Entre revoluciones: las formaciones pre-estatales del período Calcolítico palestinense. XIV Congreso Internacional de la Asociación Latinoamericana de Estudios de Asia y África, La Plata, 969–998. Available at: http://www.aladaa.com.ar/coleccionaladaa/ALADAA_XIV_Congreso_Internacional_2013-1.pdf

Joffe, A. H., 1993. Settlement and Society in Early Bronze I and II, Southern Levant: Complementarity and Contradiction in a Small-scale Complex Society. Sheffield.

Joffe, A. H./Dessel, J. P./Hallote, R., 2001. The 'Gilat Woman': Female Iconography, Chalcolithic Cult, and the End of Southern Levantine Prehistory. Near Eastern Archaeology 64, 9–23.

Kenyon K., 1981. Excavations at Jericho. Volume Three: The Architecture and the Stratigraphy of the Tell. London.

Langutt, D./Almogi-Labin, A./Bar-Matthews, M./Weinstein-Evron, M., 2011. Vegetation and Climate Changes in the South Eastern Mediterranean during the Last Glacial-Interglacial Cycle (86 ka): New Marine Pollen Record. Quaternary Science Reviews 30, 3960–3972.

Levy, T. E., 1981. Chalcolithic Settlement and Subsistence in the Northern Negev, Israel. Unpublished Ph. D. diss., University of Sheffield. Sheffield.

– 1998. Cult, Metallurgy and Rank Societies – Chalcolithic Period (ca. 4500–3500 BCE). T. E. Levy (ed.), The Archaeology of Society in the Holy Land. London, 226–244.

– 2007. Journey to the Copper Age. San Diego, CA.

Lovell, J. L., 2002. Shifting Subsistence Pattern: Some Ideas about the End of the Chalcolithic in the Southern Levant, Paléorient 28.1, 89–102.

– 2008. Horticulture, Status and Long-range Trade in Chalcolithic Southern Levant: Early Connections with Egypt. B. Midant Reyes/Y. Tristant (eds.), Egypt at its Origins 2. Leuven and Paris, 741–762.

Lovell, J. L./Rowan, Y. M. (eds.), 2011. Culture, Chronology and the Chalcolithic. Theory and Transition. Oxford.

Meadows, J., 2005. Early Farmers and their Environment: Archaeobotanical Research at Neolithic and Chalcolithic sites in Jordan. Unpublished PhD thesis, La Trobe University. Melbourne.

Milevski, I., 2011. Early Bronze Age Good Exchange in the Southern Levant. A Marxist Perspective. London.

– 2013. The Transition of the Chalcolithic to the Early Bronze Age in Socio-economic Context. Paléorient 39.2, 193–298.

Paz, Y./Aladjem, E./Abadi-Reiss, Y./Kahalani, N., /Timmer, N., 2014. Tel Sheva`. Preliminary Report. Hadashot Arkheologyiot- Excavations and Surveys in Israel 126. http://www.hadashot-esi.org.il/Report_Detail_Eng.aspx?id=9566.

Perrot, J., 1963. The prehistoric culture of Beersheba. Journal of Educational Sociology 36, 371–376.

Polanyi, M., 1966. The Tacit Dimension. London.

Rosen, S.A., 2011. Desert Chronologies and Periodization Systems. Lovell/Rowan 2011: 71–83.

Sanlaville, P., 1996. Changements climatiques dans la region Levantine à la fin du Pleistocène superieur et au début de l'Holocène. Leur relation avec l'évolution des societés humaines. Paléorient 22.1, 7–30.

Scheftelowitz, N./Fabian, P./Gilead, I., 2009. Chalcolithic Secondary Deposition Festivities: The Case of Horvat Qarqar South, Israel. Paper presented in the 15th Annual Meeting of the European Association of Archaeologists. Riva de Garda, Trento.

Shalev, S., 1994. The Change in Metal Production from the Chalcolithic Period to the Early Bronze Age in Israel and Jordan. Antiquity 68, 630–637.

Sherratt, A., 1980. Plough and Pastoralism: Aspects of the Secondary Products Revolution. I. Hodder et al. (eds.), Pattern of the Past: Studies in Memory of David Clarke. Cambridge, 261–305.

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