

POTTERS' WHEELS FROM KHIRBET AL-BATRAWY:
A RECONSIDERATION OF SOCIAL CONTEXTS*

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Nel "Palazzo delle asce di rame" della città del Bronzo Antico IIIB (2500-2300 a.C.) di Khirbet al-Batrawy sono stati rinvenuti tre dischi superiori di tornio da vasaio, una delle maggiori innovazioni tecnologiche del IV-III millennio a.C. Questa scoperta ha portato ad una riconsiderazione dello strumento in tutti i contesti noti del Bronzo Antico palestinese al fine di indagarne i risvolti socio-economici all'interno della società sud-levantina del periodo.

Keywords: potter's wheel/*tournette*; Khirbet al-Batrawy; Southern Levant; Early Bronze Age; ceramic manufacturing production

1. INTRODUCTION

The introduction in Southern Levant, during the second half of 5th Millennium BC, of the innovative technological device of the potter's wheel,¹ and its increased use especially in the 3rd Millennium BC, *i.e.* the use of rotary kinetic energy (RKE)² to improve pottery manufacture, both in terms of time of realization and quality of production, and its cultural significance, has recently been disentangled by V. Roux and P. de Miroschedji.³

A long time passed since the beginning of excavations in the Southern Levant before the rotary device was recognized and its role re-evaluated,⁴ this is possible due to the fragmentary state of preservation of these tools retrieved in excavations. The finding of two complete *tournettes* of the Early Bronze III in the palatial complex of Khirbet Yarmouk has

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¹ A number of studies were dedicated to Chalcolithic pottery of Southern Levant (see on them § 3. and fns. 21-23). For a recent study on this topic, but focused on Iran (Susa, Shahr-i Sokhta and Tepe Rud-iBiyaban 2), Syria (Tell Mardikh/Ebla) and Turkey (Hacinebi Tepe) see Laneri 2011; on Northern Mesopotamia (with previous comparisons): Tell Feres al-Sharki - see Baldi 2012; Tell Atij and Tell Gudeda - see Boileau 2005; Tell Leilan - see Blackman *et al.* 1993. A recent study on the origins and use of potter's wheel in Egypt claims that this innovative machine was introduced from the Levant during the reign of Pharaoh Sneferu in the 4th Dynasty (c. 2600 B.C.) - see Doherty 2013.

² The different fashioning techniques are recognizable through a combined study of surface features and microfabrics. Significant surface features include specific morphology of grooves, rilling, ridges and walls while significant microfabrics include specific structural patterns, air voids, particle orientation and joins. They have been extensively explained and experimentally tested by V. Roux and M.-A. Courty (Courty - Roux 1995; Roux - Courty 1998).

³ Roux - de Miroschedji 2009.

⁴ The identification of wheel macro-traces over EBA pottery is not a new information (starting from the pivotal study over the early pottery of Tell el-Mutesellim/Megiddo [Engberg - Shipton 1934]), however, since in most of finds only one disk was retrieved, the reconstruction of the complete object remained long hypothetical, based principally over the comparisons of the better known MB-LB stone pivot wheel (Roux - de Miroschedji 2009, 155).

shed new light over this peculiar instrument,⁵ clarifying definitively its functioning and its practical performance.

The recent discovery of three pieces of potter's wheel from the public complex of Khirbet al-Batrawy (Northern Jordan), here illustrated, suggests an additional re-examination of all the EBA potter's wheels in their finding contexts, with the aim of reconstruction their operational utilization, in the perspective of what has been called "*chaîne opératoire*",⁶ from the production of the object itself, to its belonging and its weight in economic terms in the Early Bronze Age Southern Levantine society.

2. POTTERS' WHEELS FROM KHIRBET AL-BATRAWY

The 6th-9th (2010-2012) seasons of excavations of Rome "La Sapienza" Expedition to Palestine & Jordan⁷ have further clarified stratigraphy and architecture of the public building unearthed in Area B South, located at the northern border of the *khirbet* dominating the valley of Upper Wadi Zarqa, called Palace B (consisting of two Pavilions: Building B1 and B3;⁸ fig. 1). The latter was erected inside the massive fortification system in the Early Bronze IIIA and lasted in use also during IIIB (Batrawy IIIB - phases 3d-a; 2500-2300 BC ca.), when it was tremendously destroyed.⁹ The Palace gathered productive and administrative functions, as it is testified by the impressive quantity of complete pottery vessels stored in it (among them also a ceremonial vessel),¹⁰ along with luxury objects, a bone knife, four copper axes and a dagger,¹¹ a complete gemstones necklace,¹² and three potters' wheels, these last preserved only with their upper disk (§ 2.1.; 2.2.; 2.3.).¹³

⁵ The palatial complex of Khirbet Yarmouk, Palace B1 (superimposed to previous Palace B2), belongs to the last EB III phase of the city (de Miroschedji 2003).

⁶ The concept of "*chaîne opératoire*" refers to the series of technical operations necessary to produce finished items through the transformation of raw materials (Cresswell 1996).

⁷ Excavations at Khirbet al-Batrawy were carried out since 2005 (director: Lorenzo Nigro; field director: Maura Sala), under the auspices of the Department of Antiquities of the Hashemite Kingdom of Jordan and they were supported by Sapienza University of Rome, the Italian Ministry of Education and University and the Ministry of Foreign Affairs of Italy.

⁸ The layout of the building shows two roughly symmetrical pavilions separated by a central corridor, with pillared halls and storerooms; Building B3 is the Western Pavilion, B1 the Eastern one (Nigro - Sala 2011, 89; Nigro [ed.] 2012, 178-188; Nigro 2012a).

⁹ For archaeological periodization and stratigraphic phases of Khirbet al-Batrawy: Nigro - Sala 2011, 86-88; Nigro (ed.) 2012, tab. 1.1, 10.

¹⁰ Preliminarily illustrated in Nigro 2010a, 73; 2011; Nigro - Sala 2011, 92-93, fig. 10.

¹¹ Nigro 2010a, 73-74; 2010c, 568-570; Nigro - Sala 2011, 94-96, figs. 13-14.

¹² Nigro 2012b.

¹³ For a preliminary illustration of one of them (§ 2.1.) see Nigro 2010a, 74; 2010c, 567-568; Nigro - Sala 2011, 93-94, figs. 11-12.

2.1. Tournette¹⁴ KB.10.B.87 (fig. 2)

The upper disk of the first *tournette* was retrieved in 2010, inside the EB IIIB destruction layer F.1054,¹⁵ which filled up Pillared Hall L.1040,¹⁶ in the Western Pavilion of the building. This rectangular hall, 4.9×7.5 m, with a series of four aligned pillar bases, stored right inside a great amount of storage vessels (large *pithoi* and jars), along with several other value objects, including the disk KB.10.B.87. Actually the disk was retrieved vertically sunk into the more than 1.2 m thick collapse layer filling up the Hall (fig. 3), in between the rim of a *pithos* and wall W.1121.

It consists in a basaltic stone disk, of a quite coarse texture, 28 cm in diameter and 3.3 cm in thickness. The upper face is quite flat, slightly depressed in the central part, an irregular surface with numerous hollows, of various dimensions. The central part looks like smoothed, coinciding with the more utilized part during wheel-moulding,¹⁷ showing a diameter of around 12-13 cm (which, thus, should coincide with the diameter of the small and thicker disk usually associated to the large one). These dimensions indirectly confirm the moulding and/or the finishing over the *tournette* especially of shapes of little dimensions - bowls, plates,¹⁸ juglets, besides neck and rim of the biggest vessels - *pithoi* and storage jars, as verified by surface features, visible on both the outer and the inner faces of the walls of the latter vessels. The lower face of this disk, slightly concave, presents a circular socket in form of a cone, deep 2.4 cm and with a diameter of 3.4 cm. The surface nearer to the socket is circularly polished, resulting glossy in that part abraded by the continuous rubbing with the lower disk; this last, not retrieved up to now, can be tentatively reconstructed, based on coeval parallels, as a basalt disk, with a biconical perforation, around 15-16 cm in diameter and 3.5 cm in thickness.¹⁹

¹⁴ The distinction between a wheel and a *tournette* rests on the revolution speed that the instrument can reach during the centering of the clay and the building of the vessel. Wheels that cannot exceed 80 revolutions per minute (rpm) whatever is the size of the vessel are called "tournettes" (Roux - de Miroschedji 2009, 164; Roux 2009a, 197-198). Fast wheel - stone pivot wheel - introduced in Southern Levant in the Middle Bronze II (with distinctive features in respect to those ones of 4th-3rd millennia BC here described - see Wood 1992; Roux 2009b) reached also 150 rpm and its speed decrease less by the potter's pressures when centering lumps of clay (see e.g. experiments conducted by R. Amiran and D. Shenhav [1985]).

¹⁵ Field number KB.10.B.1054/u; Activity 3b, Square BnII7, Elevation 657.60 m AMSL.

¹⁶ Oillared hall L.1040 is illustrated in Nigro 2010a; (ed.) 2012, 151-164; Nigro - Sala 2011, 89-90.

¹⁷ For a better comprehension of the technique of manufacture, experimental tests with a potter are conducted utilizing one of the two *tournettes* of Kh. Yarmouk (Roux - de Miroschedji 2009, 164-166, figs. 7-8).

¹⁸ Up to now, in the excavated part of the building were not retrieved open shapes complete (no plates and only a few bowls - Nigro - Sala 2011, 96), thus the affirmation of the finishing of these forms over the *tournette* is based on the study of sherds.

¹⁹ During the last season of excavation and survey on the site (August-September 2013), in the southern slope of the khirbet, the lower part of a potter's wheel was retrieved. At the first sight it seems to resemble the Middle Bronze typology, i.e. a stone pivot wheel. This kind of wheel is composed by a lower disk that is a base with a conical socket and an upper disk with a conical tenon. In the Batrawy specimen the tenon seems to belong to the lower part, possibly coinciding with the cone socket of the upper disk of the typology recovered on the site and here described. In this event, it might represent a sort of middle-way between the EB typology and the MB one. The absence of any MB or later presence at Khirbet al-Batrawy (with its last occupational phase in EB IVB - see Nigro [ed.] 2006, 77-107; 2008, 28-36, 102-105, 164-166, 294-305; 2012, 189-210; Nigro - Sala 2011, 88-89; Nigro *et al.* 2010; Sala 2012a), indirectly confirms the EB dating of the object (possibly of EB IVB and thus already of the northern and successive typology?), even if out of context.

2.2. Tournette *KB.11.B.110* (fig. 4)

The upper disk of the second *tournette* was retrieved in 2011, in the EB IIIB destruction layer F.1124,²⁰ in another room of the Western Pavilion, L.1120, interpreted as a storeroom (fig. 5).²¹ The finding spot is, like the previous one, within the final destruction layer of the building. L.1120 was a long and narrow storeroom (2.3-2.6 m of width and 6.3 m of length),²² accessible from its northern side, through Pillared Hall L.1040 (and its door opening directly on the inner lane of the palace, L.1050).

The disk is made of worked basalt stone, with a finer texture in respect with the previous specimen, less porous, with a diameter of 26.2 cm and a width of 3 cm. The upper face is flat and smoothed, the lower one is slightly concave culminating in the central part of the disk with a conical socket, oval shaped, 3.2 cm deep and 2.4 cm wide (diameter of the mouth). The polished circular area, resulting from the contact with the lower disk, showed a concentric series of lustrous rings (some lubricant had to be added to facilitate the rotary motion), measuring around 18.5 cm in diameter; this dimension can correspond to the approximate diameter of the lower disk, that is supposed to have a thickness of around 4.0 cm.²³

2.3. Tournette *KB.12.B.140* (fig. 6)

The third fragmentary basalt potter's wheel was found in the Eastern Pavilion. It was retrieved in 2012, in the EB IIIB destruction layer F.1154²⁴ inside the court (8 × 5.5 m open space) L.1046, accessible from entrance lane L.1050.

Also this disk is made of basaltic stone and although it's preserved only a little more than a quarter of the total area, all its dimensions can be determined from existing fragmentary evidence. The disk measures around 27 cm in diameter and 4.3 cm in thickness, with a central socket of circular form, 1.6 cm deep and 2.8 cm wide. Its texture is coarse, with numerous and large vesicles on both faces and scarce working traces, fact which makes more difficult the reconstruction of the dimensions of the lower disk. It appears of an inferior quality (or only much more damaged by erosion) in respect of previous ones retrieved in Halls L.1040 and storeroom L.1120.

3. *TOURNETTES* FROM EBA SOUTHERN LEVANT: A CLOSER LOOK TO THE CONTEXTS

In Southern Levant, the wheel coiling technique appeared first in Chalcolithic societies (end of 5th - beginning of 4th millennium BC),²⁵ basically being linked and roughly restricted to the manufacture of ceremonials vessels (little open bowls with rectilinear walls, named

²⁰ Preliminary number KB.11.B.1124/u; Activity 3b, Squares BnII8+BnII9+BmII9, Elevation 658.27 m AMSL.

²¹ Nigro 2012a, 705.

²² Nigro (ed.) 2006, 179-181.

²³ One of the two lower disks retrieved at Khirbet Yarmouk presents dimensions similar to that of *tournette* KB.11.B.110: the upper disk discovered in Area Ja, Stratum J-3, shows a diameter of 26.5 cm and a thickness of 3.3 cm, with a lower disk measuring 18.4 cm in diameter and 4.0 cm in thickness (Roux - de Miroschedji 2009, 160, figs. 5-6).

²⁴ Preliminary number KB.12.B.1154/b; Activity 3b, Square BpII9, Elevation 658.30 m AMSL.

²⁵ Mazar 1990, 69.

“V-shaped bowls”, systematically retrieved in funerary contexts).²⁶ Such ceremonial vessels were produced by a few craftsmen attached to a politico-religious élite according to recent hypothesis.²⁷ With the collapse of the social system, at the end of the Late Chalcolithic period, the specific social demand of this technique ceased, producing a strong break in the transmission of the wheel-craft technique, that will appear extensively again only in Early Bronze II (§ 3.2.).

The limited employ of the rotative device during the Chalcolithic, here just briefly hinted at, used for a restricted number of vessels with a clear cultural connotation, makes less necessary the investigation of each potters' wheel finding spot in order to circumscribe its use at that time.²⁸

Conversely, taking into account the EBA specimens, their number and varying distribution, may provide interesting insights about the socio-economic role of this tool, the status of its owners and its use within the early urban society. A re-examination of EBA potters' wheels finding contexts through time (tab. 1; fig. 7), it may be possible to underline some aspect of this social complexity, suggesting a feasible social practise.

3.1. *Early Bronze I (3400-3000 BC)*

After the collapse of the Chalcolithic society, there was a significant shift of settlement patterns, with decisive achievements in agricultural methods, trade relations and metalwork and craft production.

If the EB IA (3400-3200 BC) still showed a somewhat simple agriculture based village economy, EB IB (3200-3000 BC) represents the formative stage of the successive urban culture, including control and exchange on long-distances routes, the appearing of the earliest fortified settlements, the erection of former communal and cult buildings,²⁹ and an emerging economic specialization.

Though EB I pottery is largely hand-fashioned, there is a resilience area that continued to use the wheel-coiling technique: in southwestern Palestine in fact, during EB IA (3400-3200 BC), some open bowls are still coiled over the wheel with the same method used in

²⁶ The theory about the ceremonial function of the Chalcolithic V-shaped bowls was elaborated starting from the examination of this kind of shape recovered at the site of Abu Hamid, in the middle Jordan Valley; it was the only form presented in the necropolis that was produced through the RKE and with a non-local clay (Roux - Courty 1997); successively, through the broadening of the studied area, comprising all the Southern Levant and sampling every possible finding context (ecological niches and/or “functions” - domestic, funerary, worship) it was confirmed the wheel-coiling production of this form, along with a limited range of other vessels, and the probably connection with itinerant potters specialized in this type of manufacture (Roux - Courty 2005).

²⁷ Roux - Courty 2005; Roux 2007, 203-205.

²⁸ There are only two specimens recovered from LC sites, but one is unpublished (from Tel Halif, Jacobs - Borowski 1993, 79; Roux - de Miroschedji 2009, 162) and one is from a disturbed context (from Wadi Gazzeh/Nahal Besor Site E - Macdonald - Starkey - Harding 1932, 7, pls. XXII:21, XXVIII:24).

²⁹ In EB I almost all contexts are simply domestic or of cult nature (Nigro 2008; Sala 2011). The emergence of somewhat similar to leading institutions in EB I is debated and roughly identifiable only at the end of the period (EB IB) with the erection of the earliest public buildings of administrative function, such as Building 7102 of Tell el-'Areini (Brandl 1989, 365-368; Nigro 2007), and Building MA at Beth Shean (Mazar - Rotem 2009).

Chalcolithic times (thinning and shaping of the body done with the help of RKE).³⁰ In EB IB (3200-3000 BC) the wheel coiling technique seems to disappear completely,³¹ even though there are many sites where ceramics exhibit string cut marks on the outside of the bases, it seems to be utilised for finishing operations only.³²

EB I potters' wheels were retrieved in three sites: one is from Tell el-Mutesellim/Megiddo, one from Mezer, and seven potters' wheels from one single site in the southern coastal plain, Ashqelon Barnea.³³ All fragments belong to the lower part of the instrument. The finding context of the Megiddo specimen is unknown,³⁴ whereas the object from Mezer was recovered from a domestic building composed of two parallel rooms (B8, B2) in Area B, Stratum I (EB IA).³⁵ At Ashqelon Barnea, six lower wheels were retrieved in an open working area inside a domestic quarter of Stratum II (EB IB-EB IIA) Area B, while the seventh one, was found in the following layer (Building D6, Stratum I - EB II), though within a domestic structure.³⁶

3.2. *Early Bronze II (3000-2700 BC)*

The progressive affirmation of the urban society in EB II, developing from a village-based into a city-centered society,³⁷ is reflected in an increasing social complexity visible both in urban organization, with the emergence of public³⁸ and cultic architecture,³⁹ and in the growth of specialization and standardization, reflected in pottery production,⁴⁰ and in

³⁰ Observations over many repertoires of this area seem to confirm this datum: on Ashqelon Afridar see Braun - Gophna 2004, Golani 2004; generally on southwestern Canaan: Yekutieli 2001.

³¹ The technique might be disappeared almost completely in this period but the use of the *tournette* for finishing operations demonstrates that the object itself continued to exist (for possible implications see § 5.).

³² Technological studies were conducted by G. Charloux on ceramic material from Tell el-Farah N, Megiddo and Khirbet Yarmouk (Charloux 2006) and by V. Roux on pottery from Beth Shean, Tell el-'Areini, Hartuv, Mod'in (Roux 2007, 205-206).

³³ Another potter wheel (but with no specification if it is the upper or the lower part) was found at Horvat Ptora in an EB I context (Milevski 2011, 39).

³⁴ The object is reported only in a note within the description of Chalcolithic and Early Bronze pottery (ascribed to Stage I). The biconical perforation and the glassy wear on one side there detailed (Engberg - Shipton 1934, 40) allow to identify it with a lower disk.

³⁵ Dothan 1959, 27-28, fig. 8:16, pl. 2:F.

³⁶ Rosenberg - Golani 2012, 39, fig. 6.

³⁷ There is not a general consensus about the use of terms such "urbanism" or "city" for Southern Levantine entities of 3rd Millennium BC, especially in comparison with contemporary Mesopotamia and Egyptia. On this issue, see: Chesson - Philip 2003; Savage - Falconer - Harrison 2007; Schaub - Chesson 2007; *contra* Nigro 2009, 657-658, who emphasizes the Levantine EBA culture as a distinct historic-archaeological phenomenon, with its own features. On the Batrawy urban specificity see, lastly, Nigro 2013a.

³⁸ Public architecture is represented by defensive systems (Mazar 1990, 119-123; on the Batrawy system: Nigro [ed.] 2008, chs. 3, 5, 6; [ed.] 2012, ch. 2), communal buildings ('Ai water reservoir - Callaway 1980, and Granary Building of Khirbet Kerak - Esse 1991, 33-53; Mazar 2001) and the earliest palatial buildings (Khirbet Yarmouk - de Miroschedji 2003; Megiddo, Palace 3177 - Loud 1948, 70-78; Nigro 1994, 1-27).

³⁹ On EB religious architecture, see: Sala 2008.

⁴⁰ Pottery segmentation clearly recognizable in EB I underwent a general decline, showing in following EB II two broad horizons of pottery production: the northern group, with the predominance of Metallic Ware (Greenberg - Porat 1996), and the central-southern group, with the specialized production of Red Burnished Ware (Amiran 1969, 58-59).

the collection of luxury goods (high quality copper and stone objects)⁴¹ along with complexes trading networks of specific commodities.⁴²

Within this framework, also the increase of potters' wheels attestations might be viewed as an indicator of manufacturing specialization, even if pottery production over the slow wheel is very far from being a "mass-production" (§ 5).

There are several wheel specimens of this period known, sparsely distributed all over the region. Basically two different finding contexts are attested to: the first one is domestic dwellings, which, like in the previous period, in the majority of cases, gave back the lower parts of the wheels. Known examples are from Arad,⁴³ Tell Abu al-Kharaz,⁴⁴ Tel Dalit/Khirbet Ras ed-Daliye,⁴⁵ Tell el-Mutesellim/Megiddo and Qiryat 'Ata. Except for Qiryat 'Ata⁴⁶ and Megiddo,⁴⁷ where wheels finding spots are uncertain, in all the other cases the lower wheels are clearly linked to domestic compounds, with their typically rectangular plan, and series of parallels or agglutinated rooms.

The second type of finding context is more related to pottery production, including, on the one hand, a potter's workshop inside a city quarter, and, on the other hand, the only published EB pottery kiln of the region.⁴⁸ The latter was excavated at Tell el-Farah North, in local Stratum IVD of Area II. It consisted of a kiln (fig. 8), with two rooms, an underground heating chamber measuring 1.20 m in diameter, with a small entrance to place

⁴¹ About metal weapons, see: Philip 1989 and Miron 1992.

⁴² Along with the hypothesized oil-container function for Metallic Ware *pithoi*, produced only in a limited area in Northern Palestine, but largely traded all over the region (especially in the north), there are others objects of commerce and/or exchange between the emerging institutions and Egypt, in the form of palettes, mace-heads and stone vessels, as insignia of elite rank (de Miroschedji 2002; Sala 2012b).

⁴³ At Arad R. Amiran mentioned as possible potter's wheels seven elements, of which 5 are the upper disk (with the upper face flat and the lower one carved with a circular hollow), and 2 the lower one (with biconical perforation and smaller dimensions) (Amiran *et al.* 1978, 57, pl. 77:5-11); however they were made in soft limestone or chalk (except one lower disk, in basalt -Amiran *et al.* 1978, pl. 77:9) and she didn't recognized over them any traces of turning action. The only element in basalt was retrieved into a house of Level III (L. 1555, Amiran *et al.* 1978, 20).

⁴⁴ A lower wheel from Tell Abu al-Kharaz derives from the domestic quarter of Area 2, Phase II of the site; unfortunately the context (L.203) is disturbed by MB-LB intrusions and doesn't permit a deeper insight of it. Anyway also this lower wheel is in limestone instead of basalt rock (Fischer 2008, 363, fig. 324:8, into the text: figs.142:2, 146).

⁴⁵ The wheel was recovered in the western quadrant of a domestic structure of local Stratum II (phase b) (Gophna [ed.] 1996, 38-41). In spite its identification as the lower part of the *tournette*, it was erroneously published upside-down and reconstructed as based over another missing part, the "socket", of which the retrieved disk would be the pivoted part (Pelta 1996).

⁴⁶ At Qiryat 'Ata the lower part of a basalt *tournette* was recovered in a stratum of debris (Area A - Stratum I); the upper fragmentary part of another wheel, deriving from Stratum I of Area C, is made of siliceous limestone in place of basalt (see fn. 36) and the context is not registered (Rowan 2003, 191-192, fig. 6.3:1-2).

⁴⁷ The lower wheel reported from Megiddo is ascribed to Stratum XVIII/Level J-4 (Area BB, L.4014, Sq. N16), in one of the loci adjacent to the EB II monumental temple (dated to the EB IB by the excavators see Finkelstein - Ussishkin 2000, 7-8, 17-18; *contra* Sala 2008, 110-113; Nigro [ed.] 2010, 335-337).

⁴⁸ Another pottery kiln has been reported from Khirbet Kerak, in the courtyard of the Circles Building, in Area SA (Maisler - Stekelis - Avi-Yonah 1952, 227, fig. 3; Paz 2006, 63-67). It probably belongs to the final part of the occupation (EB III - Local Phase D), in which the preceding public building is abandoned (and left unfinished) and the newcomers (KKW folks) occupied the city as squatters (Greenberg *et al.* 2012, 97-102).

and discard the fuel.⁴⁹ Next to this structure there were pottery manufacturing traces, punchers, polishing pebbles and the lower disk of a *tournette*.⁵⁰

The most noteworthy case, in every respect - both in number of retrieved pieces that in type of finding context, is that of Khirbet Kerak, in Southern Galilee. Here a potter's establishment, located two blocks away from the gate, in Area EY - site Period C,⁵¹ was uncovered. At the beginning of the period belonged one upper wheel retrieved in room EY 196, which was associated to unbaked vases, scraps of coils, bowls fragments and kneaded lumps. Early Period C quarter underwent a partial collapse (maybe due to some earth tremors) and was rebuilt a first time along the same earlier layout (a compound based on pillared broad-rooms). In the next phase (Late Period C - local Stratum 7) emerged a new configuration based on square multi-roomed units, probably devoted to small, nuclear families.⁵² In one of these rooms, EY 160, the upper disk of a *tournette* was retrieved as part of an interred deposit, covering as a lid a complete hole-mouth pot.⁵³

East to this room, inside the courtyard EY 575, several others potters' wheels were recovered (14 pieces, no less than 10 complete *tournettes*), along with flint scrapers, "southern pottery"⁵⁴ and waste materials (unfired vessel fragments and lumps of clay) thrown into a pit. Most remarkable is the recovery, among the others, of an unfinished wheel,⁵⁵ just roughly hewed, demonstrating that, at least in some cases, the finishing touch of this technical tool was accomplished by their final user (§ 4.).

⁴⁹ de Vaux 1955, fig. 8.

⁵⁰ Not illustrated in the report but so described: «*disque de basalte, assez mince, poli sur une surface et percé d'un trou central*» (de Vaux - Steve 1947, 405).

⁵¹ Area EY is a 250 sq. m area excavated by E. Eisenberg and O. Yoyev in the 1980s (1981-1982, 1985-1986) and published by E. Eisenberg and R. Greenberg in 2006 (ch. 8, Greenberg *et al.* [eds.] 2006). Period C corresponds to Early Bronze II (with three subperiods - Early, Middle and Late Period C).

⁵² Greenberg *et al.* 2012, 94-96, figs. 10-11; Eisenberg - Greenberg 2006, 365-368, figs. 8.27-8.29; 8.79-8.80; Greenberg - Eisenberg 2002, 217, figs. 13.5, 13.7:4.

⁵³ Room EY 160 contained two similar pottery deposits, each consisted of a covered holemouth pot, a large jar, and a small jar. The six vessels were intentionally interred. Above the southern cache there were two jugs of unusual proportions, and one of them had incised a graffito interpreted as an Egyptian name (Greenberg - Eisenberg 2002). According to the excavators, both the architecture and finds from the area suggest ritual usage-perhaps as in a small neighborhood shrine (Eisenberg - Greenberg 2006, 366).

⁵⁴ In EB II were individuated two competitive pottery industries. The first is that of the North Canaanite Metallic Ware (NCMW), centered in the northern extremes of the Jordan Valley that distributed its products in great quantities across the region extending between the Jezreel Valley (in northern Israel) and the Litani River (in southern Lebanon) (Greenberg - Porat 1996). The other, producing the so-called "southern pottery", was represented in Area EY, using the same potting techniques and shapes but in a locally procured clay (Greenberg *et al.* 2012, 95).

⁵⁵ Greenberg 2011, figs. 8, 46-48; Greenberg *et al.* 2012, 95, fig. 14a.

EARLY BRONZE I (3400-3000 BC)	RETRIEVAL CONTEXT	PART (NUMBER OF PIECES RETRIEVED)
Meser I	domestic	lower
Ashqelon Barnea	domestic/industrial	lower (6)
Megiddo Stg IV	unknown	lower
	total	lower: 8
EARLY BRONZE II (3000-2700 BC)	RETRIEVAL CONTEXT	PART
Arad	domestic	lower
Qiryat Ata I	domestic (?)	lower
Qiryat Ata I	unknown	upper
Tel Dalit II	domestic	lower
Tell el-Far'ah N	manufacturing area	lower
Tell Abu al-Kharaz	domestic quarter	lower
Megiddo XVIII	unknown	lower
Khirbet Kerak	potter's workshop inside domestic quarter (continuous occupation into EB III) ↓	upper/lower (14 pieces)
	total	upper: 6 lower: 11
EARLY BRONZE III (2700-2300 BC)	RETRIEVAL CONTEXT	PART
Tel Qashish B-XIIA	domestic	lower
Megiddo XVI	annex of the religious building?	upper
Khirbet Yarmouk	palatial building	complete
Khirbet Yarmouk	annex of the palatial building	complete
Jericho/Tell es-Sultan	proximity of palatial building	upper
Tell el-'Umeiri	domestic (?)	upper
Bâb edh-Dhrâ'	unknown	upper/lower
Khirbet al-Batrawy	palatial building	upper (3)
Khirbet Iskander	public complex (?)	lower
Beth Shean	unknown	upper
	total	upper: 10; lower: 5
EARLY BRONZE IV (2300-2000)	RETRIEVAL CONTEXT	PART
Nahal Alexander	domestic	lower
	total retrieved pieces during Early Bronze Age	upper: 21; lower: 30

Tab. 1 - Type of finding context and part of potter's wheel retrieved, subdivided into periods.

3.3. Early Bronze III (2700-2300 BC)

Early Bronze III shows a great continuity with the preceding period, which makes it difficult sometimes to distinguish it from the previous EB II, even though transformations in ceramics technology and, especially, types and wares distribution and attestations are detectable all over the Southern Levant.

From this period, the apex of the 3rd Millennium Levantine urban culture, the highest percentage of retrieved potters' wheels consists of the upper part of the tools, with the exception of the finds from Khirbet Yarmouk, where two entire *tournettes* (each one consisting of two disks) were retrieved; they both belong to the final phase of EB III. The two instruments were stored, respectively, one inside Palace B1 (upper storey of the Hypostyle Hall), and the other in the immediate vicinity of the Palace.⁵⁶

Along with the Yarmouk specimens (together with those found in the Palace of Batrawy illustrated here, § 2.), there are other EB III exemplars which probably were found in public buildings. The upper wheel from Tell es-Sultan/Jericho⁵⁷ was found in Square HII (phases xiii-xiv- Sultan IIIc2), in the narrow units (maybe storerooms) immediately east of EB IIIB Palace G.⁵⁸ Another upper wheel was recovered near to the EB IIIA⁵⁹ sacred area of Tell el-Mutesellim/Megiddo.⁶⁰ Unfortunately unknown are the finding contexts of the upper disks from Bâb edh-Dhrâ'⁶¹ and Beth Shean,⁶² while the fragmentary disk from Tell el-Umeiri belonged to the collapsed upper storey of an EB III dwelling in Field D,⁶³ which yielded more than 30 complete vessels.⁶⁴

The lower parts of two *ournettes* were found respective at Tell el-Qassis, inside a rectangular domestic building of Area B,⁶⁵ and in an area of specialized activities, at

⁵⁶ The first *ournette* was discovered in 1997 in Area Bh, Sq. U 39, Locus 1965; the other ones was discovered in 1999, in Area Ja, Sq. K 41, Locus 2104, stratum that precedes the two superimposed Palaces B2 and B1, also dated to the latter half of EB III (de Miroschedji 2003; Roux - de Miroschedji 2009, 157-160).

⁵⁷ Dorrell 1983, n. 2904, 559-560, fig. 231:2, pl. 21:b.

⁵⁸ EB IIIB Palace G of Jericho is illustrated in Marchetti 2003, 300-303, fig. 4; Nigro 2006, 20-22, figs. 29-32; 2009b, 50, fig. 6; 2013b, fig. 5; Nigro *et al.* 2011, 586-593.

⁵⁹ The EB IIIA dating of stratum XVII/level J-6 and stratum XVI/level J-5 was proposed by D. Esse (1991, 84-87) and confirmed by the excavations of Tel Aviv University (Finkelstein - Ussishkin 2000, 587-588).

⁶⁰ Area BB, Square M13, Stratum XVI (Loud 1948, pl. 268:2); it's interesting to underline the retrieval, inside the domestic dwelling area, next to cultic platform 4017 (in Square N 13, Stratum XVII, Locus 5210 - Loud 1948, fig. 392, pl. 257:1-2), of two lower wheels made of ceramic, much smaller than the common dimensions of this object, maybe a miniature imitation of the stone/basalt object, that have had only a restricted use.

⁶¹ From Bâb edh-Dhrâ' derived both a fragmentary lower wheel (Lee 2003, figs. 21.2:3, 633) that a fragmentary upper one (but described as "basalt socket" and not drawn: Lee 2003, figs. 21.8, 633), together with an upper disk made of pottery(?) (From Field XVI.1, Stratum I-BA IV: Lee 2003, figs. 12.6:1-2, 633).

⁶² In exhibition at Rockefeller Museum of Jerusalem, but not reported in archaeological reports.

⁶³ Square 5K77, locus 9, an earthy layer assigned to Field Phase 4, belonging to EB III (the wheel was there called "stone-platter": Mitchell 1989, 287; lately recognized as potter's turntable - Herr *et al.* 1999, 112; Harrison 2000, 97).

⁶⁴ The pure domestic function attributed by the diggers (Mitchell 1989; Harrison 1997, 113-174) to this building seems odd: such a concentration of pottery inside a simple domestic building it seems quite unusual, since the EB household inventory was generally much more modest.

⁶⁵ Locus 607, Area B, Stratum XIII (BA III), Sq. AG-AH/15 (Ben-Tor *et al.* 2003, 80-82, fig. 41, pl. 9.20).

Khirbet Iskander.⁶⁶ The latter does not seem devoted to a simple domestic in function, for a number of higher status items were found in it.⁶⁷

3.4. *Early Bronze IV (2300-2000 BC)*

With the collapse of the early Levantine urban culture at the end of EB IIIB, the wheel-fashioning (but also the wheel-finishing) technique had a partial standstill, significantly linked to the breakdown of that socio-economic system also implying the standard manufacturing of pottery.

EB IVA (or "Early EB IV") pottery clearly shows the absence of the applications of the rotary device to all the repertoire, illustrated by entirely handmade vessels. Conversely in "Late EB IV" (EB IVB) the slow wheel was reintroduced and employed systematically to form closed shapes necks and to finish vessels.⁶⁸ In spite of the absence of wheel traces in Early EB IV, evidently the technical skills involved in the use of the potter's wheel, along with the production of the tool itself, didn't stop or was resumed, maybe reflecting the gradual reintroduction of the Southern Levant in an inter-regional network, with sharing to some extent the socio-economic sphere.⁶⁹

4. BASALT POTTERS' WHEELS: CIRCULATION AND PROCUREMENT OF BASALT TOOLS

The obvious consideration that potters' wheels are, in most cases, primarily basalt objects and, in this respect, finished items themselves (so not only technical devices to reach a better pottery production), is a datum not always taken into account.⁷⁰

There are several simple reasons that can explain this trend: the ubiquitous presence of pottery in comparison with fragmentary basaltic production (especially for the EB II-III periods);⁷¹ the diagnostic chronological and cultural value attributable to ceramic classes and to specific pottery productions;⁷² the durable life of basalt tools that can reflect also a

⁶⁶ Sq. B5, Phase C1 (end of EB III) (Richard - Long 2005, 272-273).

⁶⁷ Objects like a complete limestone piriform-shaped mace-head, a stamp seal with a rectangular base, and a heavy hematite stone in the form of a cosmetic grinder (Richard - Long 2005, 273).

⁶⁸ A vast examination of EB IV pottery repertoires has been recently conducted by M. D'Andrea (2012, 21-25), deepening the ceramic knowledge of this period and confirming this datum about the reintroduction of slow wheel in EB IVB (for single sites, partially pointed out before: see, for example, for Tell es-Sultan: Nigro 2003, 131-134, 138-139). Only one basalt lower potter disk was retrieved at Nahal Alexander (Dar 1977, pl. 4:7, 16) scattered in a EB IV domestic village.

⁶⁹ D'Andrea 2012, 25, 44-47.

⁷⁰ About the underestimated value given to the study of groundstone artifacts and its anthropological potential see Rutter - Philip 2008. Recently centered on this field of study: Rowan - Ebeling (eds.) 2008; Milevski 2011, ch. 5, 107-120.

⁷¹ Several studies about style, provenance and exchange are conducted over Chalcolithic and EB I groundstone assemblages, both for their preponderance in material culture of these periods and for the outstanding cultural connotation of at least a part of this kind of production (Rutter 2003, with previous references).

⁷² Suffice it to think about some of the better known pottery productions of EB Southern Levant, for instance, Gray Burnished Ware (GBW - Wright 1937, 42-55; Amiran 1967, 47, pl. 10), North Canaanite Metallic Ware (NCMW - Greenberg-Porat 1996) or Khirbet Kerak Ware (KKW - recently Greenberg - Goren [eds.] 2009), to evoke distinct chronological phases (regardless the nuances!).

long-life span and thus less precise temporal and social implications.⁷³ The latter could also be considered a positive characteristic for artifacts made of rock, since they are virtually indestructible and do not generally undergo chemical or physical changes during their manufacture, use or subsequent deposition.⁷⁴ Furthermore, basalt objects have a great potential for provenance studies (and interconnected trade/exchange networks), using geochemistry and elements in traces.

Recent geochemical analysis indicate that there was a deliberate concentration, over an extended period of time, on a particular subset of the potential outcrops of basaltic rock in the Southern Levant. For Chalcolithic and EB I periods, two main sources were identified: one in the region of Mount Hermon (Jebel esh-Sheikh) and one in the North Jordan Valley, while the basaltic rocks of the Kerak Plateau were identified as a minor source.⁷⁵ Artifacts originating from these sources were distributed across the region, and even occur at sites close to other important sources.

At present there is a lacking of chemical data for EB II-III basalt artifacts,⁷⁶ being basically restricted to spindle whorls, grinding stones, grinders and pestles, that means to a strictly utilitarian inventory. Potters' wheels are not generally investigated in this way,⁷⁷ notwithstanding their recognized value as technical devices with a social significance. Provenance studies could allow a deeper insight into the procurement of this tool, and the possible social and economic charge of its acquirement.

Even so, since quarry and production sites have not been yet identified, the scale and the characteristics of EB exchange and redistribution basalt systems it is far from being fully understood.

5. CONCLUSIONS

The three basalt potters' wheels, recovered from the EB IIIB palatial complex of Khirbet al-Batrawy, allow us to draw out some observations about this innovative long-living technical tool, its use and the possible underlying social practices tied to it.

Previous studies focused some fundamental issues: the manufacturing technique that the slow wheel assured as a technical mean,⁷⁸ and the status of specialized product of this kind

⁷³ This affirmation is incorrect when related to basalt objects with clear stylistic and cultural features (especially basalt bowls such as Chalcolithic-EB I "V-shaped" or pedestalled bowls - i.e. Amiran - Porat 1984; Braun 1990; van den Brink *et al.* 1999).

⁷⁴ Rutter *et al.* 2003.

⁷⁵ Rutter 2003, 214-215; Rutter - Philip 2008, 344-344, fig. 21.1. The identification of sources in the North Jordan Valley and Kerak Plateau had previously been made by Philip and Williams-Thorpe (1993; 2001).

⁷⁶ Chemical analysis over LB-IA basalt artifacts had demonstrated that the increase of sources in these late periods are relatively low, providing evidence for the long-term exploitation of a relatively small number of outcrops (Rutter 2003).

⁷⁷ Analysis over the upper disk of a *tournette* of Khirbet Yarmouk (conducted by N. Porat) indicates that it originates from a Neogene basalt area in the Golan or in Jordan (Roux - de Miroschedji 2009, 159).

⁷⁸ Experimental observations have demonstrated efficiency of the instruments for wheel-coiling pots of different dimensions, but inefficiency for wheel-throwing technique (fn. 13); moreover only a little percentage of the pottery repertoire of a leading site as Yarmouk presented surface features and microfibrils significant of the use of RKE, representing only 0.6% of the assemblage, less than 3% of the Minimum Number of Individuals (Roux - de Miroschedji 2009, 166-170; Roux 2009a, 202-209).

of tool, necessarily produced in workshops close to basaltic outcrops, dislocated elsewhere than in villages or urban centers that demanded these specific items and that gave them back in archaeological contexts.⁷⁹

Regarding to the relative rarity of potters' wheels along a lapse of time taken into account covering about a millennium and a half, with morphological characteristics showing a strong resistance to change, it seems convincing the hypothesis of specialized craftsmen responsible of the production of this kind of objects, transmitting their skills over many generations.⁸⁰

This might be related also to the transmission of the tool itself, handed in inheritance with the practical knowledge that allowed its use, as it documented for moulds for smiths and metalworkers.

The "stylistic" immobility of potters' wheels, in fact, does not permit a certain chronological attribution of single items outside their retrieval setting, and the absence of these objects from funerary contexts seems, at a first glance, to reveal the utilitarian function as the prime one.⁸¹ But there are other aspects to underline.

The choice of basalt for doing the wheels is a cultural choice, since other stones, easy to find and to work (such as limestone), are known and utilized for the same goal, but in minor percentage and never in public compounds.⁸² So this implies that basalt, as a prestigious raw material, had accumulated on itself social and traditional significance, linked to its economic value and its symbolic properties.⁸³

Moreover, the almost totality of the retrieved wheels follows a remarkable trend: except for the wheels from Khirbet Yarmouk, actually the only known complete *tournettes* found in a definitive public complex, the other specimens are roughly distributed along a logical subdivision, evolving temporally.

In Early Bronze I all the wheels retrieved are the lower part and derive from domestic contexts⁸⁴ (or as the case of Ashqelon Barnea identifying a sort of communal workshop area); in Early Bronze II, basalt wheels continue to be used (or stored) in dwelling quarters, as regards the lower disk, but the entire instrument (in several exemplars) was found only into an urban potter's laboratory at Khirbet Kerak, outlining the earliest emerging pottery specialization.⁸⁵ This kind of technical skill seems to move, in Early Bronze III, toward an

⁷⁹ As previously highlighted, the unfinished wheel from Khirbet Kerak (§ 3.3.) let to think that the craft organization may be variable along time and that in some cases the finishing touch over the objects was done in the same centre that requested the good.

⁸⁰ Roux - de Miroschedji 2009, 170.

⁸¹ By way of illustration a basalt potter's wheel from Early Iron Age I was retrieved in one of the tombs of Megiddo (Tomb 39 in Sq. V 18: Guy 1938, pl. 164:20, 117-119), pointing to a shift in the social recognition of the potter, represented also in his funerary context as a professional worker.

⁸² See the examples from Arad (fn. 44), Tell Abu al-Kharaz (fn. 45), Qiryat 'Ata (fn. 47) and Bâb edh-Dhrâ' (fn. 62).

⁸³ Rosenberg - Golani 2012, 42.

⁸⁴ See fn. 30.

⁸⁵ The retrieval of several potters' wheels in an open area next to a building with a particular character, maybe of domestic shrine (fn. 54), is relevant to define the possible outstanding role of the craft specialization, also in the particular social situation of the site, that presented a neighborhood division between northern and southern quarters (fn. 55).

allocation inside centralized powers (palaces or temples) holders of the entire instrument or, at least, of its upper part (with the lower, as easily transportable, in single's hands).

This would imply that the opportunity to use this technique was strongly linked to the public sphere, with the incorporation of potters in some kind of shared practices (or rituals?), maybe oriented to the creation of an interconnected craft system, not primarily in terms of practical results,⁸⁶ but above all in the construction of a communal identity.

In this sense, the social importance resided more on the institution that promoted and perhaps controlled the technical tool instead that on the potter that utilized it. He/she⁸⁷ (the potter) could be viewed as a social mean of power manifestation and of control over a technological innovation, maybe shared between several settlements such a dependent specialist,⁸⁸ keeping in mind that this technique required a long-training in order to acquire the skill and necessitated of continuous exercise to maintain it. This should be the reason for which the hypothetical status of the potter is not yet recognizable in tombs, for the very low percentage of wheel-coiled vessels in Early Bronze Age Southern Levant, that never replaced the hand-coiling technique, and for the temporary break at the end of Early Bronze III, with the decline of the first urban system.

REFERENCES

- AMIRAN, R.
1969 *Ancient Pottery of the Holy Land, From the Prehistoric to the Persian Period*, Jerusalem 1969.
- AMIRAN, R. - PORAT, N.
1984 The basalt vessels of the Chalcolithic period and Early Bronze Age I: *Tel Aviv* 11 (1984), pp. 11-19.
- AMIRAN, R. - SHENHAV, D.
1984 Experiments with an ancient potter's wheel: P.M. RICE (ed.), *Pots and Potters. Current Approaches in Ceramic Archaeology* (Monograph XXIV), Berkeley 1984, pp. 107-112.
- AMIRAN, R. - SHILOH, Y. - PARAN, U.
1978 *Early Arad, The Chalcolithic Settlement and Early Bronze Age City. First-fifth Seasons of Excavations, 1962-1966* (Judean Desert Studies), Jerusalem 1978.

⁸⁶ Analysis of V. Roux over Khirbet Yarmouk pottery had demonstrated that not only there's a minimal percentage of wheel-coiled vessels along all EB II-III periods, but not even a significant spatial shift in distribution of these last inside the settlement, so wheel-built items were not a prerogative of an élite (Roux 2009a, 203-207).

⁸⁷ In ethnographic parallels, with a socio-economic situation somewhat similar to that of Early Bronze Age, pottery production seems to be carried out by women (Gosselain 2002); nevertheless the word for "potter" in the Old Testament, *yatsar* (יָצַר), "the one who forms" (lit. the creator, but more frequently referred to the potter, see Isa. 29:16), is masculine gender. This datum supports the hypothesis that, at least in "Bible times" (Iron Age II and later), the vast majority of potters were men.

⁸⁸ Roux - de Miroshedji 2009, 170-171. *Contra* Charloux (2006, 415-416), who retains that the general sense of homogenization is due to a generalization of the demand, stimulating a standardized production in terms of paste, firing and shapes, but not linked to itinerant potters or to centralized production.

- BALDI, J.S.
2012 Identità tecniche e identità sociali a Tell Feres al-Sharqi tra fine Ubaid e LC2. Alcune riflessioni ceramologiche sull'apparizione del mestiere di vasaio nel nord della Mesopotamia tardo calcolitica: S. MAZZONI (ed.), *Studi di Archeologia del Vicino Oriente: scritti degli allievi fiorentini di Paolo Emilio Pecorella*, Firenze 2012, pp. 11-38.
- BEN-TOR, A. - BONFIL, R. - ZUCKERMAN, S. (eds.)
2003 *Tell Qashish: A Village in the Jezreel Valley, Final Report of the Archaeological Excavations (1978-1987)* (Qedem Reports 5), Jerusalem 2003.
- BLACKMAN, J. - STEIN, G. - VANDIVER, P.
1993 The Standardization Hypothesis and Ceramic Mass Production: Technological, Compositional and Metric Indexes of Craft Specialization at Tell Leilan: *American Antiquity* 58/1 (1993), pp. 60-79.
- BOILEAU, M.-C.
2005 *Pottery Production and Distribution in Third Millennium Northeast Syria: Technological Study of Tell'Atij and Tell Gudedu pottery* (Edition de la MSH), Paris 2005.
- BRANDL, B.
1989 Observations on the Early Bronze Age Strata of Tel Erani: P. DE MIROSCHEJJI (ed.), *L'Urbanisation de la Palestine à l'âge du Bronze ancien. Bilan et perspectives des recherches actuelles. Actes du Colloque d'Emmaüs (20-24 octobre 1986)* (British Archaeological Reports. International Series 527), Oxford 1989, pp. 357-388.
- BRAUN, E.
1990 Basalt bowls of Early Bronze I horizon in the southern Levant: *Paléorient* 16/1 (1990), pp. 87-96.
- BRAUN, E. - GOPHNA, R.
2004 Excavations at Ashqelon, Afridar-Area G: 'Atiqot 45 (2004), pp. 185-242.
- CALLAWAY, J.A.
1980 *The Early Bronze Age Citadel and Lower City at Ai (et-Tell): A Report of the Joint Archaeological Expedition to Ai (et-Tell) 2*, Cambridge 1980.
- CHARLOUX, G.
2006 *Artisanat et Urbanisation de la Palestine à l'Âge du Bronze Ancien: Apport de l'étude des céramiques à la structure sociale*, PhD Diss., Université Paris 1, Paris 2006.
- COURTY, M.-A. - ROUX, V.
1995 Identification of wheel throwing on the basis of ceramic surface features and microfibrils: *Journal of Archaeological Science* 22, pp. 17-50.
- DAR, S.
1977 *Ancient Settlements in 'Emeq Hephher: The Sites of Tell Nuri, Nahal Alexander and the Rockcut Tombs of Ma'abarot*, Kibbutz Ma'abarot 1977 (in Hebrew).
- D'ANDREA, M.
2012 The Early Bronze IV Period in South-Central Transjordan: Reconsidering Chronology Through Ceramic Technology: *Levant* 44/1 (2012), pp. 17-50.
- DOHERTY, S.
2013 *The origins and the use of the potters wheel in Ancient Egypt*, PhD Diss. Cardiff University 20136 (unpublished; online abstract <http://orca.cf.ac.uk/45612/>).
- DORRELL, P.G.
1983 Appendix A: stone vessels, tools, and objects: K. M. KENYON - T. A. HOLLAND (eds.), *Excavations at Jericho: Volume 5: The Pottery Phases of the Tell and Other Finds*. London 1983, pp. 485-575.

- DOTHAN, M.
1959 Excavations at Meser, 1957. Preliminary report on the second season: *Israel Exploration Journal* 9, pp. 13-29.
- EISENBERG, E. - GREENBERG, R.
2006 Chapter 8: Area EY: The Eisenberg - Yogeve Excavations, 1981-1982, 1985-1986: R. GREENBERG - E. EISENBERG - S. PAZ - Y. PAZ (eds.), *Bet Yerah: The Early Bronze Age Mound I: Excavations Reports 1933-1986* (Israel Antiquities Authority Reports 29), Jerusalem 2006, pp. 339-468.
- ENGBERG, R.M. - SHIPTON, G.M.
1934 *Notes on the Chalcolithic and Early Bronze Age Pottery of Megiddo* (Studies in Ancient Oriental Civilization 10), Chicago 1939.
- ESSE, D.L.
1991 *Subsistence, Trade and Social Change in Early Bronze Age Palestine* (Studies in Ancient Oriental Civilization 50), Chicago 1991.
- FINKELSTEIN, I. - USSISHKIN, D.
2000 Area Archaeological and Historical Conclusions: I. FINKELSTEIN - D. USSISHKIN - B. HALPERN (eds.), *Megiddo III. The 1992-1996 Seasons* (Tel Aviv Monograph Series 18), Tel Aviv 2000, pp. 576-605.
- 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.
- GOLANI, A.
2004 Excavations at Ashqelon, Afridar-Area E: 'Atiqot 45 (2004), pp. 242-262.
- GOPHNA, R. (ed.)
1996 *Excavations at Tel Dalit*, Tel Aviv 1996.
- GOSSELAIN, O.
2002 *Poteries du Cameroun*, Paris 2002.
- GREENBERG, R.
2011 Life in the City: Tel Bet Yerah in the Early Bronze Age: M. S. CHESSON (ed.), *Daily Life, Materiality and Complexity in Early Urban Communities of the Southern Levant. Papers in Honor of Walter E. Rast and R. Thomas Schaub*, Winona Lake 2011, pp. 41-54.
- GREENBERG, R. - EISENBERG, E.
2002 Egypt, Bet Yerah and Early Canaanite Urbanization: E.C.M. VAN DEN BRINK - T.E. LEVY (eds.), *Egypt and the Levant: Interrelations from the 4th Through the Early 3rd Millennium BCE*, New York 2002, pp. 213-222.
- GREENBERG, R. - GOREN, Y. (guest eds.)
2009 Transcaucasian Migrants and the Khirbet Kerak Culture in the Third Millennium BCE, The Sonia and Marco Nadler Institute of Archaeology Annual Symposium, March 23, 2008: *Tel Aviv* 36/2 (2009).
- GREENBERG, R. - EISENBERG, E. - PAZ, S. - PAZ, Y. (eds.)
2006 *Bet Yerah: The Early Bronze Age Mound I: Excavations Reports 1933-1986* (Israel Antiquities Authority Reports 29), Jerusalem 2006.
- GREENBERG, R. - PAZ, S. - WENGROW, D. - ISERLIS, M.
2012 Tel Bet Yerah: Hub of the Early Bronze Age Levant: *Near Eastern Archaeology* 75/2 (2012), pp. 88-107.

- GREENBERG, R. - PORAT, N.
 1996 A Third Millennium Levantine Pottery Production Centre: Typology, Petrography, and Provenance of the Metallic Ware of Northern Israel and Adjacent Regions: *Bulletin of the American School of Oriental Research* 301(1996), pp. 5-24.
- GUY, P.L.O.
 1938 *Megiddo Tombs* (Oriental Institute Publications 33), Chicago 1938.
- HARRISON, T.P.
 2000 Field D: the Lower Southern Terrace: L.G. HERR - D.R. CLARK - L.T. GERATY - R.W. YOUNKER - Ø.S. LABIANCA (eds.), *Madaba Plains Project 4: The 1992 Season at Tell al-'Umayri and Subsequent Studies*, Berrien Springs 2000, pp. 95-154.
- JACOBS, P. - BOROWSKI, O.
 1993 Notes and News: Tell Halif, 1992: *Israel Exploration Journal* 43/1 (1993), pp. 66-70.
- LANERI, N.
 2011 The *Life-History* of the Potter's Wheel in the Ancient Near East: S. SCARCELLA (ed.), *Archaeological Ceramics: A Review of Current Research* (BAR International Series 2193), Oxford 2011, pp. 64-72.
- LEE, J.R.
 2003 Worked stones: W.E. RAST - R.T. SCHAUB, *Bâb edh-Dhrâ': 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, pp. 622-637.
- LOUD, G.
 1948 *Megiddo II. Seasons of 1935-1939* (Oriental Institute Publications 62), Chicago 1948.
- MACDONALD, E. - STARKEY, J.L. - HARDING, G.L.
 1932 *Beth Pelet II* (Publication of the Egyptian Research Account 52), London 1932.
- MAISLER, B. - STEKELIS, M. - AVI-YONAH, M.
 1952 The excavations at Beth Yerah (Khirbet el-Kerak) 1944-1946: *Israel Exploration Journal* 2 (1952), pp. 165-173, 218-229.
- MARCHETTI, N.
 2003 A Century of Excavations on the Spring Hill at Tell es-Sultan, Ancient Jericho: A Reconstruction of Its Stratigraphy: M. BIETAK (ed.), *The Synchronisation of Civilisations in the Eastern Mediterranean in the Second Millennium B.C. II, Proceedings of the SCIEM2000 -EuroConference (Haindorf 2001)*, Wien 2003, pp. 295-321.
- MAZAR, A.
 1990 *Archaeology of the Land of the Bible, 10000 - 586 B.C.E.*, New York 1990.
 2001 On the significance of the Early Bronze III Granary of Beth Yerah: S.R. WOLFF (ed.), *Studies in the Archaeology of Israel and Neighboring Lands in Memory of Douglas L. Esse* (Studies in Ancient Oriental Civilizations 59), Chicago 2001, pp. 447-464.
- MAZAR, A. - ROTEM, Y.
 2009 Tel Beth Shean During the EB IB Period: Evidence for Social Complexity in the Late 4th Millennium BC: *Levant* 41 (2009), pp. 131-153.
- MILEVSKI, I.
 2011 *Early Bronze Age Goods Exchange in the Southern Levant: A Marxist Perspective*, London 2011.
- MIRON, E.
 1992 *Axes and Adzes from Canaan* (Prähistorische Bronzefunde 9), Stuttgart 1992.
- DE MIROSCHEDE, P.
 2002 The socio-political dynamics of Egyptian-Canaanite interaction in the Early Bronze Age: E.C.M. VAN DEN BRINK - T.E. LEVY (eds.), *Egypt and the Levant: Interrelations from the 4th Through the Early 3rd Millennium BCE*, New York 2002, pp. 39-57.

- 2003 The Late EB III Palace B1 at Tel Yarmouth: A Descriptive Summary: *Eretz Israel* 27 (2003), pp. 153-170.
- MITCHELL, L.M.
1989 Field D: the Lower Southern Terrace: L.T. GERATY - L.G. HERR - Ø.S. LABIANCA - R.W. YOUNKER (eds.), *Madaba Plains Project 1: The 1984 Season at Tell al-'Umayri and Vicinity and Subsequent Studies*, Berrien Springs 1989, pp. 282-295.
- NIGRO, L.
1994 *Ricerche sull'architettura palaziale della Palestina nelle età del Bronzo e del Ferro* (Contributi e Materiali di Archeologia Orientale V), Roma 1994.
- 2003 Tell es-Sultan in the Early Bronze Age IV (2300-2000 BC). Settlement vs Necropolis - A Stratigraphic Periodization: *Contributi e Materiali di Archeologia Orientale* IX (2003), pp. 121-158.
- 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), Roma 2005.
- 2006 Results of the Italian-Palestinian Expedition to Tell es-Sultan: at the Dawn of Urbanization in Palestine: L. NIGRO - H. TAHA (eds.), *Tell es-Sultan/Jericho in the Context of the Jordan Valley: Site Management, Conservation and Sustainable Development, Proceedings of the International Workshop (Ariha 2005)* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 2), Rome 2006, pp. 1-40.
- 2007 Alle origini della prima urbanizzazione palestinese: il caso dell'Edificio 7102 di Tell el-'Areini: *Vicino Oriente* 13 (2007), pp. 25-38.
- 2008 Tell es-Sultan/Jericho from Village to Town: A Reassessment of the Early Bronze Age I Settlement and Necropolis: J. M. CORDOBA - M. MOLIST, M^cC. PÉREZ - I. RUBIO - S. MARTÍNEZ (eds.), *Proceedings of the 5th International Congress on the Archaeology of the Ancient Near East (5-8 April 2006)*, Volume II, Madrid 2008, pp. 645-662.
- 2009a Khirbet al-Batrawy: A Case Study of 3rd Millennium Urbanism in North-Central Jordan: D. CLARK - B. PORTER (eds.), *Studies in History and Archaeology of Jordan* X (2009), pp. 657-677.
- 2009b The Built Tombs on the Spring Hill and The Palace of the Lords of Jericho ('dmr Rha) in the Middle Bronze Age: J.D. SCHLOEN (ed.), *Exploring the longue durée. Essays in Honor of Lawrence E. Stager*, Winona Lake 2009, pp. 361-376.
- 2010a *In the Palace of the Copper Axes/Nel Palazzo delle Asce di Rame. Khirbet al-Batrawy: the discovery of a forgotten city of the III millennium BC in Jordan/Khirbet al-Batrawy: la scoperta di una città dimenticata del III millennio a.C. in Giordania* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan/Colour Monographs I), Rome 2010.
- 2010b *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.
- 2010c Quattro asce di rame dal Palazzo B di Khirbet al-Batrawy (Bronzo Antico IIIB, 2500-2300 a.C.): *Scienze dell'Antichità* 16 (2010), pp. 561-572.
- 2011 Dominating the River: Khirbet al-Batrawy, an EB II-III City in North-Central Jordan: *Syria* 88 (2011), pp. 59-74.
- 2012a Khirbet al-Batrawy: *American Journal of Archaeology* 116/4 (2012), pp. 705-706.
- 2012b An EB IIIB (2500-2300 BC) gemstones necklace from the Palace of the Copper Axes at Khirbet al-Batrawy, Jordan: *Vicino Oriente* XVI (2012), pp. 227-243.

- 2013a Urban Origins in the Upper Wādī az-Zarqā', Jordan: The City of Khirbat al-Batrāwī in the third Millennium BC: *Studies in the History and Archaeology of Jordan XI* (2013), pp. 489-506.
- 2013b The Ninth Season (2013) of Archaeological Activities at Tell es-Sultan/Ancient Jericho, By Rome "La Sapienza" University and the Palestinian MOTA-DACH (online report: http://www.lasapienzatojericho.it/Results%202013/results2013.htm#_ftn1).
- NIGRO, L. (ed.)
- 2006 *Khirbet al-Batrawy. An Early Bronze Age Fortified Town in North-Central Jordan. Preliminary Report of the First Season of Excavations (2005)* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 3), Rome 2006.
- 2008 *Khirbet al-Batrawy II. The EB II-III city-gate, the EB II-III fortifications, the EB II-III temple. Preliminary report of the second (2006) and third (2007) seasons of excavations* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 6), Rome 2008.
- 2012 *Khirbet al-Batrawy III. The EB II-III triple fortification line and the EB IIIB quarter inside the city-wall. Preliminary report of the fourth (2008) and fifth (2009) seasons of excavations* (Rome «La Sapienza» Studies on the Archaeology of Palestine & Transjordan 8), Rome 2012.
- NIGRO, L. - SALA, M.
- 2011 Preliminary Report of the Sixth Season (2010) of Excavations by the University of Rome "La Sapienza" at Khirbat al-Batrāwī (Upper Wādī az-Zarqā'): *Annual of the Department of Antiquities of Jordan* 55 (2011), pp. 85-100.
- NIGRO, L. - SALA, M. - MONTANARI, D. - TUMOLO, V.
- 2010 The Early Bronze Age IV Village at Khirbet al-Batrawy, Jordan: P. MATTHIAE - F. PINNOCK - N. MARCHETTI - L. NIGRO (eds.), *Proceedings of the 6th International Congress on the Archaeology of the Ancient Near East. 5 May - 10 2008, "Sapienza" Università di Roma*, Vol. 3, Wiesbaden 2010, pp. 461-468.
- NIGRO, L. - SALA, M. - TAHA, H. - YASSINE, 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: *Scienze dell'Antichità* 17 (2011), pp. 571-597.
- PAZ, S.
- 2006 Area SA: The Stekelis - Avi-Yonah Excavations (Circles Building), 1945-6: R. GREENBERG - E. EISENBERG - S. PAZ - Y. PAZ (eds.), *Bet Yerah: The Early Bronze Age Mound I: Excavations Reports 1933-1986* (Israel Antiquities Authority Reports 29), Jerusalem 2006, pp. 53-103.
- PELTA, R.
- 1996 Special reports. Chapter 8. A potter's wheel from Tel Dalit: R. GOPHNA (ed.), *Excavations at Tel Dalit*, Tel Aviv 1996, pp. 171-185.
- PHILIP, G.
- 1989 *Metal Weapons of the Early and Middle Bronze Ages in Syria-Palestine* (British Archaeological Reports. International Series 526), Oxford 1989.
- PHILIP, G. - WILLIAMS-THORPE, O.
- 1993 A provenance study of Jordanian basalt vessels of the Chalcolithic and EBI periods: *Paléorient* 19/2 (1993), pp. 51-63.
- 2001 The production and consumption of basalt artefacts in the southern Levant during the 5th-4th millennia BC: A. MILLARD (ed.), *Archaeological Sciences '97* (British Archaeological Reports. International Series S939), Oxford 2001, pp. 11-30.

- RICHARD, S. - LONG, J.C.
 2005 Three Seasons of Excavations of Khirbat Iskander, 1997, 2000, 2004: *Annual of the Department of Antiquities of Jordan* 49 (2005), pp. 261-275.
- ROSENBERG, D - GOLANI, A.
 2012 Groundstone Tools of a Copper-Smiths' Community: Understanding Stone-Related Aspects of the Early Bronze Age Site of Ashqelon Barnea: *Journal of Mediterranean Archaeology* 25/1 (2012), pp. 27-51.
- ROUX, V.
 2007 Non emprunt du façonnage au tour dans le Levant Sud entre le Ve et le IIIe mill. Av. J.-C.: des régularités pour des scénarios historiques particuliers: P. ROUILLARD - C. PERLES - E. GRIMAUD (eds.), *Mobilités, immobilisme. L'emprunt et son refus*, Paris 2007, pp. 201-213.
 2009a Wheel Fashioned Ceramic Production during the Third Millennium BCE in the Southern Levant: a Perspective from Tel Yarmuth: S. ROSEN - V. ROUX (eds.), *Techniques and people: anthropological perspectives on technology in the archaeology of the proto-historic and early historic periods in the Southern Levant*, Paris 2009, pp. 195-212.
 2009b The Potter's wheel in Middle Bronze II in the Southern Levant: Technological study of the Beth Shean Ceramics: *The Archeotek Journal* 3/4 (2009) (<http://www.arkeotek.org/>).
- ROUX, V. - COURTY, M.A.
 1997 Les bols élaborés au tour d'Abu Hamid: Rupture technique au 4e mill. avt. J.-C. dans le Levant sud: *Paléorient* 23/1 (1997), pp. 25-43.
 1998 Identification of wheel-fashioning methods: technological analysis of 4th-3rd millennium BC oriental ceramics: *Journal of Archaeological Science* 25 (1998), pp. 747-763.
 2005 Identifying Social Entities at a Macro-regional Level: Chalcolithic Ceramics of South Levant as a Case-Study: A. LIVINGSTONE-SMITH - D. BOSQUET - R. MARTINEAU (eds.), *Pottery Manufacturing Processes: Reconstitution and Interpretation. Acts of the XIV UISPP Congress, University of Liège, Belgium, 2-8 September 2001* (British Archaeological Reports. International Series 1349), Oxford 2005, pp. 201-214.
- ROUX, V. - DE MIROSCHEJJI, P.
 2009 Revisiting the History of the Potter's Wheel in the Southern Levant: *Levant* 41/2 (2009), pp. 155-173.
- ROWAN, Y.M.
 2003 The Groundstone Assemblage: A. GOLANI (ed.), *Salvage Excavations at the Early Bronze Age Site of Qiryat 'Ata* (Israel Antiquities Authority Reports 18), Jerusalem 2003.
- ROWAN, Y.M. - EBELING, J.M. (eds.)
 2008 *New Approaches to Old Stones; Recent Studies on Ground Stone Artifacts*, London - Oakville 2008.
- RUTTER, G.
 2003 *Basaltic-rock Procurement Systems in the Southern Levant: Case studies from the Chalcolithic- Early Bronze I and the Late Bronze-Iron Ages*, PhD Diss., University of Durham, 2003 (unpublished).
- RUTTER, G. - PEARSON, D.G. - PHILIP, G - DAY, J.M.D. - OTTLEY, C.J.
 2003 The Use of ICP-MS in Provenancing Igneous Stone Artefacts: Examples from the Southern Levant: G. HOLLAND - S.D. TANNER (eds.), *Plasma Source Mass Spectroscopy; Applications and Emerging Technologies* (Special Publication Royal Society of Chemistry), Cambridge 2003, pp. 209-218.

- RUTTER, G. - PHILIP, G.
2008 Beyond Provenance Analysis: The Movement of Basaltic Artefacts through a Social Landscape: Y.M. ROWAN - J.M. EBELING (eds.), *New Approaches to Old Stones; Recent Studies on Ground Stone Artifacts*, London - Oakville 2008, pp. 343-360.
- SALA, M.
2008 *L'architettura sacra della Palestina nell'età del Bronzo Antico I-III* (Contributi e Materiali di Archeologia Orientale XIII), Roma 2008.
2011 Sanctuaries, Temples and Cult Places in Early Bronze I Southern Levant: *Vicino & Medio Oriente XV* (2011), pp. 1-32.
2012a An EB IVB (2200-2000 BC) Farmers' Community at Khirbet al-Batrawy (North-Central Jordan): R. MATTHEWS - J. CURTIS (eds.), *Proceedings of the 7th International Congress on the Archaeology of the Ancient Near East, 12 April - 16 April 2010, the British Museum and UCL*, London 2012, pp. 697-706.
2012b Egyptian and Egyptianizing Objects From EB I-III Tell es-Sultan/Ancient Jericho: *Vicino Oriente XVI* (2012), pp. 275-302.
- DE VAUX, R.
1955 Les Fouilles de Tell el-Far'ah, près Naplouse. Cinquième campagne: *Revue Biblique* 62 (1955), pp. 541-582.
- DE VAUX, R. - STEVE, A.M.
1947 La Première Campagne de Fouilles à Tell el-Far'ah, près Naplouse: *Revue Biblique* 54/3-4 (1947), pp. 394-433, 573-589.
- VAN DEN BRINK, E.C.M. - ROWAN, Y.M. - BRAUN, E.
1999 Pedestaled basalt bowls of the Chalcolithic: new variations: *Israel Exploration Journal* 49 (1999), pp. 161-183.
- WOOD, B.G.
1992 Potter's Wheel: D.N. FREEDMAN (ed.), *The Anchor Bible Dictionary*, vol. 5, New York 1992, pp. 427-429.
- WRIGHT, G.E.
1937 *The Pottery of Palestine from the Earliest Times to the End of the Early Bronze Age*, New Haven 1937.
- YEKUTIELI, Y.
2001 The Early Bronze Age IA of Southwestern Canaan: S.R. WOLFF (ed.), *Studies in the Archaeology of Israel and the Neighboring Lands in Memory of Douglas Esse* (Studies in Ancient Oriental Civilization 59), Chicago 2001, pp. 659-688.

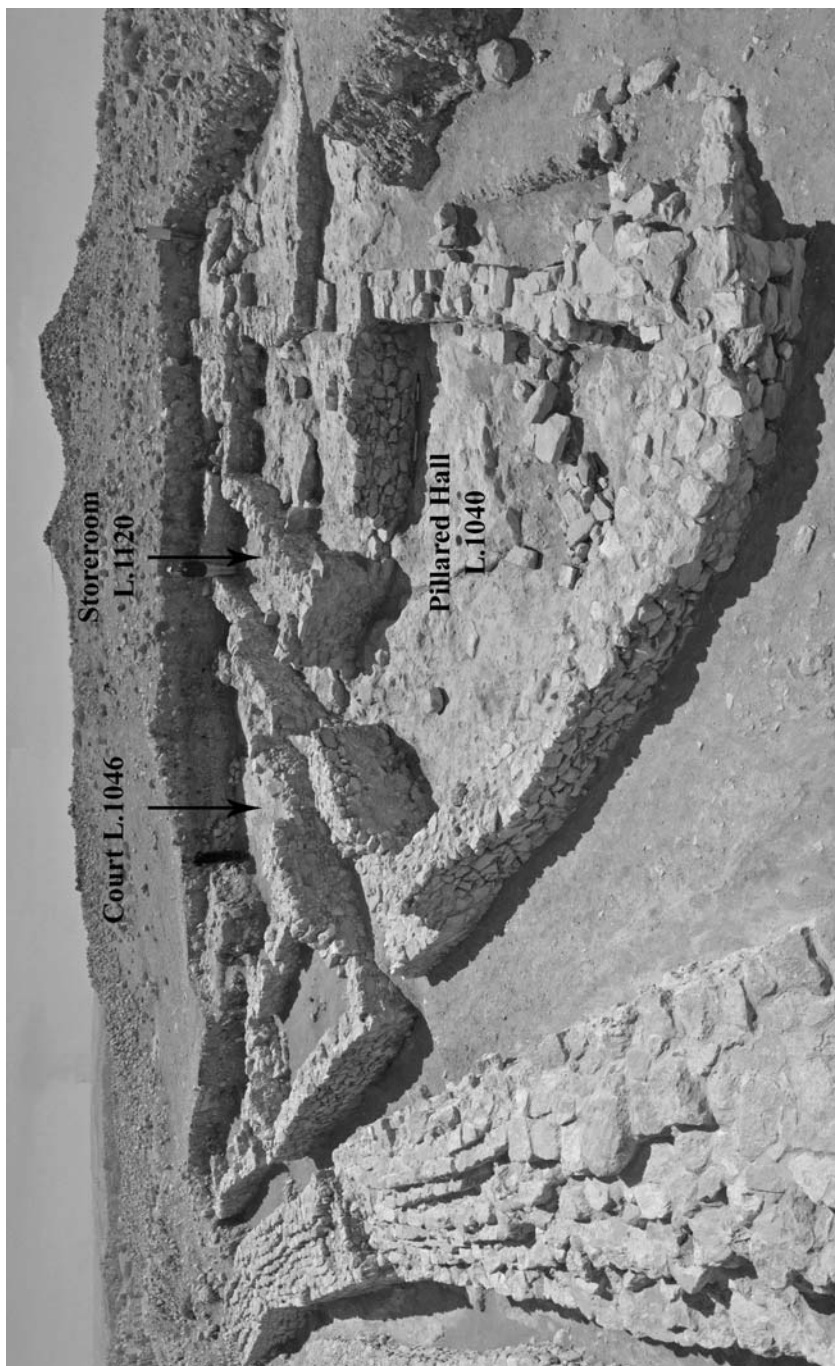


Fig. 1 - EB IIIB Palace B of Khirbet al-Batrawy, from north-west. In the foreground the Pillared Hall L.1040, where the basalt wheel KB.10.B.87 was recovered; in the background the storeroom L.1120, where the basalt wheel KB.11.B.110 was recovered (courtesy of Rome «La Sapienza» Expedition to Palestine & Jordan).

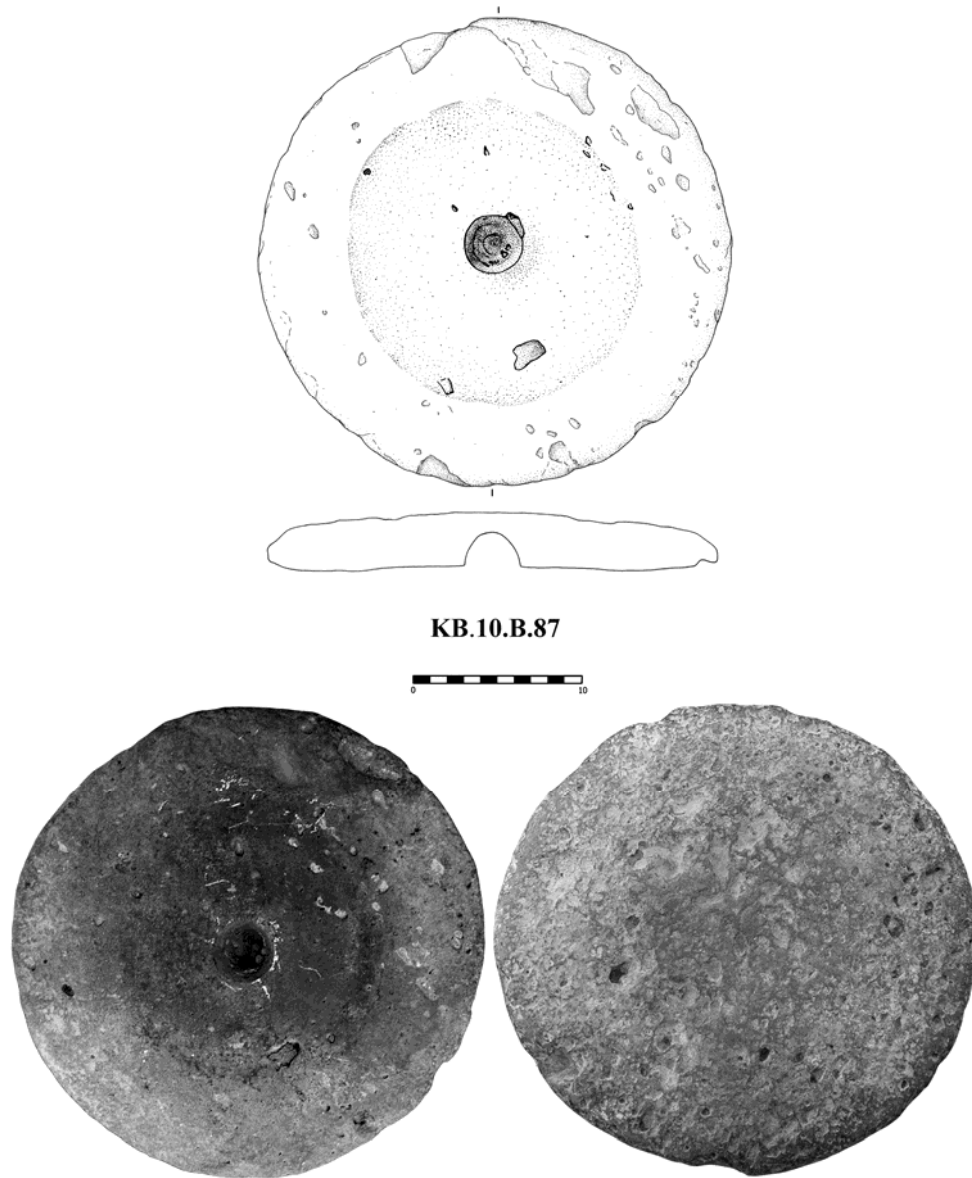


Fig. 2 - Drawing and photos of potter's wheel KB.10.B.87 (courtesy of Rome «La Sapienza» Expedition to Palestine & Jordan).



Fig. 3 - Basalt potter's wheel KB.10.B.87 in destruction layer F.1054, inside Pillared Hall L.1040 (after Nigro 2010c, fig. 12, 567).

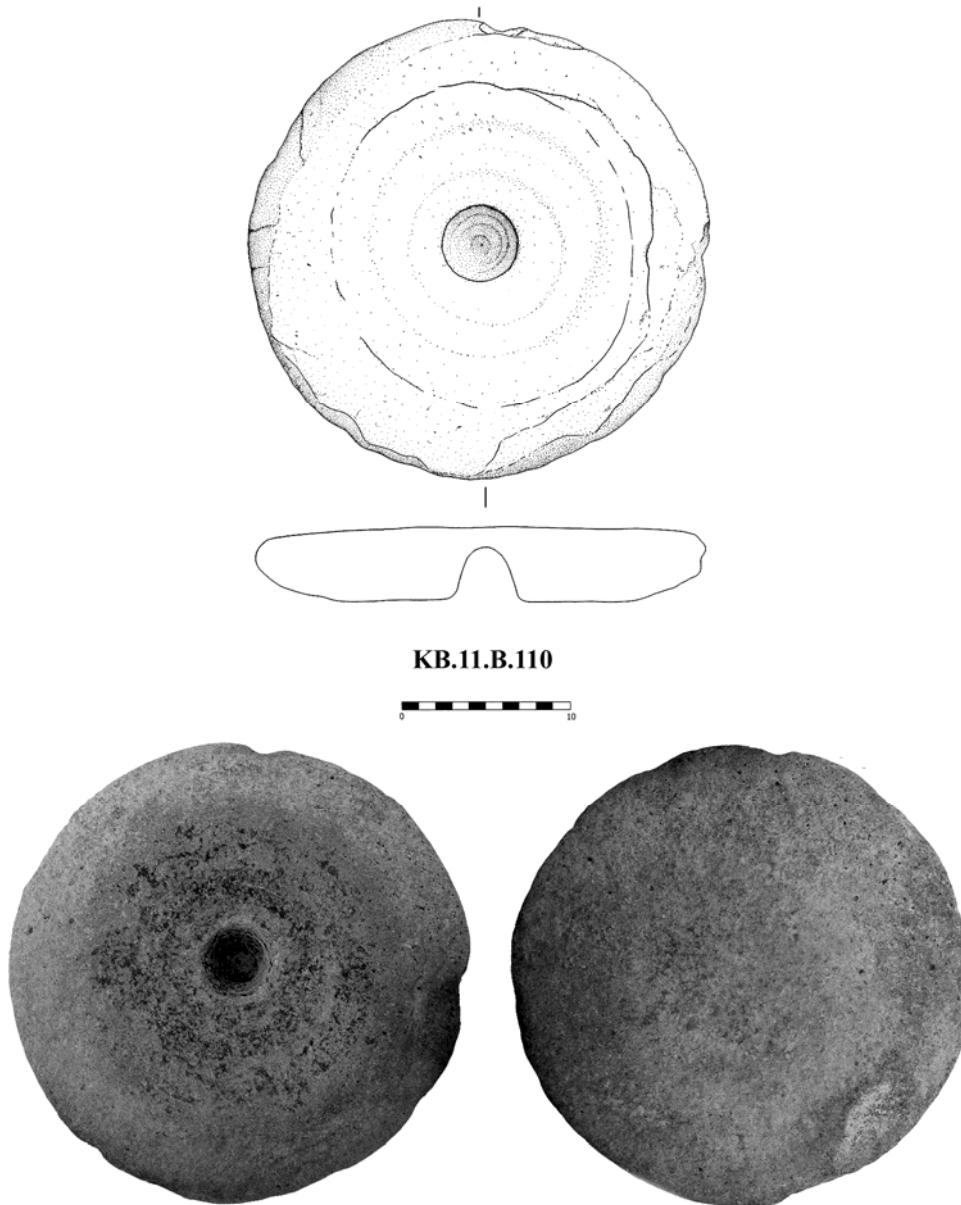
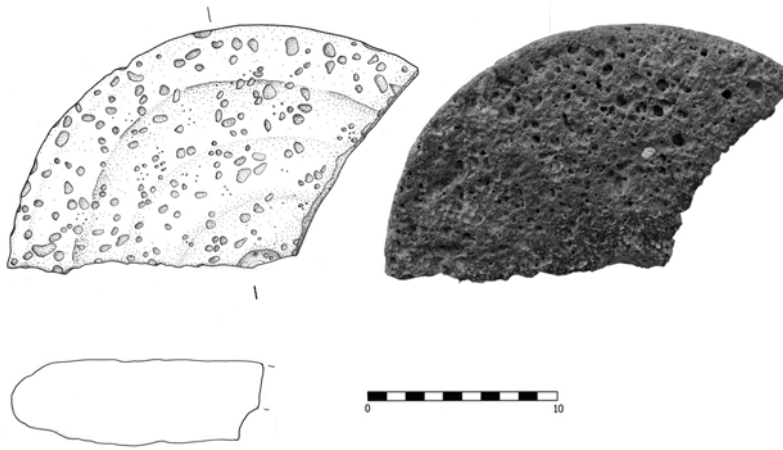


Fig. 4 - Drawing and photos of potter's wheel KB.11.B.110 (courtesy of Rome «La Sapienza» Expedition to Palestine & Jordan).



Fig. 5 - Basalt potter's wheel KB.11.B.110 in destruction layer F.1124, inside storeroom L.1120 (courtesy of ROSEPAJ; preliminary online report "Discoveries 2011").



KB.12.B.140

Fig. 6 - Drawing and photo of potter's wheel KB.12.B.140 (courtesy of Rome «La Sapienza» Expedition to Palestine & Jordan).

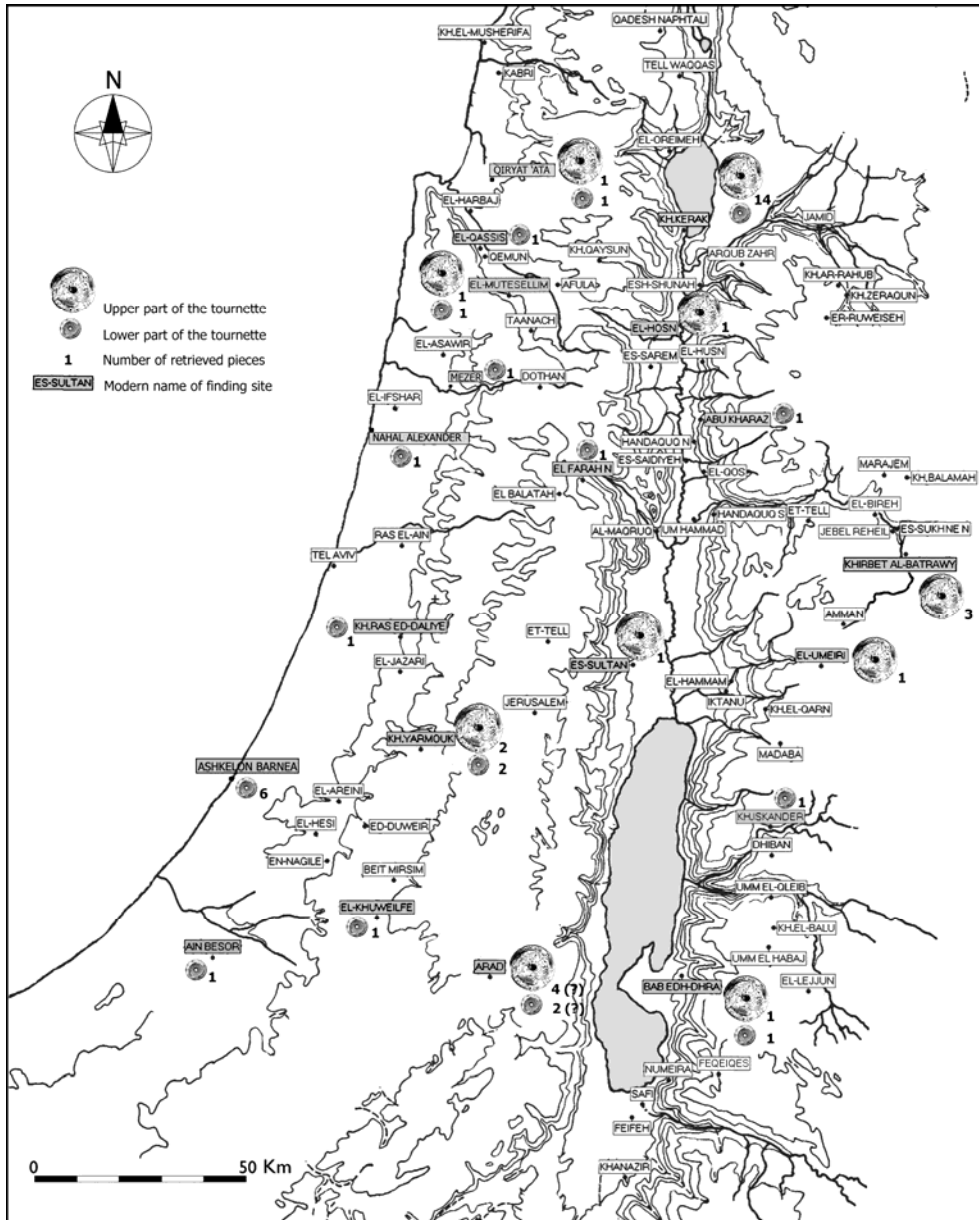


Fig. 7 - Early Bronze I-IV sites in Southern Levant, where pieces of potter's wheels were retrieved.

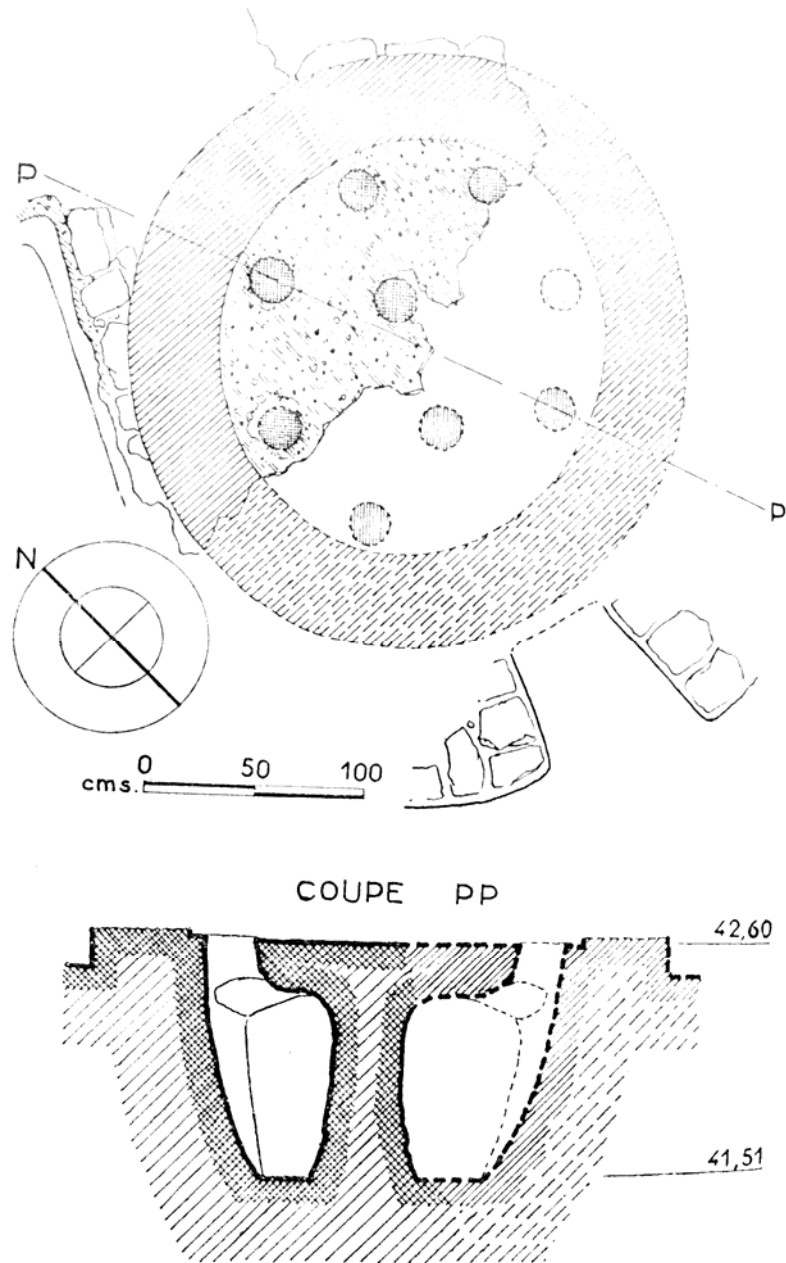


Fig. 8 - Potter's kiln discovered at Tell el-Farah North, plan and section (after de Vaux 1955, fig. 9, 558-562).