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Molluscan Fauna from Site 4 of Tell Jenin (Northern West Bank—Palestine)

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Tell Jenin was the first archaeological site excavated in the area of West Bank (Palestine) by Birzeit University. Site 4 of this Tell covers many strata (from Late Neolithic to the recent past). The molluscan fauna accumulated during the Bronze Age. There is a dominance of freshwater and land snails over the Mediterranean shells. The ''construction'' phases (occupation) contain many more specimens than the ''destruction'' ones (abandonment) in each studied stratum of the site. This molluscan study identifies paleoclimatic variations in the prehistoric times. It also reflects the di erent patterns of trade exchange, food sources, and the use of molluscs as artifacts, including their use as ornaments, in traditional and ritual activities by the prehistoric man.

Keywords: TELL JENIN, BRONZE AGE STRATA, MOLLUSCAN FAUNA, CONSTRUCTION PHASE, DESTRUCTION PHASE, PREHISTORIC MAN, PALESTINE.

Introduction

The site of Tell Jenin (UTM 1785–2075) is located about 40 km east of the Mediterranean coast and 100 km north of Jerusalem (Figure 1). This site is found at 150 m of altitude and its rate of annual precipitation is 500 mm per annum, with an average temperature of 20°C (10°C in January and 30°C in August). The Jenin region presents a distinctive geomorphological structure. It lies on top of the Nablus syncline within a number of Eocene chalk blocks in which erosional basins have been formed. According to reports from field inspectors of the Department of Antiquities during the British Mandate, Tell Jenin was first identified by Albright (1926) as the site of an ancient town on top of which was a modern cemetery and a threshing floor. The Tell is also known as Tell el-Nawar (arabic word for gypsies), because of annual nomads' encampments on the mound prior to 1948. Precise stratigraphic knowledge of the archaeological history of the site and the region of Jenin began in 1977 with Birzeit University salvage excavations at four sites of the Tell (Glock, 1979; 1987). Recent excavations and surveys of site 4 (1980–1983) indicate that the most ancient occupation of the Tell dated to late Neolithic − early Chalcolithic period.

Stratigraphical study of site 4 of the Tell describes nine strata as follows:

- *Stratum I:* Virgin soil
- *Stratum II:* Late Neolithic–early Chalcolithic
- *Stratum III:* Early Bronze I
- *Stratum IV:* 13th–12th century
- *Stratum V:* Early Byzantine occupation
- *Stratum VI:* Late Byzantine occupation (6th–7th century)
- *Stratum VII:* Omayyad occupation
- *Stratum VIII:* Mamluke–Ottoman occupation
- *Stratum IX:* The recent past: End of Ottoman rule to the present.

Materials and Methods

The faunal material which was found in the site 4 of Tell Jenin includes many mollusc shells and a lot of bone fragments. These materials were excavated over an area covering about 250 m^2 (1·2% of the Tell). These samples were collected during the 1981–1983 excavation under the direction of Professor A. E. Glock (Institute of Archaeology at Birzeit University) and Albright (Institute of Archaeological Research of Jerusalem). The samples reported here were hand-picked during the excavation, their preservation ranges from rather fragmentary to perfectly preserved specimens. Many of them show traces of manipulation, i.e. man-made holes.

The nomenclature of the marine specimens, follows systems of Abbot & Dance (1982) and Tornaritis

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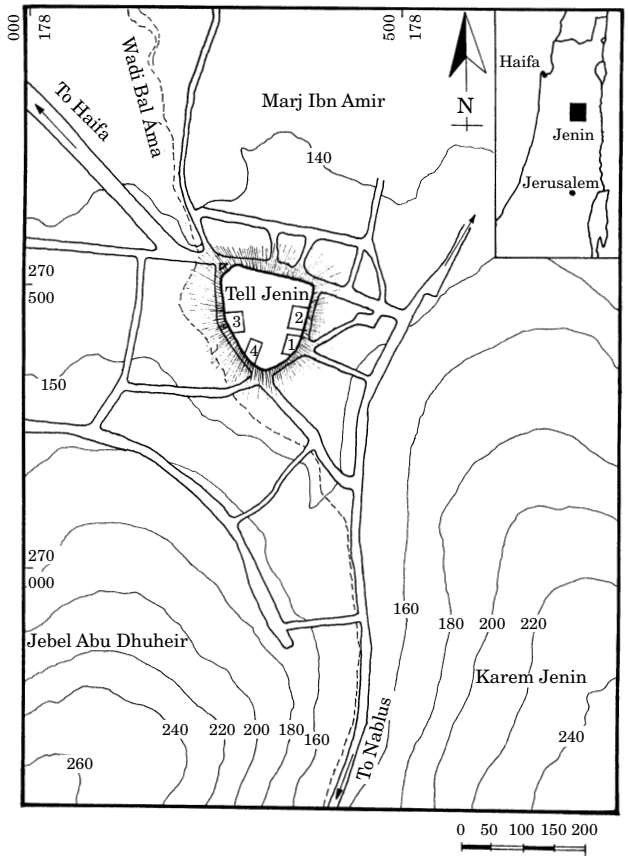

Figure 1. Sketch map showing Tell Jenin location, and the archaeological sites (1, 2, 3 and 4) excavated by Birzeit University.

(1987); the names of the terrestrial and freshwater molluscs follow Mienis (1982; 1983), Schuett (1983) and Heller (1993).

Results

The molluscan specimens found in the di erent strata of the site 4 of Tell Jenin (marine, freshwater and land snails) are presented in Figure 2.

The studied material consisted of 611 shells or known shell fragments which are classified as follows:

Gastropoda:	569	**Bivalvia:**	39	**Scaphopoda:**	3
Marine	(8)	Marine	(25)	Marine	(3)
Freshwater	(333)	Freshwater	(14)		
Terrestrial	(228)				

Systematic analysis

Gastropoda

Family *Nassariidae*

(1) *Nassarius gibbosulus* (Linnaeus, 1758).
Two specimens.

Family *Muricidae*

(2) *Bolinus brandaris* (Linnaeus, 1758).
Two specimens; both are holed.

Family *Conidae*

(3) *Conus mediterraneus* (Hwass, 1792).
One specimen, it has an apical man-made hole.

Family *Cassidae*

(4) *Phalium granulatum undulatum* (Gmelin, 1791).
Three outer apertural lips; they are manipulated.

Family *Thiaridae*

(5) *Melanopsis praemorsa* (Linnaeus, 1758).
199 specimens, one fifth were juvenile; 25 specimens were water-worn and had man-made holes.

(6) *M. costata* (Olivier, 1804).
99 specimens, half of them were juvenile; water-worn specimens were abundant.

(7) *M. cerithiopsis* (Bourguignat, 1884).
12 specimens; one had a man-made hole.

(8) *M. tuberculata tuberculata* (Mueller, 1774).
10 specimens: one apex is lost.

Family *Planorbidae*

(9) *Planorbis planorbis antiochianus* (Locard, 1883).
13 specimens: one is holed.

Family *Helicidae*

(10) *Levantina spiriplana caesaraena* (Mousson, 1854).
36 specimens; some broken ones.

(11) *Helix engaddensis* (Bourguignat, 1852).
35 specimens, some are worn; one has a large body whorl-hole (8 mm in diameter).

Family *Hygromiidaea*

(12) *Monacha haifaensis* (Pallary, 1939).
132 specimens; 25 were juvenile; 5 adults had apical holes.

(13) *M. obstructa* (Pfei er, 1842).
9 specimens; some were fragmented specimens.

(14) *Trochoidea langloisiana* (Bourguignat, 1853).
Two specimens.

(15) *Xeropicta vestalis* (Pfei er, 1841).
14 specimens.

Scaphopoda

Family *Dentaliidae*

(16) *Dentalium* sp.
Three specimens; unidentifiable specimens.

Pelecypoda (Bivalvia)

Family *Glycymerididae*

(17) *Glycymeris pilosa* (Linnaeus, 1767).
Six specimens; four broken valves.

(18) *Glycymeris violascens* (Lamarck, 1819).
Nine specimens; six are umbo holed; one has a hole at the centre of the valve.

(19) *Glycymeris bimaculata* (Poli, 1795).
One specimen; umbo is holed.

Family *Cardiidae*

(20) *Cerastoderma glaucum* (Bruguiere, 1789).
Four specimens.

Family *Unionidae*

(21) *Unio terminalis* (Bourguignat, 1852).
14 specimens: the only freshwater bivalve found in the site; broken valves.

Figure 2: Frequencies of shells in the site 4 of Tell Jenin distributed by strata

Species	Origin**	Total number	Stratum I	III	IV	V	VI	IX
Gastropoda								
Conus mediterraneus	M	1	1	0	0	0	0	0
Bolinus brandaris	M	2	0	0	2	0	0	0
Nasssarius gibbosulus	M	2	0	0	2	0	0	0
Phalium granulatum undulatum	M	3	0	1	1	0	1	0
Planorbis planorbis antiochianus	F	13	0	3	5	5	0	0
Melanoides tuberculata	F	10	0	0	7	1	1	1
Melanopsis praemorsa	F	199	0	25	133	29	12	0
Melanopsis costata	F	99	2	4	65	19	4	5
Melanopsis cerithiopsis	F	12	0	1	5	4	1	1
Monacha haifaensis	L	132	0	22	88	20	2	0
Monacha obstructa	L	9	1	4	0	4	0	0
Levantina spiriplana caesareana	L	36	0	0	34	2	0	0
Helix engaddensis	L	35	0	5	22	6	2	0
Xeropicta vestalis	L	14	0	2	3	6	3	0
Trochoidea langloisiana	L	2	0	0	2	0	0	0
Scaphopoda		0						
Dentalium sp.	M	3	0	0	3	0	0	0
Bivalvia		0						
Cerasatoderma glaucum	M	4	0	1	2	0	0	1
Glycymeris pilosus	M	6	0	3	3	0	0	0
Glycymeris violascens	M	9	0	1	5	0	0	3
Glycymeris bimaculata	M	1	0	0	1	0	0	0
Unio terminalis	F	14	0	2	11	1	0	0
Bivalvia (unknown)	?	5	0	0	4	0	1	0
Total no. of specimens		611	4	74	398	97	27	11
Total no. of species		21	3	13	19	11	8	5

Strata: I=virgin soil; III=Early Bronze I; IV=13th–12th century ; V=Early Byzantine Occupation; VI=6th–7th Century ; IX=Recent Past.
*Numbers include complete specimens and fragments. Strata II, VII, and VIII contain no shells.
**M=Mediterranean; F=Freshwater; L=Land snail.

Discussion

The molluscan fauna found at site 4 of Tell Jenin includes 611 specimens together with 1896 fragments of unspecified shells. The majority of this fauna was concentrated within stratum IV (13th–12th century); one third only is distributed among the other five strata. The sites (1, 2 and 3) of the Tell have not yet been studied, so we are not capable of making any comparison between site 4 and the other sites. When the phases of each stratum were analysed, we found that the occupation and construction phases had the majority of molluscan specimens, especially in comparison to the abandonment and destruction ones (Figure 3).

This study indicates that marine shells and freshwater snails were more abundant than land snails in construction phases of each stratum. *Monacha* specimens were extremely common in destruction and abandonment phases. These observations coincide with those of Bar-Yosef & Heller (1987) on Yiftah'el site, where *Monacha* and *Xeropicta* might have entered the site after it was deserted and covered by weeds.

Land snails occur in almost every archaeological site, but they are usually a result of natural deposition (Hester, 1975). Land snails are the only group of molluscs which might have entered the site by themselves, and were not necessarily brought in by humans. Their dominance may reflect a very short human occupation, since they are typical of deserted sites.

The absence of shells in both strata VII and VIII could be a reflection of the introduction of new laws forbidding the consumption of snails or shellfish during the Islamic period. Bar-Yosef (in press) proposed a similar hypothesis (Kashrut laws) for the Middle Bronze period at Tel Qashish.

Stratum IX, dated to the 20th century, is not reported in most archaeological excavations in the Levant. The scarcity of shells in this stratum might be due to the nomads' occupation of the Tell before 1948, since gypsy women are known to be fortune tellers and use the shells for that purpose. This socio-cultural parameter for shell exploitation by gypsies needs more elaboration in the future.

The systematic study reveals that the *Melanopsis* species are the most abundant freshwater gastropods among molluscan fauna of the site. Many of these specimens carry abrasion marks and man-made holes indicating their usage as beads and/or pendants. *M. praemorsa* is distributed all over the eastern

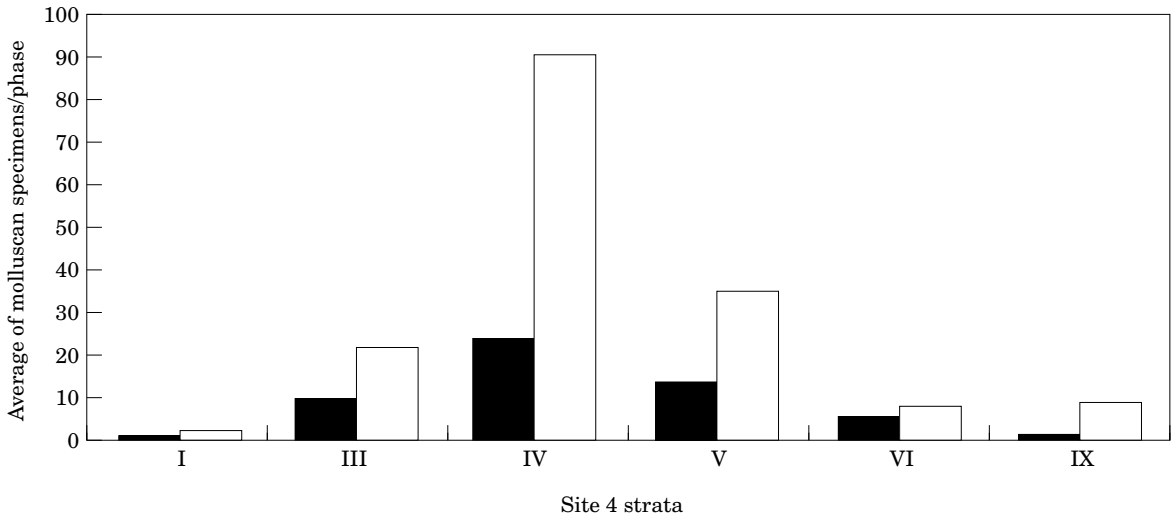

Figure 3. Frequencies of molluscan specimens among the phases of site 4 strata.

Mediterranean region and Mesopotamian basin where there are several subspecies as explained by Schuett (1983) and Kinzelbach (1987). *M. cerithiopsis* was considered as a relict of the *Melanopsis* inhabiting the Pliocene connection between Euphrates and the Jordan Valley (Schuett, 1987). Biggs (1963) had found that this freshwater snail came from a stratum dated about 1650 (MB Age) in Jericho during 1952–1958 excavations. Avnimelech (1937) demonstrated that some specimens of *M. laevigata* (*praemorsa*) found at Bethlehem related to the Natufian IV period.

In the PPNB site of Yiftah'el (Lower Galilee), *M. praemorsa* was the only freshwater gastropod present in the excavated site. It was most probably brought into it with the material for constructing the mudbricks from one of the springs near the site (Bar-Yosef & Heller, 1987). In Beisamoun prehistoric site, *M. praemorsa* and *M. costata* are represented by 144 specimens out of 146 gastropods (Mienis, 1978). Reese (1982) found that two thirds of the *Melanopsis* species were smooth and the rest were costate in the epi-paleolithic site, Hayonim Terrace, in Northern Israel. Since the *Melanopsis* species of Tell Jenin were concentrated in the construction phases of the site, it will be reasonable to conclude that the freshwater snails were brought within the mud from the river banks used for mudbrick construction.

The land snail *M. haifaensis* was found all over the strata of the site, many of the specimens were fragmented, but one third of them was completely intact. From previous records in Jordan, Schuett (1983) has described a closely related species, *M. syriaca* from various sites—north Shuna, Ajlun and Irbid. *Monacha* species are common today throughout Mediterranean regions, where the climate is cooler and receives more rain in the hilly region, so the shells become larger. *Monacha* is an annual species and its size depends largely on the amount of rainfall during the winter period, consequently large di erences in size may be observed between two successive years. *Monacha* specimens could reflect the paleoclimatic variations in the studied prehistoric sites (Heller & Tchernov, 1978). Biggs (1980) stated that this species was not known as an article of diet in Cisjordan during prehistoric times. This author had recovered some blackened fragments by the fire in the altar of the sanctuary at En-Gedi and they date to the 4th millennium .

L. spiriplana caesareana and *H. engaddensis* were the largest in size in the land snails recovered at this site, which indicates that these species could be diet articles for the people of that time. These species were found also in the sites of Nahal Oren and Carmel mountains where they dated back to the Neolithic period (10 000–6000) and were overrepresented among the archaeo-malacological material of these sites (Mienis, 1990). Avnimelech (1937) mentioned the discovery of numerous shells of *L. spiriplana caesareana* in the remains of a Byzantine convent kitchen of the 6th century in Jerusalem. The importance of these species is related to their sensitivity to climatic conditions which is reflected on the dimensions of their shells.

The Mediterranean marine gastropod *Nassarius* sp. had been used by Neolithic man and woman as an expression of beauty or for some magical and ritual purposes. Inizan & Gaillard (1978) demonstrated that since paleolithic times (*c.* 30 000 years) *N. gibbosula* was worked in a special way by rubbing o its dorsum and exposing its nicely shaped columella.

The lips of *Phalium* shells are known from a number of Near Eastern and Mediterranean archaeological sites; most of these lips can be seen as personal ornaments or o erings in graves or sanctuaries (Reese, 1989).

B. (*Murex*) *brandaris* is one of the Mediterranean Basin Muricid shells that are known for their purple-dye production in Roman times. Purple dyes are

actually derived from colourless mucus of the hypobranchial gland of sea snails as a biological deterrent of predatory fish. These blue–violet dyes were the origin of the Tekelet, which is the ritual ''blue'' textile of ancient Israel (Ziderman, 1987). This ancient shell purple-dye industry dates back to 1600–1500 in northern Syria and Greece (Reese, 1986). This is not the case in Tell Jenin, since hundreds of shells would be needed to extract a small amount of dye (Spanier, 1986).

The presence of marine shells in Tell Jenin supports the idea that shellfishing was familiar to the inhabitants of the site. Since shellfish rot very rapidly and have to be consumed shortly after gathering, most of the shell debris would probably not be taken back to the habitation site, but rather consumed on the sea shore. This might explain the small quantity of edible shellfish in the site. Although the marine gastropods are limited, we should face the most intriguing question, the way in which these shells were introduced into the site. It is not clear whether they were collected directly by the Tell inhabitants or by exchange with other groups. Bar-Yosef (1989) assumed that most shells were acquired by direct collection, as well as by di erent patterns of trade exchange.

The *Dentalium* shells adhering to Natufian skulls in primary burials in El-Wad Cave (Garrod & Bate, 1937) strongly suggest their use as headdress decorations. The *Dentalium* sp. are found in burials decorating more males than females (Belfer-Cohen, 1988). The large quantities of *Dentalium* that were found at the Netiv Hagdud in the Jordan Valley indicate a continuation of the earlier Natufian tradition (Bar-Yosef, 1991). It seems that shell-bead manufacturing was an important activity at Wadi Tbeik, southern Sinai. The finished products might have served as commodities in long-distance exchange (Tchernov & Bar-Yosef, 1982).

Important changes began during the Epipaleolithic when some groups of mobile hunter–gatherers became sedentary. A major change in shell use occurred when the Neolithic farming communities were established. The desert hunters and gatherers used many more marine shells as items of exchange and body decoration than did the farmers. Whilst Jericho and Nahal Hemar provide evidence for the symbolic use of marine shells, the hunger–gatherers of southern Sinai, who were contemporaneous with communities of farmers and shepherds in the North, viewed them in purely economic terms. Those shells were gathered on the shores of Sinai to be exchanged in return for cereals and possibly other cultivated crops such as legumes (Bar-Yosef, 1991).

The Neolithic hunter–gatherers of southern Sinai, or the *Dentalium* shells from the PPNA villages of Jordan Valley had nothing in common with the Tell Jenin assemblage, and therefore we could not make comparisons between them.

The common Mediterranean marine bivalve *Glycymeris* was more abundant than other bivalves at the site. All specimens were perforated at the umbo region by rubbing. These bivalves were obviously holed for wearing and to be used as necklaces. These types of necklaces are of Early Bronze age and since they are strong shells they are chosen only for ornaments. This specimen was also embedded in the skulls as the eyes of a lime plaster statue (Kenyon, 1957). Biggs (1963) suggested that *Glycymeris* symbolizes the moon or the moon deity, while *Cardium* (*Cerastoderma*) with its ridges represents the sun rays. Perhaps the deity of moon was more popular than that of the sun especially in lowlands around old Jericho. *Cardium* species had been used as a charm to prevent the building from being haunted by the spirits. So the inhabitants of Jericho did not mix the two genera of *Cardium* and *Glycymeris* in one necklace. These personal speculations of Biggs (1963) are not supported by any other archaeologist of the Levant.

U. terminalis was the only freshwater bivalve found in the site. The specimens are fragile and tend to break, which explain the large number of fragments. They might have been an edible species for the inhabitants of the site. We could not support this hypothesis at the present. These bivalves might be embedded as mud brought in for brick manufacturing or building. The activities of rodents or birds, should also be considered.

The southern Levant exhibits remarkable spatial variability in climatic and vegetational condition (Zohary, 1981). This mosaic environment is clearly reflected by the regional faunal diversity (Tchernov, 1979). The various groups of shells and snails, and their distribution represent changing ecological, social and economic roles within the di erent strata of the site, and also reflect on its human societies in general.

Conclusion

The molluscan fauna presented in site 4 of Tell Jenin accumulated during Early Bronze, Late Bronze and Early Byzantine periods of occupation.

The dominance of freshwater snails of genus *Melanopsis* during the construction phases of the site is due to their presence within the mud used for mudbrick building. The land snail dominance may reflect a very short human occupation or the desertion of sites. The absence of shells during Islamic periods (Strata VII and VIII) could be a reflection of the laws forbidding the consumption of snails or shellfish. The holed specimens of shells in this site indicate their usage as beads and/or pendants. The presence of marine shells in Tell Jenin supports the idea that shellfishing was familiar to the inhabitants of this site.

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