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The Faculty of Humanities  
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# New Studies in the Archaeology of Jerusalem and its Region

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Editors:

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and Joseph (Joe) Uziel

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Front cover: The Western Cardo, after restoration and preservation, beneath the houses of the Jewish Quarter (photo: J. Uziel)

Back cover: The exposure of the Western Cardo during the Jewish Quarter Excavations (photo courtesy of the Israel Exploration Society)

First division: Top: Prof. Benjamin Mazar explains the findings from the excavations at the corner of the Temple Mount to Moshe Dayan (Photographer unknown, courtesy of E. Mazar; Bottom: Prof. Benjamin Mazar's Excavations along the walls of the Temple Mount, 1968 (Photo: Y. Eisenstark, courtesy of the National Archive)

Second division: G. Steibel and B. Isaac study the Roman Milestone at Mile IX, between Jerusalem and Beit Guvrin (Photo: N. Szanton)

Third division: Top: Reconstruction of the kilns and production area of the Binyane Ha-'Umma potter's workshop for bricks and roof tiles of the Tenth Legion (Drawing: S. Kweller); Bottom: Reconstructed section of how the kiln for producing legionary bricks and tiles at Binyane Ha-'Umma was used (courtesy of the excavations of H. Goldfus and B. Arubas at Binyane Ha-'Umma, 1992, drawing: S. Kweller)

Forth division: "The Spring Tower" that fortifies the Gihon Spring in the City of David (Reconstructions: Y. Shmidov)

Fifth division: Pier of arched Crusader Hall, Street of the Chain (Photo: D. Dagan)

Sixth Divider: Top: The northern entrance to the theatre-like structure beneath Wilson's Arch (Photo: A. Peretz); Bottom: The southern pedestal of the theatre-like structure beneath Wilson's Arch (Photo: A. Peretz)

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## New Insights into Middle Bronze Age Burial Customs in Light of Recent Excavations at the Manahat Spur (Jerusalem)

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There are certainly interesting discoveries to be made by digging in the ancient cemetery at Mál'ha

(Clermont-Ganneau 1889: 459)

### Introduction

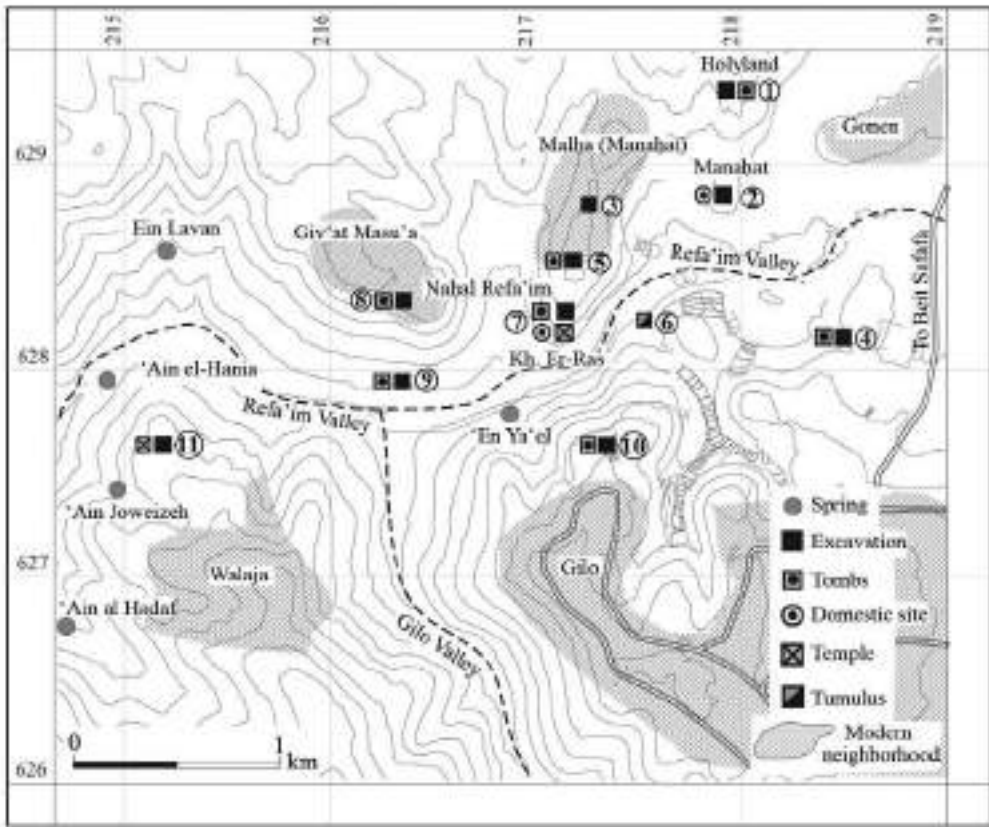
Mortuary archaeology is now less about the material culture of the living and more about cultural approaches to death. Researchers now ask questions about the social categories, religious attitudes, and ritual action associated with death. The Middle Bronze Age has been the focus of several seminal studies regarding the way society deals with death (e.g., Ilan 1992; Hallote 1995; Baker 2006). All these have been limited by the scope of the evidence, which is comprised of more easily retrieved artifacts: pottery vessels, metal and bone objects and, sometimes, seals. But in the last decade or so the material and life sciences have begun to make a staggering contribution to archaeological analysis. The present paper is an example of how scientific analysis can supplement traditional material culture analysis many times over. This paper focuses on a particular rock-carved tomb in the Refa'im Valley in the Jerusalem

region in which scientific methods, including microscopic pollen analysis and microfaunal analysis, have revealed critical new data that would have gone undetected only ten years ago. These methods shed new light on burial customs and reveal practices that were previously unknown.

In the summer of 2014, salvage excavations were conducted on the slopes of the Manahat spur, which descends southwestward into the Refa'im Valley. The Manahat spur is delineated by the Jerusalem (Malha) shopping mall to the east, the Jerusalem Biblical Zoo to the west, the Ramat Sharett and Holyland Park neighborhoods to the north, and the Refa'im Valley to the south. The excavation area is delimited by the houses of Manahat to the north and northeast, Khirbet Er-Ras to the south, and roads at the foot of the spur: Yitzhak Moda'i Street to the southeast, and Aharon Shulov Street to the west.

The excavation took place in preparation for the additional expansion of the Manaḥat (Malḥa) neighborhood.<sup>1</sup> Notable among the finds are remains found in Area B, at the top of the southern slope, which include an Intermediate

and Middle Bronze Age II cemetery comprised of 67 rock-cut shaft tombs hewn near the edge of the spur, some of which had been excavated earlier (Zehavi 1993, and see below). The northwestern part of the cemetery, including



**Excavator and excavation year**

- |   |   |
|---|---|
| 1. Ben-Arieh 1995<br>Zelinger 2000<br>Milevski 2002<br>Greenhut and Milevski 2006-2008<br>Be'eri 2013 | 5. Kisilevitz 2013                          |
| 2. Edelstein 1987-1989  | 6. Milevski 1998                            |
| 3. Zehavi 1990-1991   | 7. Eisenberg 1983<br>Eirich-Rose 2008-2009. |
| 4. Wiegmann 2013  | 8. Ovadiah 1993                             |
|   | 9. Weksler-Bdolah 2017                      |
|   | 10. Zilberbod 2014                          |
|   | 11. Ein-Moe 2010-2011                       |

1 Excavated Sites dating to the Intermediate and Middle Bronze Age in the Refa'im Valley (Drafting : N. Zak)

tombs that had been previously excavated by Zehavi, was buried under a thick layer of construction debris from the development of Manahat in the 1990's, and only partially re-exposed. Directly to the east, on the upper part of the southern slope, a number of excavated tombs, partially filled with detritus and modern waste, were visible at the beginning of the 2014 excavations.

### History of Research

Urban development of the southwestern region of Jerusalem since the late 1970's, and the construction of the West Bank "separation wall" by Israel in the 21<sup>st</sup> century, resulted in a spate of archaeological work in the Refai'm basin, specifically in the region between Gonen (Katamon) and Battir (Fig. 1). This work has included:

- an extensive survey of southwestern Jerusalem (Kloner 2000)
- surveys in the vicinity of Walaja (Dagan and Barda 2010)
- numerous excavations near Beit Safafa (including: Zissu and Moyal 1998; Feig 2003; Nagar 2015; 'Adawi 2016; Wiegmann and Ben-Ari in preparation)
- excavations at the site of Manahat, the current location of the Malha shopping mall (Edelstein, Milevski and Aurant 1998)
- various excavations in the Holyland Park compound and its vicinity (Ben-Arieh 2000; Zelinger and Golani 2005; Milevski and Ben-Or 2007; Milevski and Agha 2008, Milevski, Greenhut and Agha 2010; Greenhut 1995; Be'eri 2015)
- excavations at Giv'at Masu'a (Ovadia 1993) and on its southeastern slope at the site of Nahal Refa'im, the current location of the

Jerusalem Zoo (Eisenberg and Edelstein 1985; Eisenberg 1990; Eisenberg 1993; and recently Erikh-Rose 2015)

- excavations on the slope of a spur descending towards the Refa'im Valley from Gilo (Zilberbod and Be'eri 2017, 'Adawi A-7457/2015, unpublished)
- excavations at 'En Ya'el (Edelstein 1993; Weksler-Bdolah 2007; and Avner 2015)
- excavations west of 'En Ya'el (Weksler-Bdolah 2017)
- excavations near Walaja (Ein-Mor 2011; Kisilevitz 2012)

The Manahat spur itself was surveyed early on (Gibson and Barkay 1977), and again in preparation for the current excavation (K. Arbiv, A. Wiegmann and Y. Kapil, S-439/2013).

Between December 1990 and March 1991, the upper part of the Manahat spur was excavated by A. Zehavi (1993) in preparation for the expansion of the Manahat (Malha) neighborhood beyond the confines of the old village of Al-Maliha. Twenty-two shaft tombs were documented, mostly located at the southern edge of the Spur, and partially overlapping with the current (2014) excavation area. The site of Khirbet Er-Ras, located at the southern foot of the spur, underwent salvage excavations (Feig 1996, Feig and Abd Rabu 1996; Edelstein 2000), and has recently been excavated again over the course of three seasons (2011–2013) by an expedition from Tel Aviv University (Gadot 2011, 2015). The finds date predominantly to the Iron Age II, Persian, and Early Hellenistic periods with some remains from the Intermediate Bronze Age and Middle Bronze Age II.

The research detailed above indicates that the Refa'im Valley was densely settled during the Intermediate and Middle Bronze Ages. Villages and agricultural installations were found in the excavations at Manahat and Nahal Refa'im, and ritual structures were found at Nahal Refa'im and Waladje. Though a number of tombs were found in the valley itself, the majority of tombs from these periods were found in cemeteries in the Holyland compound, Gilo, Giv'at Masu'a, and Manahat, all of which are situated on the upper part of their respective spurs. Remains ranging from the Iron Age to modern times have been found in the region, notably Iron IIB dwellings at Kh., Er-Ras and 'En Ya'el, two Roman villas at 'En Ya'el, and structures and terrace walls associated with the village of Al-Maliha.

### **The Site and its Environs**

Until 1948, the summit of this spur was dominated by the village of Malha (Al Maliha), which ranged over an area of 6800 dunams (= 680 ha). The landscape of the surrounding valleys and the northern part of the eastern slope of the spur was characterized by terraces and cultivated plots. In the late 19<sup>th</sup> century the village was mentioned by Clermont Ganneau (1899: 459–463) and Conder and Kitchener (1882: 21, 136–137) as a village of moderate size with rock-cut tombs and ample archaeological remains in its immediate vicinity. During the 1948 war, the village's Palestinian inhabitants fled (Morris 2004: 239), and its houses were subsequently populated by Jews, and incorporated in the newly established neighborhood of Manahat. The spur extends over an area of approximately 150 dunams, all three of its slopes descending

sharply towards the Refa'im Valley, though the southern slope is somewhat more moderate. Walking paths and terraces constructed across the spur, both in antiquity and in modern times, and forestation expedited by the Jewish National Fund (JNF) have considerably changed the natural topography of the spur. The modern (late 20<sup>th</sup> century) landscaping is particularly evident in the northeastern slope, and includes stone staircases, metal railings, and a community garden.

Three geological formations dissect the spur horizontally.<sup>2</sup> The Kfar Sha'ul formation at the top is characterized by a crust of hard limestone (*nari*) about 1 m thick, capping a layer of soft chalk. The Aminadav formation in the bottom half of the spur features hard, rugged dolomite not suitable for husbandry, though it can sustain olive trees and vines planted within its crannies. Finally, the Moza formation located at the foot of the spur, as it is throughout the adjoining valleys, is conducive for cultivation.

### **The Cemetery**

The Bronze Age cemetery has been disturbed in modern times, notably by 20<sup>th</sup> century construction consisting of a service road and at least two concrete structures. Remains of the structures include four shallow, hewn channels containing metal rods and nails with reinforced concrete and concrete building blocks. The service road is evidenced by a ca. 8 meter-wide path of destruction traversing the cemetery. This destruction includes the complete removal of the hard *nari* layer and part of the chalk layer, resulting in the partial or complete annihilation of tombs, leaving behind caverns, some alone

and some clustered together. The caverns were filled with earth and crushed chalk originating from the walls and ceilings of the destroyed tombs, as well as with modern waste, such as a tin coffee can with Hebrew writing, plastic bags, aluminum foil and small planters. The latter may have been left by the JNF workers who forested the site. Generally, the tombs located beyond the range of the path were well preserved. In the municipal map of Jerusalem from 1993, this path is documented as being paved and dead-ended. It does not exist in earlier or later maps and does not extend beyond the boundaries of the cemetery. It would seem that this path was temporary, and facilitated the development and expansion of Manahat in the 1990's, including the removal of the concrete structures and the landscaping of the spur – terracing and the planting of trees (Gadot et al. 2015) – which covered most of the tombs. As a result of these modern activities the cemetery can be divided into two sections, the upper section in the north – characterized by the steep descent of the generally unharmed rock, and the lower section in the south – characterized by significant modification of the bedrock. In addition, natural erosion of the chalk resulted in internal decay and the collapse of some of the tomb chambers, exacerbated by the penetration of roots of trees planted in the 20<sup>th</sup> century. Therefore, many of the tombs were only partially preserved. At times they were only evidenced by curvatures in the rock, or cavities full of crushed chalk that sometimes contained modern waste. Between Zehavi's 1990-1991 excavations and the recent 2014 excavations, 67 tombs, in various stages of preservation, were found near the top of the southern slope of the spur, along

a topographic strip approximately 20 m wide (Fig. 2). The tombs are typical of the Intermediate Bronze Age rock-cut shaft type, consisting of a round shaft (1.00–2.00 m. deep), at the bottom of which is a narrow opening, typically sealed shut with a large stone, leading into the burial chamber (Greenhut 1995:18-20). The shafts were cut through the hard *nari* layer on the surface and into the soft chalk of the Kefar Sha'ul formation, into which the chambers themselves were quarried, generally perpendicular to the slope. The chalk has eroded and collapsed over time. The tombs are densely spaced and arrayed somewhat haphazardly, suggesting an attempt to maximize the area suitable for carving over an extended period. Most of the tombs were not excavated, due to the objections of the ultra-religious Atra Kadisha organization; construction at the site has been halted, and the cemetery has remained untouched.

Although most of the tombs were damaged and/or robbed, a number were found sealed by sealing stones. In the case of sealed tombs, the earth in the burial chambers was carefully sifted. Few finds were retrieved, however; these include a number of vessels from Tombs 7 and 29, and human bones found in Tombs 30, 34, 35 and 36. Only one tomb, "Tomb 7", found sealed and intact, was fully excavated.

The finds from Tombs 7 and 29 constitute the focus of this paper; despite the relatively meager remains in these tombs, their inter-disciplinary analysis has resulted in several new insights regarding Bronze Age mortuary behavior in the Refa'im Valley region, particularly when viewed in the context of contemporaneous finds in the immediate vicinity.<sup>3</sup>



2 The Cemetery at Manahat – Aerial Photo (Photo: Griffin Aerial Imaging)

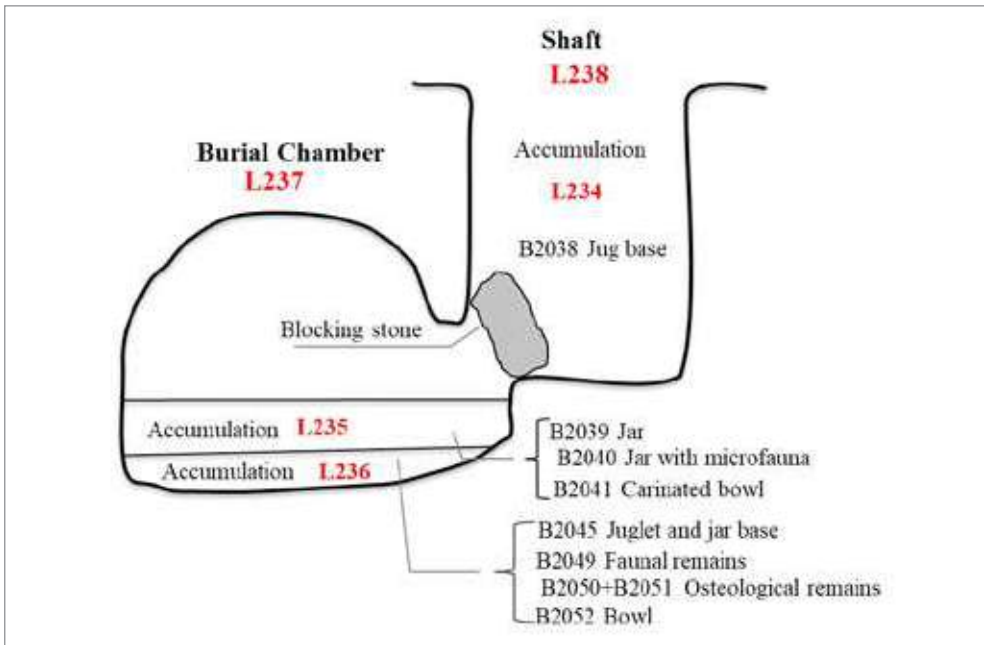
### **Tomb 7**

While removing a thin layer of colluvium between previously excavated tombs, another tomb was revealed, which had not been excavated previously. This tomb (Tomb 7) would prove to be the only sealed tomb with both intact vessels and osteological remains that was fully excavated. This is a sealed tomb covered by a 0.2 m layer of earth and located in the upper part of the southern slope between tombs excavated in the early 1990's. The shaft was full of earth, with a layer of large stones midway from the top. The fill beneath the stone layer contained a single sherd, the base of a jug (Fig. 7:4). A large blocking stone was found at the bottom of the shaft, resting *in situ* against a 0.4 m wide

opening leading down into a small oval chamber (Figs. 3–4). In the chamber, a 0.35 m thick layer of soil, partially originating in the weathered chalk, covered the rock surface. Two storage jars were found resting on this earthen layer, one intact (Figs. 5, 7: 6) and the other cut lengthwise, with the lower half full of small animal bones (Figs. 7: 7, 11, see *Microfauna* below) and the upper half covering it. The jar has a clean and precise cut, which seems intentional, and may have served as a tray with the second half placed above it as a lid. Two bowls were found on the chamber floor near the entrance—a large carinated bowl (Figs. 7: 2, 9) and a globular bowl (Figs. 6, 7: 1). Human remains consisting of a partially articulated individual were found in



3 Tomb 7 blocking stone – looking north (Photo: S. Kisilevitz)



4 Tomb 7 schematic section (Drafting: S. Kisilevitz)



5 D. Tanami retrieving a whole storage Jar from Tomb 7 – looking northeast (Photo: S. Kisilevitz)



6 Tomb 7 skeletal remains and head-rest - looking east (Photo: D. Tanami)

the center of the chamber lying in a north-south orientation with its head to the north. Additional pottery fragments found in the chamber include the base of another storage jar (Fig. 7: 5), and the upper part of a piriform juglet (Fig. 7: 3). A loaf-shaped stone (0.35×0.25×0.1 m) was found on the floor, adjacent to the northern wall; it may have served as a head-rest for the deceased.

### **Tomb 29**

A second sealed tomb (Tomb 29), situated to the south of the modern path, yielded a single storage jar. Located in the southern part of the excavation, and mostly unscathed by modern disturbance, its shaft was plugged by a layer of large stones and packed earth. A high step leads through an opening into the chamber, which was full of earth. The western part of the chamber was paved with a cobblestone pavement. Similar pavements were found in tombs from the intermediate and Middle Bronze II, such as one on the northern bank of the Refa'im Valley (Weksler-Bdolah 2017; Fig. 1, site number 9), in Caves 5, 7, 11 and 15 in the cemetery at Efrata (Gonen 2001: Plans 16–17, 20, 22–24), and in a burial cave at Moza (Sussman 1966: 40, Fig. 1). Generally, these stone pavements did not extend over the entire surface of the chamber; they likely served as a foundation for the burials, at times separating burials from different periods (Gonen 2001: 48–49). The chamber was full of sediment, and the meager finds consist of a few scattered human bones and a single storage jar found on the floor, propped against the western wall. There is a stepped passage in a natural crevice in the rock, leading to a small opening in the back (western) wall of the chamber. It may be that the natural crevice served

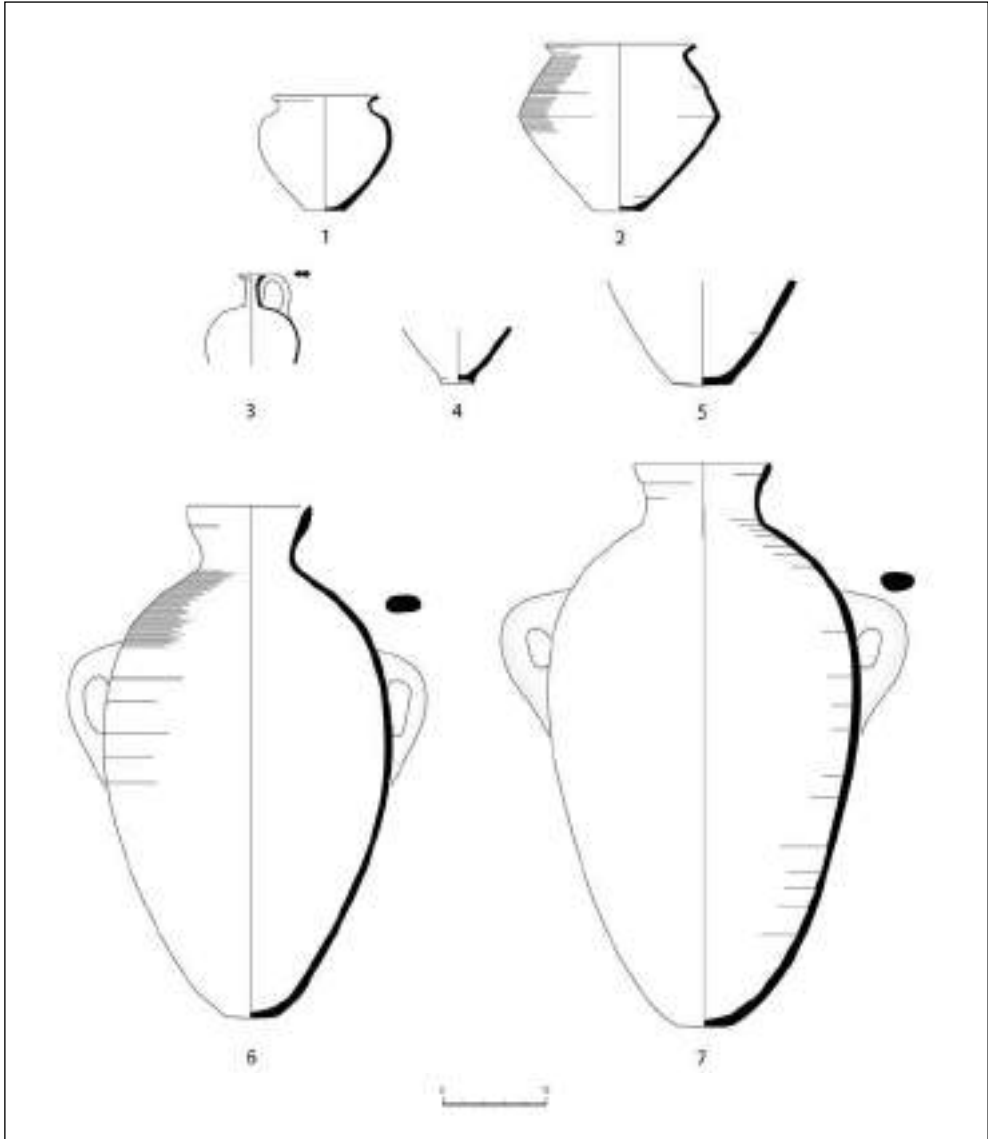
as a second entryway into the chamber. Since there is no evidence in the tomb of later use, and robbers would not have bothered to shape steps in the sloping rock leading to the western side, it would seem that this second entrance was created during the Middle Bronze Age, while the tomb was still in use.

### **The Ceramic Assemblage**

The modest assemblage gleaned from Tombs 7 and 29 comprises eight vessels, dated to the transitional phase of the Middle Bronze I-II or to the early Middle Bronze II period (and see further below).<sup>4</sup> This assemblage includes two bowls, a jug base, a piriform juglet, a jar base and three medium-sized storage jars. Of these, seven were found in Tomb 7 (Fig. 7) and one was found in Tomb 29 (Fig. 8).

### **The Relative Chronology of the Ceramic Assemblage**

The size of the ceramic assemblage allows for only general observations concerning its relative date within the Middle Bronze Age. Some of the vessels have parallels in Beit Safafa (Wiegmann and Ben-Ari, in preparation), the Holyland Compound (Milevski, Greenhut and Agha 2010), Efrata (Gonen 2001: 35–89) and Jericho (Kenyon and Holland 1982: 384–454). The large deep carinated bowl (Figs. 7: 2, 9) is notable for its two carinations (one sharp and one vestigial), a flat base and its exterior horizontal burnish. No parallel is known to date, although similar bowls, with one carination and either a ring or a disk base, were found at the Holyland Compound and Jericho (Milevski, Greenhut and Agha 2010: 401, Fig. 6; Kenyon and Holland 1982:



7 The ceramic assemblage of Tomb 7 (1-2) Carinated Bowls, (3) Piriform Juglet, (4) Jug base, (5-7) Storage Jars (Drawings: I. Lidski-Resnikov)

Fig. 156:15–17). Storage jar 2039 (Fig. 7:6) was treated with a delicate combing. Similar surface treatment was found on jars from the Holyland Compound (Greenhut, personal communication). Also notable is storage jar 2040 (Fig. 7: 7) which

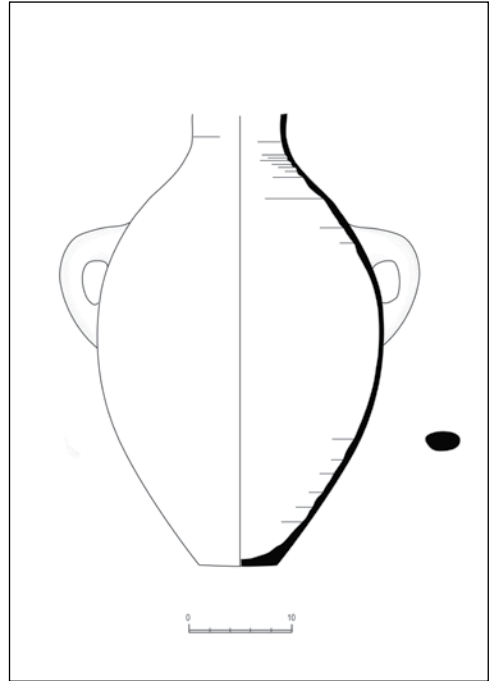
seems to have been intentionally cut in half along its lateral section.

Some of the features, such as horizontal burnish and delicate combing, together with the jars' shape and size, and the stepped

rim juglet, are features of the late Middle Bronze I or the transitional Middle Bronze I-II phase; they are rarely found beyond the early Middle Bronze II (Beck 2000: 214–215; Bonfil forthcoming; Epstein 1974; Ilan 1991; Ilan and Marcus forthcoming). There is nothing in the present assemblage typical of the Middle Bronze II and III periods—flaring rim carinated bowls, large jars with profiled rims and trumpet bases (Bonfil forthcoming). Some or all of these features were found, for example, in the Dominus Flevit burial cave (Saller 1964), Nahal Refa'im; Cave 900 (Gershuny 2017), and some of the tombs in the Holyland Compound (Milevski, Greenhut and Agha 2010). Thus, the assemblage from Manahat Tombs 7 and 29 (as well as some of the vessels found in Zehavi's past excavation)<sup>5</sup> seems to predate these burial sites. It appears that the Manahat Middle Bronze Age ceramic assemblage is one of the earliest within this period in Nahal Refa'im.

### The Implications of the Ceramic Assemblage

We assume that the interment of one deceased together with a small ceramic assemblage was a single event, and that afterwards the tomb was sealed. This is contrary to burial sites such as Cave 900, which contained multiple, successive burials and the deposition of larger numbers of grave goods (Weksler-Bdolah 2017; Gershuny 2017). Thus, the small assemblage that was recovered from Tomb 7 (Fig. 7) presumably represents the complete ceramic burial kit of one interment. This kit is comprised of two bowls, a juglet and three jars. In addition, the base of a jug was found in the tombs' shaft (Fig. 7:4). The idea of a



8 Storage jar (B2113) from Tomb 29  
(Drawings: I. Lidski-Resnikov)



9 Large carinated bowl (B2041) from Tomb 7  
(Photo: C. Amit)

burial kit was first defined by Binford (1972: 208-243, 412-416), followed by Shay (1983), and more recently by Baker for the Middle and Late Bronze Age burials at Ashqelon (2006; 2012). According to these scholars, the kit is comprised of common offerings deposited with each interment as an integral part of the burial process. This standardization and uniformity suggest ceremonial behavior which allows a glimpse into an invisible set of beliefs and rituals concerning life and death (Baker 2012: 14-15, and see below).

These vessel types are assumed to be redundant and as such can be categorized as essential for the mortuary process. It is possible that some of the vessels were used first in funerary rituals and then placed in the burial caves, symbolizing participation of the dead, making the vessels, too, essential. But it should be emphasized that the above discussion pertains to the pottery kit alone; this was only part of the complete burial kit, which will be discussed further in the concluding section.

### **The Human Skeletal Remains**

Fragmentary human skeletal remains were found at the Manahat spur. The bones were in a very poor state of preservation. In only one cave (Tomb 7) were the bones inspected *in situ* by an anthropologist, while the rest of the bones were examined only after excavation. Therefore, complete reconstruction of the anthropological parameters was impossible.

**Tomb 7.** The remains included fragments of a skull vault, an upper jaw, and postcranial bones (Fig. 6). The bones were found articulated, indicating primary burial. The deceased was

placed on its back, in a north-south orientation, with the head towards the north. Age at death, based upon tooth attrition rate, was estimated at 50< years (Hillson 1986).

**Tomb 29.** The remains included fragments of a skull vault, a lower jaw, and long bone diaphyses. Age at death, based upon tooth attrition rate, was estimated as 18-30 years (Hillson 1986).

**Tomb 30.** The remains included fragments of a skull vault, a lower jaw, and a long bone diaphysis (lower limb). Age at death, based upon tooth attrition rate, was estimated as 20-35 years (Hillson 1986).

**Tomb 34.** Only a few long bone diaphyseal fragments were found. Although the age at death and sex could not be estimated, it was possible to determine that the bones do not represent an infant or a small child.

**Tomb 35.** Only the diaphysis of a tibia was found. Although the age at death and sex could not be estimated, it was possible to determine that it does not represent an infant or small child.

**Tomb 36.** The remains included fragments of a skull vault, a tooth, and long bone diaphyses. Age at death, based upon tooth attrition rate, was estimated as 30< years (Hillson 1986).

To summarize, the remains of seven individuals were found at the Manahat spur burial site.

Although the bones were extremely fragmentary, the age at death was estimated for four of them as being adults of a wide age range (18-30, 20-35, 30<, 50<), while for the remaining three a minimum age of 10 years can be estimated based upon bone proportions. In other large burial sites in the vicinity of the Manahat spur, where Intermediate Bronze burial caves were

re-used during the Middle Bronze Age, more than one individual was expected per grave (Nagar 2017; Nagar, forthcoming). The extremely small minimum number of individuals (MNI) in the present excavation may indicate that each tomb represents a single burial, or it may reflect the very poor state of preservation and the fact that the fragments were scattered.

**The Faunal Assemblage from Tomb 7**

The faunal assemblage from Tomb 7 includes bones of medium size mammals found scattered throughout the burial chamber, and microfauna found in the intentionally cut storage jar (Fig. 7: 6). The only non-caprine bone from the tomb is an upper shell (carapace) of a tortoise (*Testudo*). The assemblage of medium size mammals comprises only 11 identifiable bones. We have sorted them by taxa, skeletal part

(radius or astragalus, etc.), part of bone (distal/shaft/proximal), and side (left/right). The bones were quantified using the number of individual specimens (NISP) and the MNI represented in the assemblage.

The preservation of bone was very poor. The sediment retrieved from the cave contained some pulverized bone, so it is possible that post-depositional processes influenced the composition and size of the preserved assemblage. The poor state of preservation made it impossible to take measurements and analyze the assemblage morphometrically. A single measurement was taken on a complete radius (according to von den Driesch 1976). Morphological indicators were used to identify remains as belonging to either sheep or goat (Zeder and Lapham 2010). Age was estimated based on epiphyseal fusion (Silver 1969).

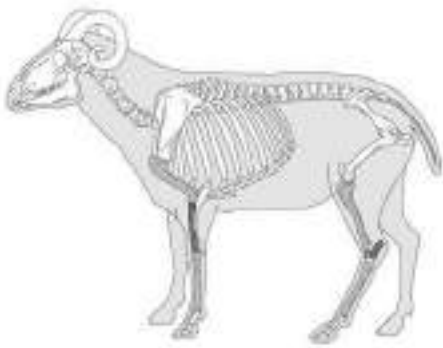
Table 1 Identified bones from Tomb 7

| Locus | Basket | Animal     | Bone       | Part     | Side  |
|-------|--------|------------|------------|----------|-------|
| 235   | 2052   | Sheep/goat | Humerus    | Distal   | Left  |
| 235   | 2052   | Sheep      | Radius     | Complete | Right |
| 236   | 2042   | Sheep/goat | Radius     | Proximal | Left  |
| 235   | 2052   | Sheep      | Tibia      | Distal   | Right |
| 235   | 2052   | Sheep/goat | Metatarsus | Proximal | Right |
| 235   | 2052   | Sheep/goat | Metacarpus | Proximal | Right |
| 236   | 2042   | Sheep      | Calcaneus  | Complete | Right |
| 235   | 2048/1 | Sheep      | Calcaneus  | Complete | Left  |
| 236   | 2042   | Sheep      | Astragalus | Complete | Right |
| 235   | 2047/2 | Sheep/goat | Teeth      |          |       |
| 235   | 2047/1 | Tortoise   | Shell      |          |       |

**Table 2** Identifiable specimens and body parts

| Skeletal element   | Side  |      | Axial/<br>Unknown<br>side | Distal/proximal ends |        | Other<br>fragments | Taxon               |
|--------------------|-------|------|---------------------------|----------------------|--------|--------------------|---------------------|
|                    | Right | Left |                           | Present              | Absent |                    |                     |
| Ilium              | 9     | 5    |                           |                      |        |                    | <i>Bufo viridis</i> |
| Urostyle           |       |      | 7                         |                      |        |                    | <i>Bufo viridis</i> |
| Presacral vertebra |       |      | 11                        |                      |        | 3                  | <i>Bufo viridis</i> |
| Atlas              |       |      | 1                         |                      |        |                    | <i>Bufo viridis</i> |
| Radio-ulna         |       |      | 5                         |                      |        | 8                  |                     |
| Tibio-fibula       |       |      | 13                        | 6                    |        |                    |                     |
| Humerus            |       |      | 11                        | 1                    | 8      | 2                  |                     |
| Femur              |       |      | 11                        |                      | 2      |                    |                     |
| Phallanges         |       |      | 32                        |                      |        |                    |                     |
| Unident. shafts    |       |      |                           | 42                   |        |                    |                     |

Table 1 summarizes the analysis of the medium-size mammal remains found scattered throughout the burial chamber of Tomb 7. The identified bones are listed with their locus and basket numbers, along with the above-mentioned indicators. The majority of these bones are caprine. Of these, five were identified



10 Parts of the sheep skeleton identified in Tomb 7. (Sheep drawings ArchéoZoo.org, modified by Z. Turgeman-Yaffe)

as sheep (*Ovis aries*), and it is possible that they represent a single individual that was placed in a complete state. The body parts present are illustrated in Fig. 10, demonstrating that most of the bones are from the limbs; axial and head parts are absent or rare. A single tooth fragment represents the cranial bones. It is apparent that the assemblage contains bones from both sides of the body without preference for either the left or right side.

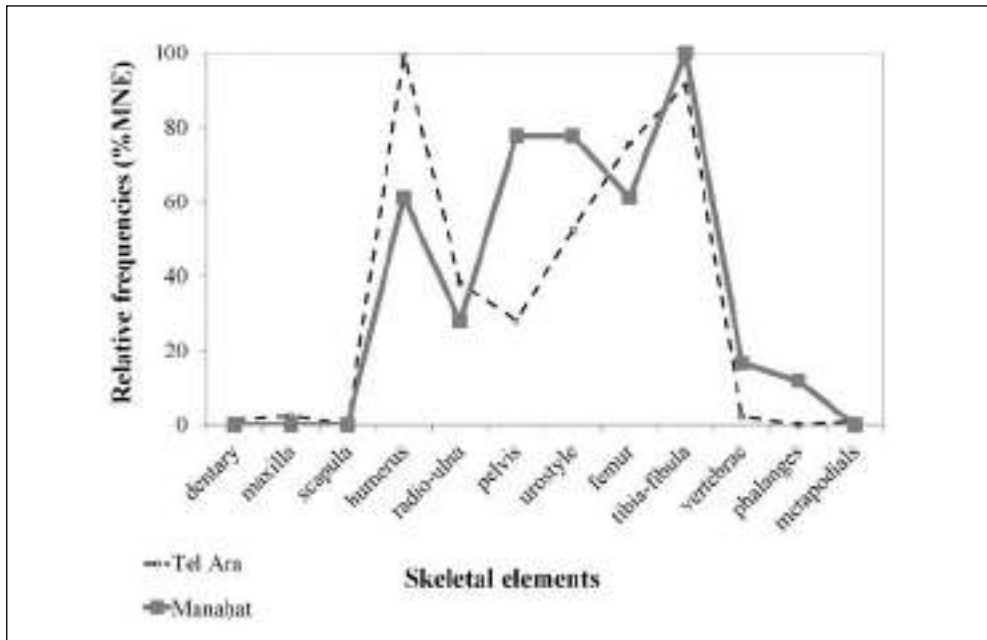
Patterns of epiphyseal fusion (of the distal radius and distal tibia) reveal that the interred sheep was an adult, at least three years old. No cut marks or evidence of burning were found on the bones. However, this absence could be related to the poor preservation of bone surfaces.

Funerary offerings of single sheep are a well-documented phenomenon of the Middle Bronze II period. For example, the faunal assemblage

from the recently published Tomb 900 at Nahal Refa'im was found to contain caprines exclusively (Kolska Horwitz 2017). Bones of individual caprines accompanied burials in tombs west of Tel Qasile as well (Sade 2006). In Efrata, the faunal assemblage from the relatively well-dated Cave 7/8 was comprised almost exclusively of sheep bones, including all parts of the skeleton, with donkey remains present in very small numbers (Horwitz 2001). Further to the north, two Middle Bronze Age burials from Tel Kabri were found accompanied by the remains of one or two young caprines (Horwitz 2002); in Hazor, a burial cave (T1181) contained the remains of only the meaty limbs and trunk of young sheep (Horwitz 1997). In a burial cave dated to the same period in Nahal Ha'ela, a complete lamb was placed near the feet of the



11 Cluster of microfaunal remains found in half of storage jar B2039. (Photo: Z. Turgeman-Yaffe)



12 Comparison of body part representation between the assemblage of Tomb 7, and the assemblage from Wadi 'Ara

deceased (Turgeman-Yaffe, forthcoming), and in Tel Dothan, sheep bones were found in vessels placed next to the human remains (Lev-Tov and Maher 2001).

*Microfauna.* A cluster of microfaunal remains (Fig. 11) was discovered in a storage jar that was intentionally cut in half (Fig. 7:7) in Tomb 7. These remains were analyzed in the laboratory of the National Natural History Collections of the Hebrew University in Jerusalem. The assemblage consisted of 177 specimens, all belonging to amphibians. Within this assemblage, 42 specimens were identifiable only as fragments of long bones, but 135 specimens were complete enough to be identified and attributed to a particular body part. The identifiable specimens represent a variety of body parts (Table 2), including long bones (humerus, femur, radio-ulna, tibio-fibula), spinal column (vertebrae, urostyle), pelvis (ilium), and phalanges. A taxonomic identification was made on the 36 vertebra and pelvis bones. All of these bones belong to the green toad (*Bufo viridis*). The MNI estimate is based on pelvis bones, of which the side of body (left or right) could be identified, showing that the assemblage includes at least nine individuals. The green toad is presently common in most regions of Israel, including the Jerusalem hills (Yom-Tov and Mendelssohn 1988).

Skull bones of the green toad (dentary, maxilla) are distinctly absent. Fig. 12 shows the body part representation in the assemblage from Tomb 7 compared to an assemblage of toad remains found in complete vessels in a rock-cut tomb from the Late Bronze Age at Wadi `Ara in northern Israel (Weissbrod and Bar-Oz 2004,

2014; Delfino *et al.* 2007). The assemblage from Wadi `Ara comprised predominantly green toads (NISP=578), with a small number of eastern spadefoot toads (*Pelobates syriacus*; NISP=3). Skull fragments of both species were extremely rare in the Wadi `Ara assemblage and constituted only 1% of the identified specimens (NISP=6). Furthermore, the Wadi `Ara assemblage showed low quantities of vertebra and phalanges (Fig. 12). The resemblance in body-part representation between the two assemblages is statistically significant according to a  $\chi^2$  test, where the test includes only body parts that are represented in both assemblages ( $\chi^2 = 50.004$ ; Monte Carlo  $P = .0001$ ; Cramer's  $V = .249$ ).

The preservation of the toad assemblage from Tomb 7 is relatively poor, as can be inferred from the variable frequencies of different body parts (Table 2), the absence of complete specimens, and the large number of unidentified bone fragments. Since the tomb was discovered sealed, it is plausible that the state of preservation is a result of the conditions inside the tomb (e.g., moisture and microorganism activity), as noted in the medium-sized mammals as well (see above). The more abundant body parts, such as the limbs and pelvic bones (humerus, femur, radio-ulna, tibio-fibula and pelvis) are also the ones that are relatively more robust. In contrast, skull fragments are less durable and tend to appear in particularly low frequencies in assemblages from archaeological (Llona and Andrews 1999; Rabinovich and Biton 2011) and paleontological (Sampson 2003) settings. The toad remains did not exhibit any sign of human treatment; such as burn marks.

In order to assess the association between the toad bones and the vessel in which they were found, two test samples of sediment from the floor of the tomb were collected. Both samples were 30 liters in volume and contained no toad or other small animal remains. This suggests that the cluster of toad remains is associated with the vessel that contained them.

The presence of toad remains inside vessels from funerary contexts in the Middle East has been reported in a number of instances, and is known from different phases of the Bronze Age (e.g. Weissbrod and Bar-Oz 2004; Schwartz *et al.* 2006). It is possible that a vessel containing toads was placed alongside the sheep limbs (or complete animal) as part of the ceremonial placing of food offerings in the grave. In this scenario, the skulls of toads were removed in advance and are therefore absent from the assemblage (Weissbrod and Bar-Oz 2004). That being said, and despite the clear association between the toads and the vessel, one cannot entirely reject the possibility that the toads burrowed their way into the coolness of the tomb and made their way to the inside of the storage jar.<sup>6</sup>

### **Palynology<sup>7</sup>**

Nine samples were taken for palynological investigation (Table 3). Four samples were collected by scraping the bottoms of several vessels from Tombs 7 and 29 (samples 1-4): a large carinated bowl, the storage jar that was cut lengthwise, and a small globular bowl— all from Tomb 7— and a single sample from a storage jar found in Tomb 29. Other samples were collected from various locations to serve

as control samples, mainly from the sediments which filled the vessels (samples 5-7), and sediments from the cave itself (samples 8-9). Pollen extraction followed a regular chemical preparation procedure (Faegri and Iversen 1989). Pollen grains were identified under a light microscope, with magnifications of 200X, 400X and 1,000X. In each sample, all the extracted pollen grains were counted and identified. For pollen identification, the comparative reference collection of Israeli flora pollen of Tel Aviv University's Steinhardt Museum of Natural History was used, in addition to pollen atlases (e.g., Beug 2004; Reille 1995; 1998; 1999).

The palynological corpus of the three control samples collected from the sediments which filled the vessels included only Mediterranean elements typical to the Judean Mountains. The pollen spectra of the four samples scraped from the bottom of the vessels also included pollen grains of date palm (*Phoenix dactylifera*). In addition, the large carinated bowl from Tomb 7 (Fig. 7:2) included a single pollen grain of myrtle (*Myrtus*), which is native only to northern Israel. Pine (*Pinus*), *Phillyrea* and olive (*Olea europaea*) are wind-pollinated Mediterranean trees, native to the Mediterranean forest/maquis and are currently found in the Judean Mountains. Based on the palynological evidence, these Mediterranean arboreal taxa were also prevalent in the region during the Middle Bronze Age (Neumann *et al.* 2007; Litt *et al.* 2012; Langgut *et al.*, 2014; 2015). By that time, the olive was already domesticated (Langgut, Adams and Finkelstein 2016 and references therein), and the pollen

grains may therefore originate in nearby olive orchards.<sup>8</sup> It is curious that other species that are native and common in the Mediterranean forest/maquis, such as oaks and terebinths, are absent. The non-arboreal pollen group is composed of small shrubs and herbs common to open field vegetation, e.g., grasses (Poaceae), goosefoot (Chenopodiaceae), and sagebrush (*Artemisia*).

No doubt, the most interesting observation of this palynological study is the occurrence of pollen grains of date palms in vessels from Tombs 7 and 29. The native date palm grows in habitats characterized by high temperatures, rainless summers, and very low humidity, which is important for the fruit setting and ripening. Date horticulture in Israel is located in desert areas. Its occurrence in relatively high quantities within the vessels may indicate cultivation of date palms nearby.<sup>9</sup> Since the tree does not bear fruit in the Mediterranean climate of the Judean Mountains, other purposes for its cultivation should be considered. In Egyptian wall paintings dated to ca. 1500 BCE, date palms are depicted in funerary gardens (el-Aref 2017; Wilkinson 1994). In antiquity, date palms symbolized fertility and perhaps the regeneration of life (Ayalon 1987). Since myrtle is an insect-pollinated plant, it is characterized by low pollen dispersal efficiency. Therefore, it is suggested here that myrtle grew nearby.

### Discussion and Conclusions

Most of the chambers of the Manahat spur cemetery are small; their narrow openings imply that only one individual could access a tomb at a time, to place the deceased and the

vessels inside. Certainly, no communal rites were expedited inside the tomb chamber. Some of the tombs contain a stone pavement, such as that in Tomb 29. The chambers were sealed by large blocking stones. When the tombs had served their purpose, the shaft was filled with earth and a layer of large stones, which sometimes solidified into a cement-like layer that required breaching with a jack-hammer. Of the 2014 excavations, Tomb 7 is the only fully excavated sealed tomb at the site with vessels *in situ* and human bones in articulation. The composition and distribution of the remains indicate that the tomb was used for a single burial with vessels placed with locational intent. It seems unlikely that the tomb was plundered, as the blocking stone was *in situ* and the vessels inside, certainly the small bowl situated near the entrance (Fig. 6), would have been pushed aside or broken by any intruder.

The ceramic vessel types recovered from Manahat (Figs. 7-9) are similar to those recovered from other Middle Bronze Age burial assemblages in the central hill region, such as Beit Safafa (Wiegmann and Ben-Ari, in preparation), the Holyland Compound (Milevski, Greenhut and Agha 2010), and Efrata (Gonen 2001: 35-89).

When compared to other tombs of the Refa'im Valley (e.g. Weksler-Bdolah 2017; Gershuny 2017), the tombs reported here are conspicuously modest in their burial goods; there are no metals, no jewelry, and no scarabs. Since the tomb was found sealed and undisturbed by human agents this simplicity should be understood as intentional and meaningful.

**Table 3** Palynological investigation from Tombs 7 and 29

| Lab ID                     | pollen # 1           |        | pollen # 2          |        | pollen # 3                 |        | pollen # 4  |       | pollen # 5                                  |        | pollen # 6                                  |        | pollen # 7                                  |       | pollen # 8                              |       | pollen # 9                              |       |
|----------------------------|----------------------|--------|---------------------|--------|----------------------------|--------|-------------|-------|---|--------|---|--------|---|-------|---|-------|---|-------|
| Field ID                   | L.235                | B.2041 | L.236               | B.2052 | L.235                      | B.2040 | L.256       | B2113 | L.235                                       | B.2039 | L.235                                       | B.2041 | L. 235                                      | L.235 | B.2046                                  |       |   |       |
| Tomb                       | T7                   |        | T7                  |        | T7                         |        | T29         |       | T7  |        | T7  |        | T7  |       | T7                                      |       | T7                                      |       |
| Description                | large carinated bowl |        | small globular bowl |        | storage jar cut lengthwise |        | storage jar |       | sediment inside the vessel - control sample |        | sediment inside the vessel - control sample |        | sediment inside the vessel - control sample |       | sediment from the tomb - control sample |       | sediment from the tomb - control sample |       |
| <b>Arboreal pollen</b>     |                      |        |                     |        |                            |        |             |       |   |        |   |        |   |       |   |       |   |       |
| <i>Pinus</i>               | 25                   | 37.3   |                     | 0.0    | 10                         | 18.2   |             | 0.0   | 4   | 80.0   | 5   | 35.7   | 2   | 40.0  | 33                                      | 68.8  | 2                                       | 20.0  |
| <i>Olea europaea</i>       | 2                    | 3.0    |                     | 0.0    | 2                          | 3.6    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   | 4                                       | 8.3   | 1                                       | 10.0  |
| <i>Phillyrea</i>           |                      | 0.0    | 1                   | 2.4    | 1                          | 1.8    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   |   | 0.0   |   | 0.0   |
| Cupressaceae               |                      | 0.0    |                     | 0.0    |                            | 0.0    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   | 1                                       | 2.1   | 1                                       | 10.0  |
| <i>Phoenix dactylifera</i> | 23                   | 34.3   | 27                  | 64.3   | 2                          | 3.6    | 6           | 75.0  |   | 0.0    |   | 0.0    |   | 0.0   | 1                                       | 2.1   | 5                                       | 50.0  |
| <i>Myrtus</i>              | 1                    | 1.5    |                     | 0.0    | 1                          | 1.8    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   |   | 0.0   |   | 0.0   |
| <i>Ricinus</i>             |                      | 0.0    |                     | 0.0    |                            | 0.0    |             | 0.0   | 1   | 20.0   | 1   | 7.1    |   | 0.0   |   | 0.0   |   | 0.0   |
| <b>Non-arboreal pollen</b> |                      |        |                     |        |                            |        |             |       |   |        |   |        |   |       |   |       |   |       |
| <i>Artemisia</i>           | 2                    | 3.0    | 2                   | 4.8    |                            | 0.0    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   | 1                                       | 2.1   |   | 0.0   |
| Poaceae                    | 5                    | 7.5    | 3                   | 7.1    | 13                         | 23.6   | 2           | 25.0  |   | 0.0    |   | 0.0    | 3   | 60.0  |   | 0.0   |   | 0.0   |
| Cereal type                |                      | 0.0    |                     | 0.0    | 4                          | 7.3    |             | 0.0   |   | 0.0    | 1   | 7.1    |   | 0.0   |   | 0.0   |   | 0.0   |
| Asteraceae<br>Asteroideae  | 2                    | 3.0    | 2                   | 4.8    | 5                          | 9.1    |             | 0.0   |   | 0.0    | 1   | 7.1    |   | 0.0   | 6                                       | 12.5  | 1                                       | 10.0  |
| Chenopodiaceae             | 3                    | 4.5    | 2                   | 4.8    | 6                          | 10.9   |             | 0.0   |   | 0.0    | 5   | 35.7   |   | 0.0   |   | 0.0   |   | 0.0   |
| <i>Mercurialis</i>         |                      | 0.0    | 2                   | 4.8    |                            | 0.0    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   |   | 0.0   |   | 0.0   |
| Urticaceae                 |                      | 0.0    | 1                   | 2.4    | 1                          | 1.8    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   |   | 0.0   |   | 0.0   |
| Plantaginaceae             |                      | 0.0    | 2                   | 4.8    |                            | 0.0    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   | 1                                       | 2.1   |   | 0.0   |
| <i>Ephedra</i>             | 1                    | 1.5    |                     | 0.0    | 1                          | 1.8    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   |   | 0.0   |   | 0.0   |
| Brassicaceae               |                      | 0.0    |                     | 0.0    | 1                          | 1.8    |             | 0.0   |   | 0.0    | 1   | 7.1    |   | 0.0   |   | 0.0   |   | 0.0   |
| Fabaceae                   |                      | 0.0    |                     | 0.0    |                            | 0.0    |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   | 1                                       | 2.1   |   | 0.0   |
| Polygonaceae               | 3                    | 4.5    |                     | 0.0    | 8                          | 14.5   |             | 0.0   |   | 0.0    |   | 0.0    |   | 0.0   |   | 0.0   |   | 0.0   |
| Sum                        | 67                   | 100.0  | 42                  | 100.0  | 55                         | 100.0  | 8           | 100.0 | 5   | 100.0  | 14  | 100.0  | 5   | 100.0 | 48                                      | 100.0 | 10                                      | 100.0 |
| Unidentified               | 20                   |        | 9                   |        | 24                         |        | 8           |       | 5   |        | 5   |        | 3   |       | 4                                       |       | 4                                       |       |
| Spores                     | 148                  |        | 160                 |        | 311                        |        | 298         |       | 1   |        | 24  |        | 3   |       | 25                                      |       | 7                                       |       |

The microfaunal assemblage consisting of toad remains, found in the deliberately-cut storage jar, was probably placed intentionally in the vessel. As no microfauna was found in any other vessel or in the carefully sifted accumulation within the burial chamber it seems improbable to assume that several toads burrowed into the burial chamber, targeted this particular jar and no other, and proceeded to perish in it. It would therefore seem that the toads are part of the 'burial kit' placed in the tomb alongside the interred. In general, mortuary goods will fall into three different categories: personal, status, and essential. Personal objects represent the deceased individual's persona, such as the possessions required or used by the interred. Objects of status represent the deceased's social rank, profession, or both, and include items indicative of wealth and rank. The essential artifacts include vessels perceived as necessary for the well-being of the deceased's spirit in the afterlife (Baker 2012: 42, 47). At face value, the modest burial kit of Tomb 7 might imply a low status for the deceased. But perhaps it is not so straightforward.

Further research is required comparing, diachronically, the inventories and contexts of the many tombs of the Manahat cemetery. Only in this way might we learn whether tomb contents reflect an intentional variability that differentiates between social statuses, changes in normative mortuary behavior over time, or the vicissitudes of individual agency. Here is a doctoral dissertation waiting to be written.

The Manahat spur cemetery is part of the Intermediate and Middle Bronze Age II settlement

array that existed along the Refa'im Valley, known from surveys and excavations conducted between Batir and Beit Safafa. These excavations have revealed domestic structures and evidence of agricultural production (at Manahat and at Nahal Refai'm), cult places (at Nahal Refai'm and Walaja), as well as a series of shaft tomb cemeteries: at the Holyland Park compound and its vicinity, at Giv'at Masu'a, and at Gilo. While the settlements and some tombs (near 'En Ya'el, at Nahal Refai'm, and at Beit Safafa) are located at the base of the hills and on alluvial fans near the valley, the cemeteries are generally located much higher up, on the spurs.

The Intermediate and Middle Bronze Age habitation of the Refa'im Valley shows continuity in both settlement location (Eisenberg 1993) and cemetery location. This is a common phenomenon throughout the central highlands, and it raises the question of whether it is a reflection of kin-group continuity from the Intermediate and Middle Bronze Age. One indication of continuity is that there is almost no early Middle Bronze Age material culture in the highlands—that coeval with Aphek pottery phases 1 and 2 (Beck 2000; Cohen 2002). This might suggest that the material culture of the late Intermediate Bronze Age in the highlands is contemporaneous with the early Middle Bronze I material culture of the lowlands (see Ilan 1995a: Fig. 3).

Single burial was normative, though not exclusive, in both the Intermediate Bronze Age and the Middle Bronze Age I, especially in the central highlands of the Southern Levant (Greenhut 1995: 18-20; Gonen 2001; Cohen 2009: 6-8). Since the Manahat cemetery is located in a broad area of small

corporate group settlements, space was not at a premium, at least at first. Individual identity was recognized within the framework of the familial burial ground. This would make sense especially if the tomb was understood as a womb from which rebirth was facilitated (see below). The multiple successive burials of the Middle Bronze Age II-III and Late Bronze Age were not yet a feature of the highlands. Several features in the modest burial assemblage of Tomb 7 suggest that concepts of liminality and regeneration were operative in mortuary rituals and beliefs: the burial “kit” of redundant “essential” artifacts, the date palm pollen, and, likely, the myriad toads inside one of the jars. In Egypt of the second millennium BCE the frog was considered a symbol, or even agent, of regeneration (Brandl 2002: 186-189 and further literature there). A Spanish archaeological mission has recently unearthed a unique funerary garden amongst the early 18th Dynasty rock-cut tombs of Djehuty and Hery (ca 1500-1450 BCE) in the Draa Abul Nagaa necropolis in Egypt (el-Aref 2017). A bowl containing dates and other fruits was among the garden finds. The idea of regeneration in burial contexts is, of course, widely accepted (see for example Bloch and Parry 2001; Metcalf and Huntington 1991; Ilan 1995b: 135-136). Had the burials been intact, one might have expected the skeletons to have been interred in a flexed (fetal) position, with the heads facing the tomb opening—the tomb simulating the womb (cf. Ilan 1995b: 135). As indicated above, the two modest tombs reported here are but a small sample of a much larger mortuary landscape in the Refa'im Valley. Two structures excavated in the valley—one

at Nahal Refa'im (no. 7 on Fig. 1) and one at Walaja (no. 11 on Fig. 1)—have been interpreted as temples (Eisenberg 1993: 91-92; Ein Mor 2011), based on architectural data (the megaron form at Nahal Refa'im) and the presence of ritual objects such as miniature and specialized vessels. Might these have a mortuary function? Might date palms and myrtle have been cultivated in the temple precincts? Or perhaps the palynological evidence points to a funerary garden comprised of date palms, olives, myrtles and pines located in the midst of the cemetery itself. Such plants and such a garden would have been imbued with recognized (regenerative?) meanings that would have been played out in Middle Bronze Age funerary rituals. The name of the Refa'im Valley is probably an ancient one meaning the Valley of the Manes of the Dead. This is the name used by the biblical writer(s) who probably knew of the ancient ancestral burial grounds (2 Samuel 5: 22). Our understanding of the valley and its dead will expand with future research. The Refa'im Valley will have much to say about Bronze Age society and mortuary beliefs in the Levant as a whole. But perhaps the most important conclusion to be derived from this paper is that maximum retrieval of “ecofacts”, and the scientific analysis of those ecofacts, provide a wealth of information far beyond the standard visible material culture repertoire of burial contexts. This will make tomb excavation and publication slower and more expensive but often much more rewarding. The question is will we archaeologists working in both academic and rescue projects take up the challenge?

## Endnotes

- 1 The salvage excavation (IAA Permit No. A-7170) was conducted on behalf of the Israel Antiquities Authority and directed by S. Kisilevitz with the assistance of Z. Turgeman-Yaffe, N. Shahami and K. Arviv (area supervisors), S. Mizrahi, L. Oz, R. Furestani, Y. Kafil and M. Haber (supervision), N. Nehama and R. Abu Halaf (administration), D. Tanami (metal detection), M. Kahan, A. Hajian and M. Kunin (surveying and drafting), A. Peretz (field photography), G. Aerial Imaging (aerial photography), D. Levi (GIS), B. Turi and A. Keinan (safety supervision), Y. Avni (geology), Y. Nagar (physical anthropology), D. Ben-Ami, I. Zilberbod, Z. Greenhut, A. de Groot and A. Frumkin (consulting). Excavation of the tombs was assisted by A. Wiegmann, D. Tan'ami, S. Mizrahi and R. Cohen. Contributors to the publication include Z. Turgeman-Yaffe and N. Marom (faunal remains), L. Weisbrod (microfauna), N. Ben-Ari (Bronze Age ceramics), A. Amir (residue analysis), D. Langgut (palynology) and D. Ilan (burial rituals). Technical assistance was provided by R. Cohen-Amin (processing of finds), J. Bukengolts (pottery restoration), C. Amit (studio photography), I. Lidski-Resnikov (drawing of finds) and N. Zak (drafting). We would like to thank D. Namdar for retrieving RA samples and for suggesting pollen analysis at the outset.
- 2 We thank Y. Avni of the Geological Survey of Israel for his analysis of the geological formations and their implications for settlement.
- 3 Residue analysis and petrography have yet to be conducted on these vessels. We expect these studies to further enhance our understanding of mortuary behavior in this region.
- 4 The chronological terminology adopted here is the tripartite Middle Bronze I, II and III division instead of the older sub-division of Middle Bronze IIA, B and C (cf. Ilan 1995a: 97) and is based on the chronology used by Bietak (2002).
- 5 These vessels will be published in the final report, which is in preparation.
- 6 The green toad is known as a species that burrows into the ground seeking to preserve its body moisture and to find a suitable place for hibernation during the dry season (aestivation; Hoffman and Katz 1989); in the process it can reach a considerable depth.
- 7 D. Langgut acknowledges the support of Israel Science Foundation grant no. 2141/15.
- 8 Palynologically, wild and domesticated olive pollen grains are indistinguishable (Langgut, Lev-Yadun and Finkelstein 2014: n. 1; Lipshitz *et al.* 1991: fig. 2).
- 9 The two control samples analyzed from sediments within the cave also included pollen grains of date palms, but in lower frequencies (samples 8 and 9, Table 3). It is possible that the contents of the vessels spilled out into the cave. The control samples from the cave sediments included significantly fewer pollen grains than the samples from the vessels.

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