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Water in Antiquity

In Memory of
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Dr. David Amit

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Front cover: The six shafts tunnel at Sepphoris (photo: Alon Levite)

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The Ancient Garden at Ramat Raḥel and its Water Installations

Boaz Gross, Yuval Gadot and Oded Lipschits

Preface

The ancient site of Ramat Raḥel is located on the main road connecting Jerusalem and Bethlehem, midway between the two cities (fig. 1). The site is perched on a high peak (818 meters above sea level) and dominates its surroundings to the north, west and south. During Yohanan Aharoni's extensive excavations at the site (1954, 1956, 1959-1962), a rectangular palatial structure was unearthed, which included a tower extending from its western side, as well as a central courtyard. The complex became known for its ashlar masonry and numerous well-crafted architectural elements and decoration, such as volute capitals (the so-called Proto-Aeolic capitals), window balustrades and wall crenellations (Aharoni 1962; 1964; see also Aharoni 1956; Lipschits 2009; Lipschits *et al.* 2011 and references therein). During the Renewed Excavation Project at Ramat Raḥel (2005-2010), which was conducted by Tel Aviv and Heidelberg Universities, and which was directed by Oded Lipschits, Manfred Oeming and Yuval Gadot, additional parts of the palatial complex were discovered. It also became clear that the western face of the palace and tower were surrounded by a luxurious garden complex (Lipschits *et al*. 2011: 21-22). Several elaborate installations collected water and channeled and dispersed it throughout the garden. At the same time these installations served an aesthetic and decorative purpose.

A palynological analysis based on fossilized pollen sampled from the plaster in the garden's water pool clearly indicate that local and imported plant species were cultivated in the garden (Langgut *et a.l* 2013a.). Among the species are willow (*Salix*), poplar (*Populus*), grapevine (*Vitis vinifera*), olive (*Olea europaea*), the common fig (*Ficus carica*), myrtle (*Myrtus communis*), water lily (*Nymphaea*), citron (*Citrus medica*), cedar (*Cedrus libani*), birch (*Betula spp.*) and Persian walnut (*Juglans regia*). Some of these species require large amounts of water for their cultivation.

The palace and garden of Ramat Raḥel are located in a relatively arid environment, devoid of natural springs, the nearest one located in the Rephai'm Valley, some four km west of the site. This seemingly paradoxical situation (a flourishing garden on the one hand and the absence of a permanent, reliable, water source on the other) demands explanation: How did the designers of the complex supply the garden with enough water? Was the collection and storage of annual rainwater sufficient, or were there any other means of delivering water to the site? How did the complex's water system collect and disperse water to the various parts of the garden? And above all, why was Ramat Raḥel chosen for this purpose?

It is the aim of this paper to contend with these questions. First, the concept of "conspicuous consumption" will be examined, as will its place in the decoding of political and social goals behind excessive water use in semiarid environments. This will be followed by a description of the various water installations of the garden, as well as an attempt to reconstruct how they served utilitarian and aesthetic purposes. Finally, there will be a discussion of how viewing the water facilities in the context of the conspicuous consumption of water can enhance our understating of the palatial complex in Ramat Raḥel during the Iron Age and Persian Period. It can also shed light on the site's relations with Jerusalem, which during the Iron Age was the capital of the Kingdom of Judah, and which was later a provincial theocratic center.

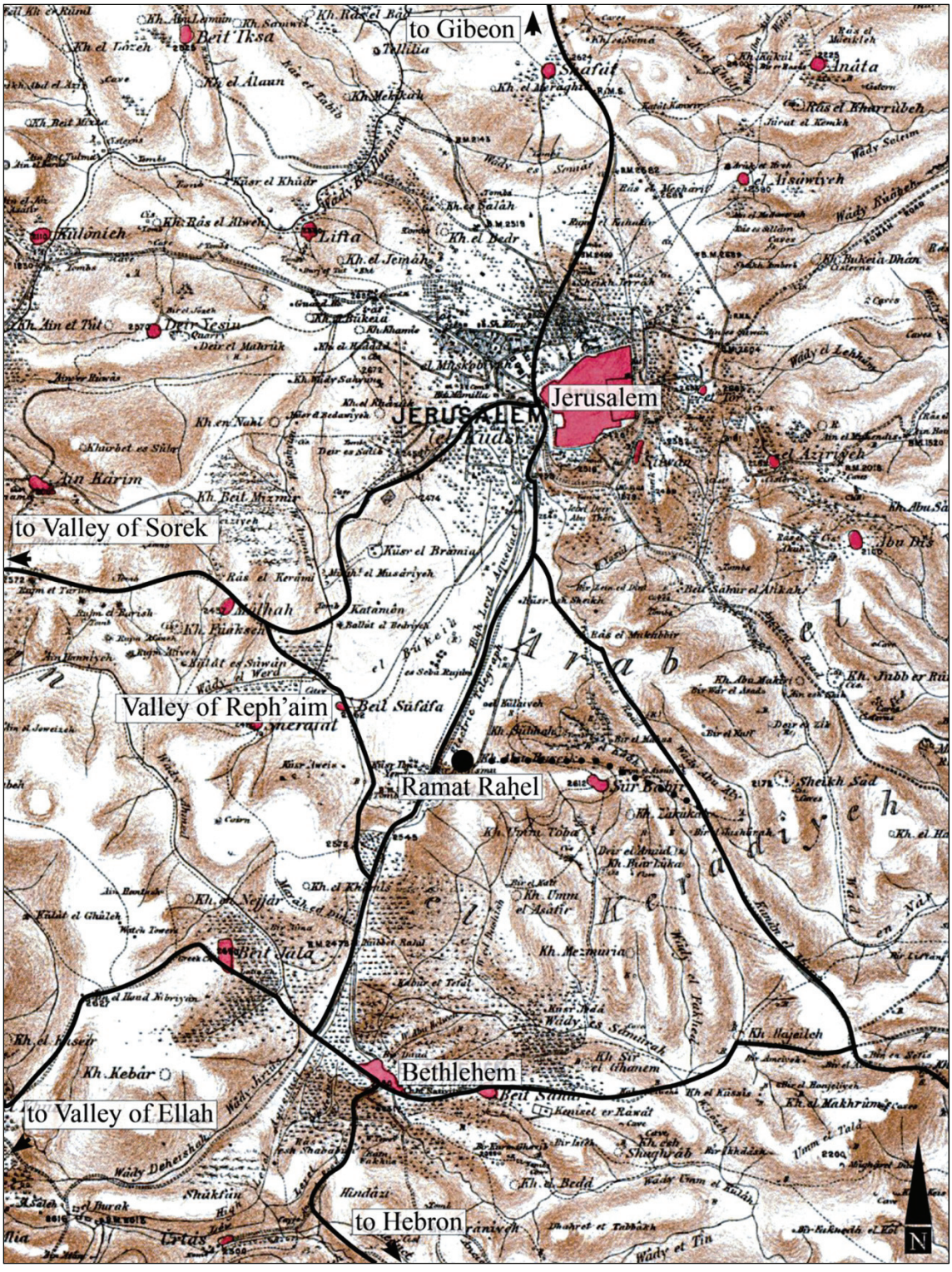

Fig. 1: Regional map (source: PEF, edited by Ido Kock).

Monumentality and Conspicuous Consumption

The "principle of least effort" is a basic principle guiding the actions of human societies and individuals. Zipf defined the energy people invest into any action as a resource, one which is regularly rationed and conserved. In egalitarian societies, events that involve the disproportional expenditure of such energy can sometimes occur, but according to Zipf, this activity is, in fact, an investment meant to conserve larger amounts of energy in the future (Zipf 1949: 1; see also Trigger 1990: 122-123).

A phenomenon that contradicts the "principle of least effort" is "conspicuous consumption," which is apparent mainly in hierarchal societies. Conspicuous consumption is the expenditure of energy, in the form of rare or precious goods, or the use of human resources in a seemingly non-utilitarian fashion or to no apparent economic gain. As human societies became increasingly stratified, the use of the lower class's energy by the upper classes for non-utilitarian proposes became the symbol of their status and the instrument used to solidify the social order (Trigger 1990: 125-126). Zipf tried to incorporate this phenomenon into the principle of least effort, claiming that by using the energy of the lower class, the upper class is actually using the least amount of effort (Zipf 1949: 518). Trigger, however, insists that conspicuous consumption contradicts the principle of least effort, and that this contradiction is the essence and effect of the phenomenon, as can be seen mainly in monumental architecture.

Monumental architecture is one of the strongest expressions of conspicuous consumption; it is the creation of structures and elements for which the physical investment, in both human energy and raw material, far exceeds the economic or material output they produce (Trigger 1990: 119-120). As such, monumental architecture is considered the boldest and longest-lasting expression of a ruler's power (Trigger 1990: 128; Kanpp 2009: 49). According to Trigger, the use of monumental architecture peaks during times of state and social formation and regime or cultic change, being used as proof of the strength and power of the new order, or as an attempt to establish such order (1990: 127).

In order to define a structure as monumental architecture, it must demonstrate evidence of large scale pre-planning, relatively advanced engineering capabilities, artistic craftsmanship and the recruitment and management of large workforces (1990: 121). Above all, monumental architecture must be visible to as many people as possible. This is especially important for the principle of conspicuous consumption, as the political and economic values of such expense can only be achieved if they are appreciated by all. These conditions are all evident in the palatial complex in Ramat Raḥel in general and its garden in particular.

The Natural Water Regime in Ramat Raḥel

Ramat Raḥel is located on the edge of the Judean Desert. Measurements that began to be recorded in 1844 indicate an average annual precipitation of about 400 mm in the region (compared to about 600 mm in the western part of the city; see Rubin 2000: 2-3). An archaeobotanical study shows that during the period between Iron Age IIb and the Hellenistic era (8^{th}-2^{nd} centuries BCE), the climate in the Land of Israel was relatively dry and similar to current conditions (Langgut *et al.* 2013b: 157 [Fig. 3], 161). We can therefore assume that the garden existed, and flourished, in a semi-arid environment.

No spring or a well that could have supplied the site have yet been identified on the hill of Ramat Raḥel. The Upper Aqueduct, which passes the foot of the hill, was constructed during the first century CE (Bilig 2012; see also Amit 2002 for an alternative dating), several centuries after the garden fell out of use. At the foot of the mound, adjacent to Hebron Road, a man-made water cistern with the Arabic name *Bir Kadismu* was still visible until recent years (Fast 1924; Maisler 1935). This same reservoir, with the same name, also ap-

pears on 19th century Palestine Exploration Fund maps. This appellation preserves the name of the Kathisma Byzantine Church, built at the foot of the tel. Several fifth- and sixth-century sources mention the church's construction and the reasons behind this choice of location; according to Christian tradition, it is the place where the pregnant Mary rested before setting out on the final leg of her journey to Bethlehem (Lipschits *et al*. 2011: 5). The church was exposed during excavations and dates to the Byzantine and Early Islamic periods (5th-9th centuries CE; Avner 2005; Bilig 2012). As far as we can tell the pool is related to the church and cannot be considered as a possible water source for the garden during the Iron Age or Persian period. It must be assumed, therefore, that throughout most of Ramat Raḥel's settlement history, the inhabitants of Ramat Raḥel relied solely on the collection of rainwater in artificial reservoirs and cisterns (Lipschits *et al* 2011: 3). A less likely possibility is that the water was brought from the Repha'im Valley, perhaps using beasts of burden – a process that would have required an immense investment of effort and resources (and see below).

The Garden at Ramat Raḥel

Three main Building Phases were discerned in the palatial complex at the site (Lipschits *et al*. 2011:9).[1]

Building Phase I includes the establishment of a tower in the western part of the site (fig. 2). To the east of the tower were, presumably, several buildings. It is difficult to determine the plan of these structures as most of them were covered, dismantled or incorporated into the palace of Building Phase II (see below). During this early construction phase, Ramat Raḥel already served as an important administrative center, as the multitude of storage-jar handles impressed with *lmlk* or private seals testify (Lipschits *et al.* 2011: 13-15). Many of the elaborate and luxurious architectural elements, such as the decorated stone capitals (Lipschits 2009), window balustrades and wall crenellations[2] could perhaps be assigned to this Building Phase, as some of them were found in secondary use in later phases. This phase is dated to the end of the 8th century or the early 7th century BCE.

Building Phase II gave the site its current appearance. During this phase, a monumental palace complex was established east of the tower (see fig. 2), which became the most prominent element in the environment for anybody viewing the palace from the west. The central courtyard of the palace was constructed on top of a layer of crushed limestone, creating a level, elevated podium on the peak of the hill and on its northeastern slopes. The origin of the crushed limestone is most likely located at the western part of the site, where large-scale hewing and rock-cutting activity took place involving the removal of the *nari* rock layer. The result of this activity is a 1.6 hectare lowered plateau surrounding the tower from north, west and south, where the soft limestone under the *nari* was smoothed and leveled. This artificial re-formation of the site elevated the rock scarp on which the tower was originally constructed, making the edifice even more dominant (Lipschits *et al.* 2011: 21) (fig. 3) This phase was dated by the Renewed Expedition to the last third of the 7th century BCE, and it is now clear that there is complete continuity of all structures belonging to this Building Phase into the Persian period (late 6th- early 5th centuries BCE).

During **Building Phase III** the Palace complex was expanded by the addition of a northwestern wing at the expense of some of the garden area (fig. 2). The 20 x 30 meter edition was built using a different construction technique than the rest of the citadel, incorporating massive ashlar block laid inside deep, wide foundation trenches, with gray mortar

[1] The Renewed Excavation Project's conclusion regarding the phasing of the site differs from that of Aharoni, who identified only two construction phases during the same time frame (Aharoni 1964: 38).

[2] Similar architectural elements can be seen decorating the pavilions (bitanu) in the gardens and parks portrayed in reliefs found in Assyrian palaces in Nineveh and Khorsabad.

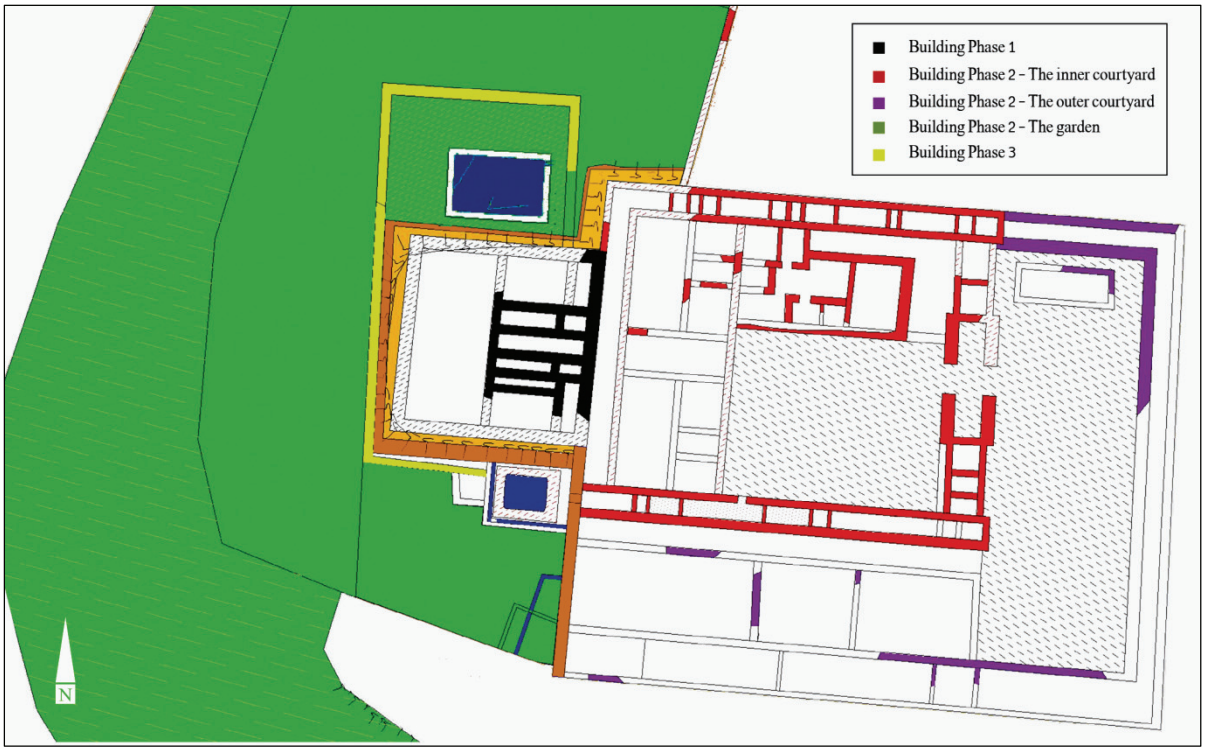

Fig. 2: General plan of the site according to Building Phases (plan by Benjamin Arubas and Shatil Emmanuilov).

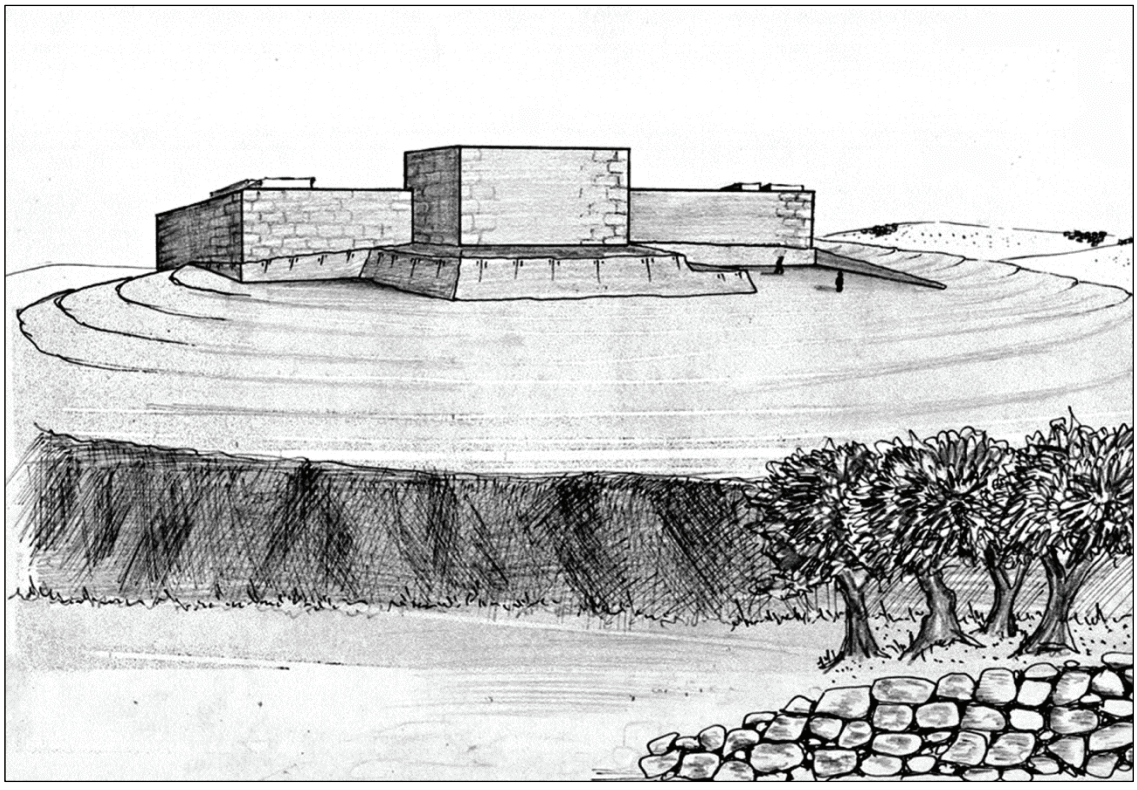

Fig. 3: Illustration of the palace from the west (drawing by Nirit Kedem).

Fig. 4: Garden soil in the southwestern area, looking south (picture by Noga Cohen-Aloro).

between and over them. Open water channels stretch along the walls of this expansion. This construction is dated to the end of the 6th or beginning of the 5th century BCE.

The creation of the garden complex therefore took place during Building Phase II and its modification took place during Building Phase III. As part of the creation of the complex, an even 40-50 cm layer of dark brown soil, devoid of stones and pottery sherds, was laid on top of the smoothed limestone bedrock (fig. 4). In the northwestern part of the garden, this soil, termed by us as "garden soil", was found at the edge of Building Phase III foundation trenches (see description below) or abutting rock cut lines. It does not reach the scarp on which the tower sits. The hewing and smoothing of the rock and the laying of the garden soil were contemporaneous, and are also the earliest human activities that took place in the western part of the site. These two conclusions are further strengthened by the fact that in all but two locations the garden soil was found resting on top of smoothed bedrock. Both exceptions can be explained through later destruction and robbing activities. Also noteworthy is the complete absence of any type of fill or accumulation and the absence of pottery and other archaeological finds between the garden soil and the rock. Moreover, architectural elements related to other Building Phases, such as tombs, structures and installations, were always found on top of the garden soil or penetrating it from above. It must be mentioned, however, that the extensive hewing activity could have obliterated any earlier remains, if they had indeed existed.

It appears that the hewing activity and the laying of garden soil were a central part of an even larger-scale engineering project at the site, as the relocation of the hewn material allowed for the elevation of the eastern parts of the site and the creation of the artificial podium on which the palace and its courtyard were

built (Kedem 2009: 73; Lipschits *et al*. 2011: 20-21). Pottery yielded from this artificial limestone fill was dated to the late Iron Age II period (Freud 2011: 83), providing the date for the creation of the garden complex.

The dark brown soil is the most pronounced marker of the border of the garden. As the soil is devoid of stones and pottery sherds, it is likely that it underwent some sieving, supporting the likelihood that it aided in agricultural endeavors and was thus worth the effort. We can also assume that the thickness of the soil (40-50 cm) is significant, perhaps being suited to the cultivation of specific species of plants (see below). The lack of pottery in the garden soil makes it difficult to date. Nevertheless, the garden soil was covered and fell out of use during the Hellenistic period. The pottery derived from the layers of fill and accumulation sealing the garden soil includes sherds dating to the late Iron Age to the Early Roman period. OSL (Optically Stimulated Luminescence) analysis, however, has shown that the garden soil was covered at 2320±80 or 2420±80 years before present – historically, the beginning of the Hellenistic period (Langgut *et al.* 2013a: 122).

Water Installations in the Garden

The garden complex incorporates various water installations, some of which can be functionally linked together, while others seem either independent or disconnected from the main system. It must be assumed that the garden underwent many changes and alterations throughout the time in which it was used, which complicates the understanding of the system as a whole.

The following is a description of the installations that we can secularly identify as belonging to a continuous system according to the direction of water flow and our understanding of how a water distribution mechanism would logically function. The description refers to Building Phase III, the last of the system's phases. The southern part of the garden (fig. 5) is dominated by a hewn, trapezoid-shaped depression, in which some of the most conspicuous water installations were found. It is our understanding that this area is the source, or beginning, of the water system and it will therefore be described first.

Pool 2: This pool is the most dominant, best preserved architectural feature in the southern part of the garden. The pool's walls were built of well-crafted ashlar blocks, 0.8-1.35 meters wide (the latter being the maximum width of the walls). The walls were covered by a thick layer of strong, homogenous plaster, 0.025 m thick in some places (fig. 6). Several layers of plaster were discerned, indicating repeated maintenance of the pool. The floor is a rare example of masonry and attention to quality and detail: A section of the floor indicates that it was built of large, flat, ashlar blocks fitted together. On top of the stone base, a thick layer (0.2 meters) of hard plaster was cast. The corners, where the floor touches the walls, were smoothed and rounded for a perfect finish. The high craftsmanship displayed in the construction of Pool 2 enabled the excellent preservation state in which it was found.

The pool is 1.1 meters deep, and could hold up to 35 cubic meters of water. Considering the lack of any other water source (see above), it is assumed that the pool was fed by rain water that was siphoned and channeled throughout the site (and perhaps conveyed from rooftops via gutters). The pool elevation (see section plan fig. 7) above the garden surface indicates that it was used as the source of a water distribution system and fed other installations. This is further proven by the gutters found connecting to the pool (see Gutters 3 and 4, below).

Its elevated position, together with the quality of the construction makes it clear that the pool was meant to be a dominant feature in the garden from both utilitarian and aesthetic perspectives. The presence of water lilies (shown through palynological analysis; see Langutt *et al.* 2013a: 13), which may have

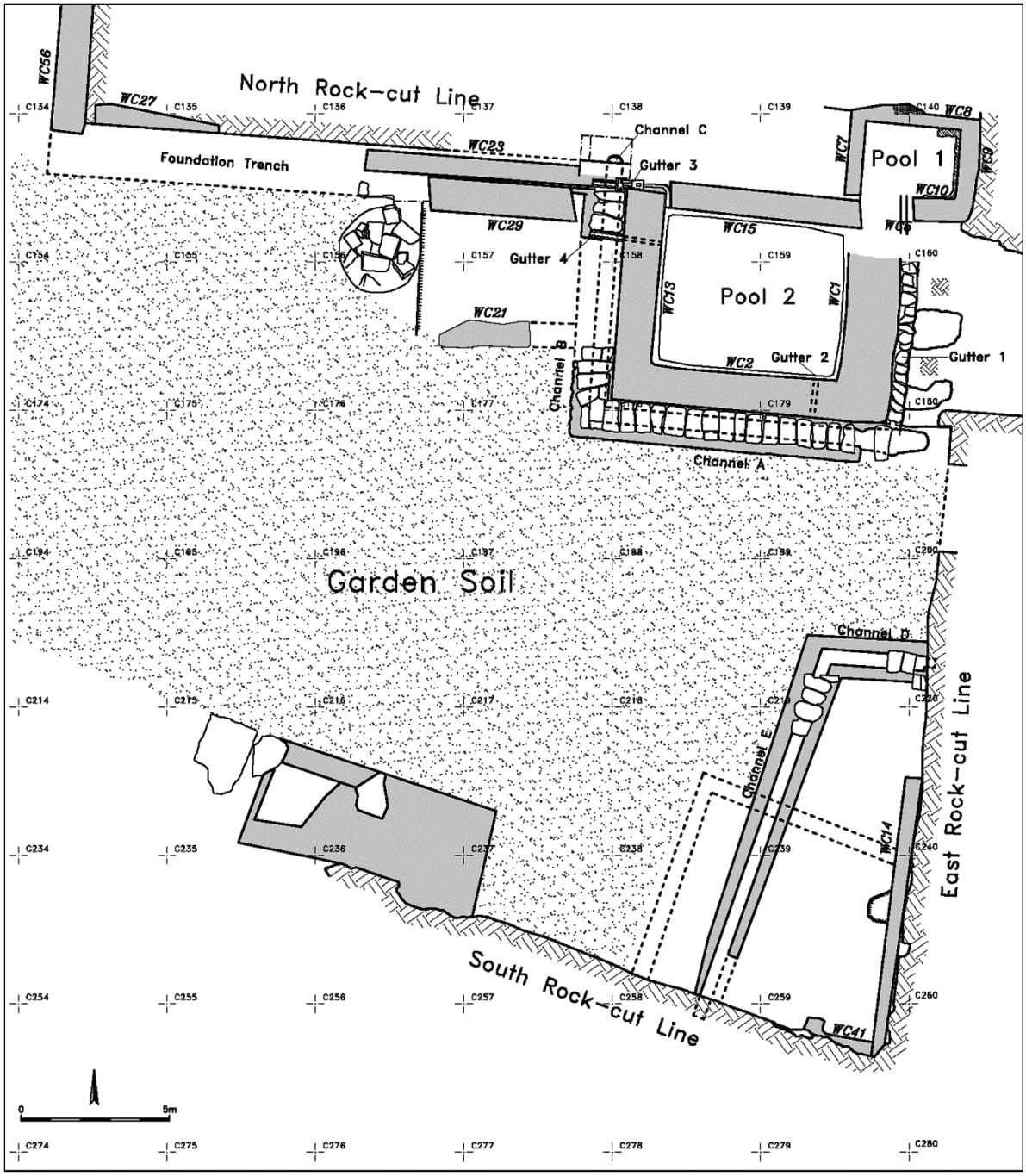

Fig. 5: Plan of the southern part of the garden (plan by Shatil Emmanuilov).

floated in the pool highlights its decorative function.

During the Hellenistic period the southern part of the garden was taken out of use and became an industrial area. Representing this change are two lime kilns that were found south of Pool 2. Contemporaneously with the creation of the lime kilns, the gutter openings in Pool 2 were sealed from the inside and the pool was filled with lime originating in the kilns (Lipschits *et al.* 2011: 37-40).

Fig.: Pool 2, looking south (picture by Noga Cohen-Aloro).

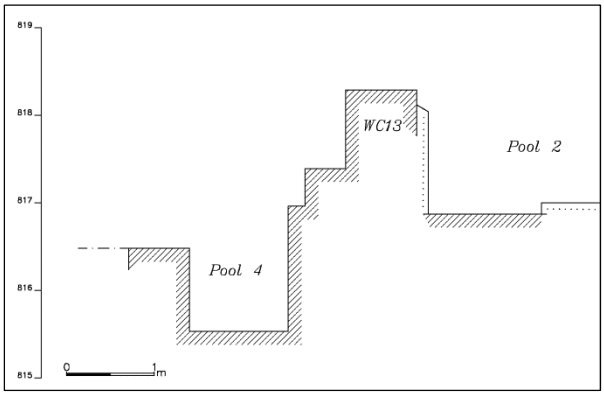

Fig. 7: Section plan of Pool 2 and smoothed bedrock, looking north (plan by Shatil Emmanuilov).

Stone Gutters: Three stone gutters were found connected to Pool 2. Gutters 3 and 4 were open and masterfully carved out of a hard, bright white limestone (fig. 8). Gutter 2 is hewn and plastered.

Gutter 3 is located in the northwestern corner of Pool 2, between walls WC15 and WC13. The gutter has three main parts: The first section crosses the width of wall WC15, from south to north. This segment of the gutter is 0.88 meters long and 0.35 meters wide. At the northern end of this segment, the gutter turns 90 degrees westwards, and stretches 0.9 meters in that direction. The gutter stretches on but at a lower course (0.3 meters below), creating a stepped section. The top section of the gutter is placed within a 0.35-meter-wide built trench. As the width of the gutter itself is only 0.1 meters, 0.1-meter-wide ledges were left on each side. This part of the gutter must have been constructed together with the walls of the pool, making it an integral part of it. On the western end of the top part is a device that unlike the rest of the gutters, which are bright white, is crafted out of reddish limestone. The square device (0.26 x 0.24 x 0.28 meters) has three openings, each 0.12 meters wide. It appears that it was used as a valve or damming mechanism that allowed control of the water

Fig. 8: Stone gutters (picture by Yuval Gadot).

flow in the gutter. As the western and eastern openings can easily be interpreted as control ling the water flow in Gutter 3, the top opening could have probably been used to connect an additional gutter that collected rain water, or as the opening for a slat used to dam the gutter (see fig. 8).

As stated above, the third part of the gutter is located 0.3 meters below the first two, creating a small waterfall. The descending water was collected in a 0.33-x-0.23-meter basin fashioned from the same white stone. The basin opens to the west, where the gutter stretches on for 0.8 meters. Two round holes were drilled through the southern face of the gutter, near its connection with the basin. The holes, 0.05 meters in diameter, could have been used as openings to other gutters or trenches that have not been preserved. In this stretch the gutter was placed on top of a ledge near the top of wall WC23. This finely built wall served to support the southern face of the rock cut scarp on which the tower sat. The wall was plastered to the top, and as it was associated with the principle features of the garden it is safe to assume that it was built as part of the garden's original plan. It is thus likely that Gutter 3 continued 17 meters farther westward in order to connect with a water channel leading north, adjacent to western face the artificial scarp.

Gutter 4 is embedded in the western wall of Pool 2 (fig. 9). It is located near the bottom of the pool and thus, in addition to providing irrigation, is likely to have served as a drain for the pool used during cleaning and maintenance. Its eastern part, 1.33 meters long, is embedded within the wall, evidence that the wall and the drain are contemporaneous, and built according to a pre-devised plan. The western part of the gutter protrudes 1.12 meters westwards of wall WC13, and is made of a single carved rock. The faces of the gutter are 0.05 meters thick and it is 0.13 meters deep. In its western part, the gutter rests on top of one

of the stone slabs covering Channel C (see below). It is assumed that the gutter extended farther to the west, parallel to Gutter 3. Another possibility is that the gutter originally ended at this point, and its water served to irrigate the garden soil west of Pool 2. Slight archaeological evidence may also suggest that another plastered pool existed west of Pool 2, which was later removed, may have been the destination of the water from Gutter 4.

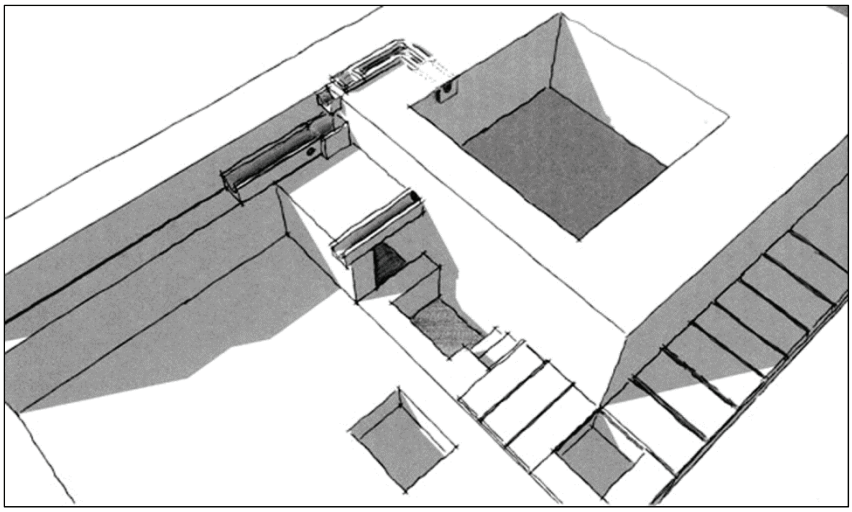

Fig. 9: Sketch of Pool 2 and stone gutters, looking northeast (drawing by Nirit Kedem).

Gutter 2 is a small drain, 0.15 meters wide and 0.3 meters high, that was installed in the outer face of wall WC2. This gutter is hewn and plastered, rather than having been made of cut stone, and may also be interpreted as a small trench. Wall WC2 was found in a relatively poor state of preservation, rendering the reconstruction of Gutter 2 difficult; however, it appears that it was hewn into the face of the wall, using the upper course of the wall as a roof. The extant length of the gutter was 1.05 meters – shorter than the 1.3 meters width of the wall. The difference, about 0.25 meters, is caused by the intentional sealing of the gutter opening with plaster, as was done to the other two gutters. The difference in construction technique and materials has led to the conclusion that Gutter 2 is not an integral part of the pool and was added in a later phase. The gutter fell out of use, together with the rest of the gutters, when the pool was repurposed for lime production.

Channel A-C refers to three roofed, hewn channels that share common attributes. During the first phase of the garden they were a single continuous channel (hence: Channel A-C) that delineated Pool 2 to the south and west, adjacent to its built walls (fig. 5) The channel most likely served as a means of collecting excess water from Pool 2 (and perhaps also Pool 1). It may also have allowed for the drainage of water from the artificially flattened bedrock underneath the garden soil, thus preventing swamping and rotting of plant roots. During a later phase, other installations were inserted and incorporated into the channel, dividing it into sections.

Channel A runs along the outer southern face of Pool 2. It is 10 meters long, 0.5 meters wide and 1.5 meters deep. The channel was hewn into the soft limestone, and its floor is about 1.2 meters below the level of the garden soil. The inner faces of the channel bear signs of repeated plastering, including intentional scraping of an old layer to ensure the strong bonding of a new layer. The roof slabs were placed on ledges that were plastered as well. The northern ledge and the bottom of wall WC2, the southern wall of Pool 2, were plastered together, creating a smooth rounded transition from the wall face to the channel. This shows the contemporaneousness of the two installations, and strengthens the assumption that they were built according to a common plan.

The roof slabs were made of cut *nari* rock, and they share the same dimensions: about 1 x 0.5 meters large and 0.2 meters thick. Seventeen slabs were found *in situ* (the second slab from the east was missing), and their shared dimensions indicate they were all originally crafted to serve this function.

The channel had two openings: one, 0.63 x 0.48 meters in size, was found in the western part of the channel, where it meets Channel B. This opening appears to be an integral part of the channel, and thus part of the original garden plan. The opening may have served as a "manhole" for maintenance, or even as a means of drawing water from the channel – as it lacks any other opening that would allow for drainage. The second opening was found in the eastern part, where one of the roof slabs is missing. This opening is not part of the original plan of the garden, and was probably created in a later phase, as signs in the plaster indicate that the slab was forcibly removed. On the eastern end of the channel there are signs of an attempt to extend it eastward, as can be seen in the rough hewing into the rock and low quality plaster.

Channel B-C is located at the foot of the western face of Pool 2, and runs adjacent to wall WC13. It is 5.9 meters long (inside) from its connection with Channel A in the south to a built wall in the north. A sounding dug north of this wall revealed that it was built against solid rock or wall WC23, and was likely the original end of the channel. The channel shares the same dimensions as Channel A, as they belong to same continuous installation. It was found covered by seven roof slabs. A similar number was removed when a plastered vat (Pool 5) was incorporated into it, most likely when the area stopped being used as a garden and became the site of lime industry.

Channel E-D, like Channel A-C, was hewn into the rock and formed a continuous conduit (fig. 5). This channel was used primarily to drain the excess water from the bedrock (see above).

Channel D stretches from the eastern scarp of the hewn complex (see above), where it penetrates the rock face in a 0.45-meter-deep niche. The purpose of the niche is not clear. From this point the channel extends 3.25 meters westward, than turns toward the southwest for another meter. In total, the channel is 4.2 meters long. It is 1.05 meters deep in its western part and 0.75 meters in the eastern part (from the rock surface). The channel is 0.45-0.5 meters wide, although the hewn part is wider – as ashlar walls were built inside it, forming the inner face of the channel. The tops of these walls serve as ledges on top of which roof slabs were placed (fig. 10). All but two of the slabs were robbed, but it is assumed that the entire channel was roofed by the 0.45-x-0.8-meters slabs. The channel was thoroughly plastered with the same material found in Channel A-C.

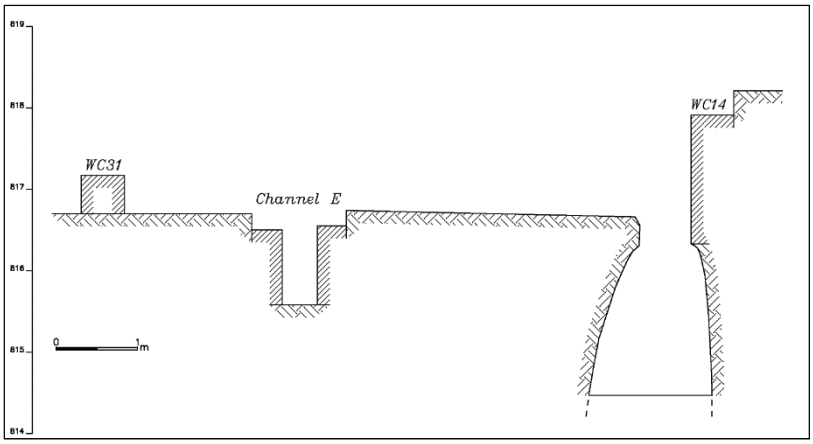

Fig. 10: Section plan of Channel E, looking north (plan by Shatil Emmanuilov).

Channel E continues the delineation of Channel D, beyond a collapse. It extends 13.5 meters farther in a straight line toward the southwest, ending at the southern scarp of the hewn complex. Here another niche was found, about 0.8 meters deep and 0.5 meters wide. The channel is 0.42 meters wide and 1.05 meters deep in its northern part and 0.48 wide and 0.7 meters deep in its southern part. Four roof slabs were found *in situ* and sections revealed the robbery trenches that were most likely created to salvage the well-cut stones.

The **open water channels** are a continuous sequence of plastered channels built along wide ashlar walls, surrounding the rock outcrop on top of which the tower was built.

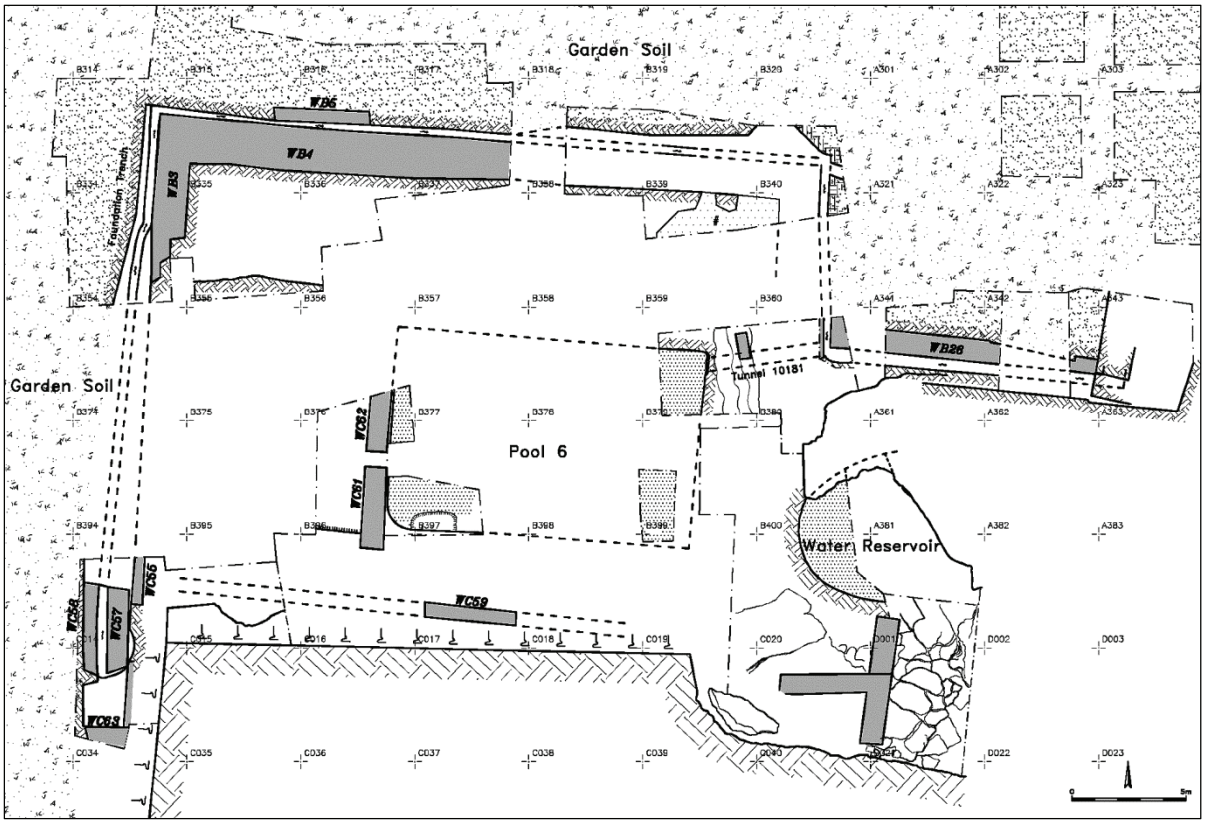

Fig. 11: Plan of the northwestern area (plan by Shatil Emmanuilov).

According to our reconstruction of the system, the open channels – created together and alongside a monumental expansion of the palace during Building Phase III – were connected to the earlier water system in Square C154 (fig. 5). There the open channel supposedly connected with the continuation of Gutter 3, deriving its water from Pool 2.

The extension of the palace itself was built of massive ashlar walls found inside deep, wide foundation trenches (fig. 11).

The channels are about 0.3 meters wide and up to 2.6 meters deep (fig. 12). They were usually installed between two walls: on one side, the massive ashlar wall, and on the other, a small wall that supported the rock face of the foundation trench. Only in places where the rock seemed solid enough, the channel ran between the ashlar wall and the plastered rock face.

Fig. 12: Open water channels, looking east (picture by Pavel Shrago).

The open channel system stretches some 150 meters. In two locations differences in elevations could be discerned: In Square C34 (see fig. 11) a 2 meter drop, from south to north, occurs. In this area the channel and the architecture around it are poorly preserved, making it difficult to understand their exact function. We assume that here the water either dropped down as a waterfall, or funneled down through a vertical drain.

In Square B380 the channel diverges in two directions. To the east it continues an additional 12 meters, bounded by a built wall in the north, and hewn and plastered rock in the south, and finally turning northward through a narrow plastered passage or pipe between the stones of the northern wall. The continuation of the channel northward in unclear, but we can assume it goes on as a hewn tunnel. In the northwestern part of the site a cave was found with a plastered entrance and partially collapsed roof (Aharoni 1964: 53). Due to safety considerations this cavity was not investigated. It may have been the final destination of the channel system.

To the west, the channel continued into a hewn tunnel covered with stone slabs. The tunnel is 4.5 meters long, 0.51 meters wide and 1.29 meters high (fig. 13). The building technique utilized in the creation of the tunnel is unclear, but it seems that the tunnel was hewn horizontally in a 'T' shape, and then the slabs were inserted into the wide part – probably to support the unstable limestone above. The tunnel was thoroughly plastered. At its western end, a rectangular stone device was found embedded in the rock face that included a cone-shaped, westward-oriented drilled hole. It is possible this device regulated the flow of water into Pool 6 (see below) to the west.

Fig. 13: Roofed tunnel, looking southwest (picture by Pavel Shrago).

Fig. 14: Fill inside the foundation trenches, looking south (picture by Oded Lipschits).

The open water channels and the impressive architecture surrounding them likely fell out of use during the Hellenistic period when the walls were dismantled and the empty trenches were filled with a homogeneous layer of fill containing large numbers of pottery sherds and small stones (fig. 14). It is likely that the fill originated in dump piles that accumulated at the site during the time it was inhabited, as it includes sherds dating to the late Iron Age to the Hellenistic period. Pottery from later periods was only found in places where later burials penetrated the fill.

The thoroughness of the wall's removal and the homogeneity of the fill indicate that the process was deliberate and took place over short period of time – and was an action that can be understood as an attempt to erase evidence of the existence of the unique and elaborate complex.

Pool 6 is a large plastered pool located north of the rock outcrop (fig. 11). It is 9 meters wide and 13.5 meters long. Its maximum depth may have been 2.5 meters, making its volume about 300 cubic meters. Pool 6 is the largest water reservoir in garden complex.

The pool construction style is similar to that of Pool 2. Its faces are hewn with some construction, as can be seen in walls WC61 and WC62, which were built into a hewn ledge and covered by a 1-2-cm-thick plaster layer. These walls are about 1.5 meters high and 5.5 meters long. Below the walls the face of the pool is hewn and plastered. More similarities can be seen in the design of the floor. As in Pool 2, the floor here was also made of flat ashlar blocks, cast over with a 12-cm-thick layer of plaster. This technique was observed in Square B397, where a later burial (L11205) penetrated the pool's floor. Only the southwestern and northeastern corners were found, both of which were carefully rounded and plastered. The top part of the pool in the east is mostly damaged, and no boundary wall was found – only the plastered rock. Remains of a north-south-running wall (WB11) were found on a rock-hewn step, and may have been part of the pool's boundary. It is important to stress that while Pool 2 is located above the garden soil level in the northern part of the garden, Pool 6 is sunk deep below the flattened bedrock.

It appears that Pool 6 belongs to the initial phase of the garden (Building Phase II), as does Pool 2 and the massive rock-hewn installations in the area. The location of the pool is important for its somewhat symmetrical alignment around the tower: Pool 2 in the south (and perhaps Pool 1), the channels and gutters surrounding the tower, and Pool 6 in the north.

After the opening between Pool 6 and the tunnel to its east (see above) was plastered over, the pool was disconnected from the rest of the water system, but continued to function independently. When the pool was finally taken out of use it was not filled with the same material as the rest of the surrounding foundation trenches, but was simply abandoned, gradually being filled by the silt and earth that

eroded from the cliff to the south (fig. 15). The pottery in these layers was dated from the late Iron Age to the late Roman period.

Fig. 15: Accumulation layers inside Pool 6, looking west (picture by Pavel Shargo).

Fig. 16: The water reservoir, looking east (picture by Pavel Shrago).

In addition to the installations described above, several other water installations were found that may not have been a part of the main system.

Pool 1 is located in the southern area of the garden and could have been part of the original plan, though this cannot be established with certainty (fig. 5) The pool, which was excavated but never published by Aharoni, was rediscovered in a poor state of preservation, and filled with refuse from the previous expedition. It is 1.8 meters deep, 2.4 meters wide and 2.5 meters long. The walls of the pool still bear the marks of plastering, and its floor is comprised of smoothed rock. The pool was connected to Channel A (see above) through Gutter 1. It is possible that Pool 1 was built in a later phase, and not as part of the original garden, as can be seen in the different style in its construction as compared to Pools 2 and 6, e.g., the floor building technique, the relatively poor masonry and the low quality plaster.

Gutter 1 is 6.5 meters long and 0.22 meters wide and deep near its northern opening, and 0.2 meters wide and 0.33 deep to the south. It runs from Pool 1, along the eastern face of Pool 2, and was covered with small stone slabs that were placed sloping above it on pre-made ledges. Compared to the roof slabs of Channel A-C and D-E, these slabs are roughly made. At its originating point in Pool 1, a built basin can be discerned. The gutter ends above Channel A, where remnants of plaster may indicate the existence of another basin that has not survived. Nevertheless, the function of the gutter is clear – feeding Channel A with the water of Pool 1. It should be noted, however, that if indeed Pool 1 was built during a later phase, then the connection to Channel A through Gutter 1 must be later as well.

The Water Reservoir is a large plastered cavity that was exposed in the northwestern part of the site under the massive pieces of the cave's roof (fig. 11). This reservoir had been in use until the Roman period, when the cave roof collapsed. The complete contour of the reservoir was not exposed, but based on the excavated part we know that it was at least 6 meters in diameter, and about 3.5 meters deep. We can calculate a minimum of 100 cubic meters of water that could have been stored in the reservoir (fig. 16), making it one of the largest water installations at the site. The reservoir was filled via a round opening in its roof (already discovered by Aharoni; 1964: 55), and a series of hewn trenches leading to it, still visible to its east.

It is not clear when the reservoir was first created, or if it was part of the ancient garden's water system. Pottery vessels found on the plastered floor of the cistern indicate that its last use was during the Early Roman period. Although we cannot determine its earliest date, the reservoir's location at the foot of the northern face of the tower and proximity to the palace, together with the evident investment of resources required to build it, allow us to assume that it was in use with the rest of the garden's water installations.

Consumption of Water at Ramat Raḥel during Later Periods

The use of a multitude of water installations at Ramat Raḥel did not cease with the destruction of the garden. During the Hasmonean period (2nd century BCE), a Jewish village was founded on the ruins of the palace and extended eastwards (under modern day Kibbutz Ramat Raḥel). Due to extensive development and construction during later periods, few architectural remains were preserved from this period, making it difficult to estimate the size of the settlement. It is known, however, that no fewer than 13 ritual baths (*mikveh*s) were in use in the village, alongside several water cisterns (Lipschits *et al*. 2011: 38). Furthermore, the water reservoir under the (now) collapsed cave roof is known to have been in use during this period (see above). Despite the limited information regarding the settlement's size, it is clear that such a large number of ritual baths and water cisterns would not have been necessary to fulfill the inhabitants' basic needs. It thus seems that the tradition of excessive use and storage of water prevailed after the palatial complex ceased to exist (although perhaps for

other, cultic, purposes rather than the need to express monumentality), and until the destruction of the village during the Great Revolt of 70 CE (Lipschits *et al.* 2011: 40).
During the Roman period (2nd century CE), and despite a drastic change in settlement patterns, a Roman bathhouse (Aharoni 1962: 24-27) seems to have preserved the Ramat Raḥel tradition of using water for leisure and adornment.

Discussion

The evidence presented above indicates that from the late Iron Age through the Persian period and until the early Hellenistic period, and to some extent during the late Hellenistic period and ending in the late Roman period, the use of water in Ramat Raḥel far exceeded the natural attributes of its location. Although the site's environment enjoys a fairly decent annual precipitation, the site itself is located on the edge of the Judean Desert, perched on a rocky, arid hill that is devoid of any renewable water source.

Estimating the palace's built area at about 7 dunams, and considering that the climate and average rainfall was similar to that of the present (about 400 mm per year), it was theoretically possible to store about 2,400 cubic meters of rain water each year. If added together, the garden installations, pools, channels and tunnels that were found (or presumed) connected, could hold about 400 cubic meters.[3] To this estimate we should add the capacity of the assumed water reservoir in the northwestern part of the site (not excavated due to the instability of the cavity) that was likely the destination of the open channel system.

The conspicuous use of water (a precious resource usually consumed with care and in moderation) that began in Ramat Raḥel in the 7th century BCE, is an example of conspicuous consumption and monumentality – a rare phenomenon in Judahite material culture. The water is just one element of monumentality present in Ramat Raḥel, which can also be seen in the palace itself in the fine ashlar masonry, the articulated architectural elements and the evidence of ceremonial feasts (Lipschits *et al*. 2011: 14-15). Furthermore the import of foreign species to be planted in the garden is itself a marker of monumentality, as this was seen in the royal gardens of the Assyrian kings Sargon II, Sennacherib and Assurbanipal V in Dur-Sharukin and Nineveh (Thomason 2001: 91; Wiseman 1983: 143), and in the gardens of the kings of the Achaemenid Empire (Briant 2002: 78).

It is difficult to calculate the amount of water needed to irrigate and cultivate the garden. Nevertheless, the mere existence of the garden and its long duration proves that the water was, in fact, sufficient. Furthermore, the palynological study identified at least one pollination cycle of local and imported plants (Langgut *et al*. 2013a). The use of abundant water allowed for the cultivation of plants that could not have otherwise been grown at the site. Local trees such as poplar and willow, as well as the myrtle bushes, naturally grow in streams and lush areas, and many of the imported species also require large amounts of water. The planting and flourishing of these species was a result of years of cultivation and careful irrigation.

An attempt to reconstruct the inner organization of the garden can be made: The thickness of the garden soil above the flattened bedrock (only about 0.5 meters) would have favored plants with wide reaching roots rather than penetrating ones – such as grape vine and myrtle – and fruit bearing trees – such as fig, olive and walnut (Borowski 1987: 102, 104). The citron has non-penetrating roots (about 0.3-0.4 meters) as well. The larger trees, on the other hand, such as cedar, birch, poplar and willow, were probably planted on the perimeter of the garden, at the foot of the first hewn and lowered rock terrace. This assumption is based on the relative shallowness of the garden soil, and the lack of cracks, breaks or crevices large trees would have created (Langgut *et al.* 2013: 125) in the smoothed bedrock in all the excavation squares where it was exposed. Such an arrangement of the vegetation fits the descrip-

[3] As a rough estimate, and based only on secure, documented installations.

tion of Persian estate gardens as passed down by Greek writers, where the fruit trees were enclosed behind a "wall" of conifers (Tuplin 1996: 105).

The absence of irrigation trenches in the garden soil may suggest that the irrigation was carried out through earthen trenches. Stronach (1989: 482-483) envisioned such an irrigation method in the central part of the royal garden at Pasargadae. Minzker surveyed and listed the main actions required to establish a working water system: preliminary plan, survey and measurements, quality and performance assessment and applying modifications, and finally, operation and upkeep (1989). The duration of the use of the water installations at Ramat Raḥel, and the evidence that they were constructed as part of a larger engineering project, and were modified, altered and maintained throughout centuries, all indicate that the system was monitored and governed by an authority possessing long term planning and operational abilities.

As stated above, the garden was built on the western part of the hill on which the site was established. This part of the site is highly visible from three directions: north, west and south, and is easily identified from most parts of the Repha'im Valley and wide areas south and west of Jerusalem (Kedem 2009: 81-87; Lipschits *et al.* 2011: 22). For anyone viewing the site from afar, the presence of trees and greenery on top of the high peak, with the arid Judean desert in the background, must have been eye catching. As the aim of monumental architecture is the impression of power and authority on the viewer (Trigger 1990: 126-127; Letesson and Vansteenhuyse 2006), the visibility of the site in general, and the garden specifically, has a key role in understanding it in this context. If the garden had been built in the eastern part of the site its impact on the landscape, and in effect, the view of the local population, would have been drastically diminished.

The garden complex in Ramat Raḥel is unique for its period in the archaeology of Judah and the greater Land of Israel. Pleasure gardens became widespread during the periods following the garden's destruction in the palaces of the Hasmonean kings and their counterparts in the vicinity, as can be seen in Jericho, Herodium and 'Iraq el-Amir in Transjordan (Gleason and Bar-Nathan 2013: 320-324). Some of these palaces continued to develop during the Herodian period. The style of the later gardens is, however, different than that of Ramat Raḥel: The Hasmonean gardens included swimming pools and steps descending to them. In addition, pools were the destination of water, rather than an installation used for its distribution. In 'Iraq el-Amir and (later) in Petra, pavilions – and even entire palaces – were built on artificial islands in the center of pools (Gleason and Bar-Nathan 2013: 324; Bedal 2001: 27; see also Bedal 2004). It thus appears that conspicuous consumption of water in palatial complexes in the region became a tradition, and in regions far more arid than that of Ramat Raḥel. However, in all of the sites mentioned above, the water supply to the garden came through aqueducts drawing from stable, renewable water sources, and was not based on local storage of rain water. Just as the collection and storage of water for decorative purposes is an example of conspicuous consumption, so are the engineering projects required to channel water across long distances for the same purpose. Examples can be found in the grandiose water systems in Assyria during 12th-7th centuries BCE. These systems were primarily aimed at providing water to the land near the upper Tigris, where the river gorge is deep and where extracting water in large quantities for irrigation is difficult (Bagg 2000: 309-310). Texts and royal reliefs, as well as the persistent growth in the scale of the projects – reaching its peak during the reign of Sennacherib – plainly show that kings regarded these water projects as highly prestigious, placing them under the definition of monumental architecture (Bagg 2000: 320-322).

The conclusion of the Renewed Expedition at Ramat Raḥel is that beginning in the 7th century BCE the site was used a tax collection center, serving the empires controlling the Kingdom of Judah, and later the province of Judah (Lipschits *et al*. 2011: 37). As mentioned by Trigger (1990: 127), the use of monumental architecture is most common during times of

regime change or the establishment of a new ruler. It should thus be assumed that an administrative center such as the one at Ramat Raḥel, used to collect taxes for the benefit of a foreign power, would be in a constant state of establishing and solidifying its authority. The design of the garden, at least during its peak in the Persian period, is similar to the description of other "estate gardens" throughout the Achaemenid Empire, which may have also been used to collect taxes (Tuplin 1996: 94, 105). Furthermore, Xenophon writes about a decree dated to the reign of Xerxes the Great, according to which a formal garden should be built in each province (satrap) (Briant 2002: 233).

Therefore, like other royal and pleasure gardens and monumental projects in the ancient Near East, the palatial complex and its garden at Ramat Raḥel were meant to inspire awe and veneration for the might and wealth of their creators. In the case of Ramat Raḥel, the effect was directed mainly toward the fertile lands of the Repha'im Valley, which was probably part of an estate governed by the authority at Ramat Raḥel and which was the main source of tax revenues collected at the site.

It is not surprising then to identify a form of "monumentality" in the manner in which the garden complex fell out of use during the Hellenistic period – one characterized by the methodological and thorough disassembly of the buildings' walls, and complete coverage of the empty foundation trenches and garden soil in debris and refuse. The finds from these layers, including pottery sherds and coins dating to the late Hellenistic period (Lipschits *et al*. 2011: 37), may suggest that this process took place during the Hasmonean revolt or during their reign.

The destruction and desolation of an administrative center that served the foreign empires that ruled Judah for 550 years can be interpreted as no less symbolic than the establishment of that center.[4]

Conclusions

The garden at Ramat Raḥel is the earliest known archaeological evidence in Judah for the conspicuous consumption of water in a pleasure garden.[5] The information presented here regarding the characteristics of the garden, its location at the site, the landscape reformation required for its establishment, and the quality of its masonry and finish provides ample evidence to support the interpretation of the complex as a clear example of monumental architecture and conspicuous consumption of material and human resources, meant to exude power, wealth and authority.

The most apparent expression of this consumption is the use of water. It is evident that preservation of this precious substance was not the main concern of the garden's designers: The open pools and channels, the waterfalls and the plant species chosen to be grown in the garden, all highlight the conspicuous use of one of the most important resources in the arid mountainous region as a means of strengthening and establishing the power and status of the rulers of the land.

[4] Destruction of gardens as a political statement is known from the campaigns of Tiglat-Pileser III, who burned down the gardens of Damascus in 733 B.C.E (Tadmor 1994: 79, text 23, lines 8-12). The gardens of Persian governors were similarly destroyed during rebellions in Phoenicia, and the garden of local kings were destroyed by the Persians subduing these revolts (Carroll 2003: 124).

[5] The Bible describes at least one more garden in Judah: the "King's Garden" in Jerusalem. This garden appears in context of the burial of the kings of Judah (2 Kings 21: 18, 26). This garden could also have been the royal pleasure garden, as could be seen in the garden of Pasargadae, where Xerxes tomb was built (Briant 2002: 443). The "King's Garden" in mentioned again in the description of the Babylonian conquest of the city (2 Kings 25: 4; Jeremiah 39: 4; 52: 7). Despite these descriptions, indicating a broader tradition of the gardens on Judah during the Iron Age, no archaeological evidence of the king's garden has yet to be found. The biblical text itself provides very little information regarding the nature of that garden.

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