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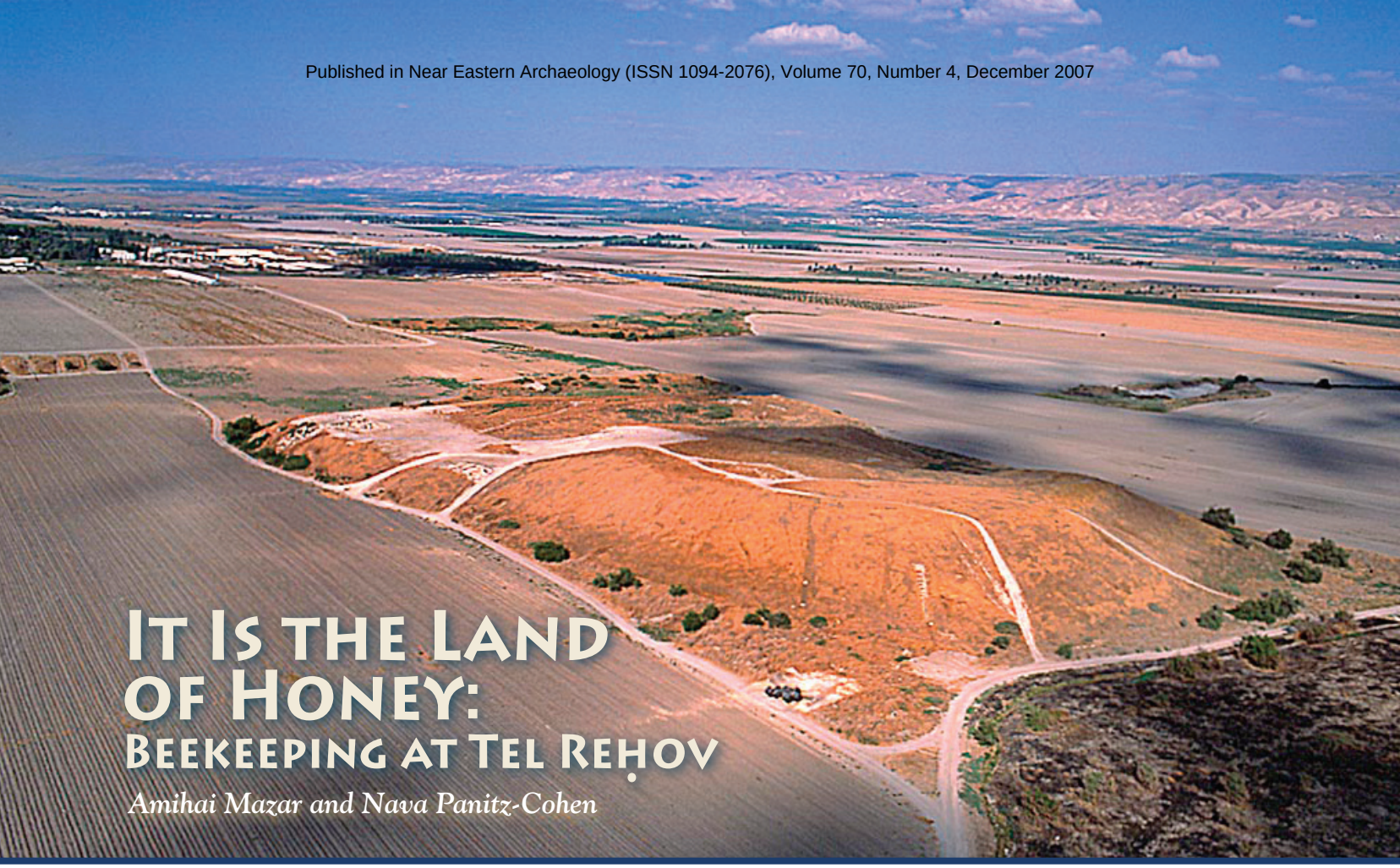

It Is the Land of Honey: Beekeeping at Tel Reḥov

Amihai Mazar and Nava Panitz-Cohen

Rearing bees in hives and the production of honey and beeswax is one of the least-understood aspects of the economy during the Bronze and Iron Ages in the ancient Near East. The Bible does not refer to bee-keeping, though in Egypt there are a number of pictorial depictions of bee-rearing and various ancient Near Eastern texts indicate that honey was a well-known and prestigious commodity in antiquity. However, no beehives had ever found at archaeological sites in this region. Thus, the discovery of an apiary of an industrial nature in an Iron Age IIA context (Area C) at Tel Reḥov constitutes a unique and extraordinary discovery that, in fact, revolutionizes our knowledge of this economic endeavor in general and in ancient Israel in particular.

Tel Reḥov is a large mound located in the heart of the Beth-Shean Valley in northern Israel, some five kilometers south of Beth-Shean, six and a half kilometers west of the Jordan River and two and a half kilometers east of the Gilboa Hills. It is situated in the Jordan Valley and strategically commands a major north–south route, as well as the east–west thoroughfare that connects Pella in Transjordan to the Jezreel Valley and from there to the coast in the west. Broad fertile tracts of land and plentiful water sources surrounding the site have made it a focus of continuous intense occupation. The mound is composed of two equal parts—a lower city on the north and an upper city on the south, with the ten-hectare total making it one of the largest and most impressive mounds in Israel. *Photo courtesy of Albatross.*

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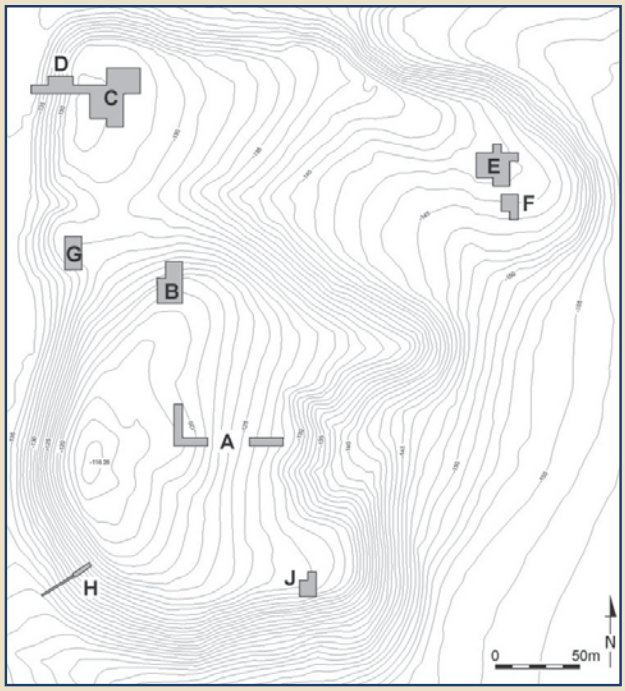
An Introduction to Reḥov

The excavations at Tel Reḥov are part of the Beth-Shean Valley Archaeological Project, which began in 1989 with the excavations at Tel Beth-Shean. Since 1997, the project has been made possible by the continuing sponsorship of John Camp of Minnesota. Eight seasons of excavations from 1997 to 2007 have been carried out at Tel Reḥov.[1] *The focus of the investigations have been on the Iron Age IIA period (the tenth to ninth centuries* BCE*). Vast building remains from this period have been revealed in eight excavation areas representing various parts of the mound, and thus it can be concluded that the entire ten hectares of the mound were densely settled at this time. Following a severe destruction during the ninth century* BCE*, the lower city was abandoned in its entirety, while occupation continued on the upper mound until the Assyrian conquest at the end of the eighth century* BCE.



The excavation areas on the tell are identified on this drawing. Note Area C in the northwestern part of the lower city. The aerial photo of Tel Reḥov on p. 202 faces northeast, with the Gilead Hills in the background. *Drawing by J. Rosenberg.*

Other periods revealed during the excavations include the Early Bronze Age III, when a mighty fortification surrounded part of the upper mound (Area H) and the Late Bronze Age and Iron Age I, when a dense continuous occupation sequence was identified in the trench cut in the western slope of the lower city (Area D). Remains of Early Islamic occupation have been revealed on the summit of the upper city (Mazar 1999; 2003a; 2008; in press).

The Iron IIA architecture at Tel Reḥov differs in both plan and technical details from the prevalent Iron Age II architecture typical of Israel. Virtually all the walls were constructed of mudbricks with no stone foundation, a phenomenon unknown from other contemporary sites. The buildings contained a wealth of finds, including hundreds of restorable ceramic vessels, seals, ivories, metal and stone objects, bones, flint, clay altars and shrines, figurines, and a profusion of organic material. These rich finds make Tel Reḥov a major site for research into the Iron Age in northern Israel.

While Tel Reḥov is not mentioned in the Bible, it figures in other ancient sources. Several texts dating to the Egyptian New Kingdom indicate that Reḥov was the central city-state in the region in the Late Bronze Age, while nearby Beth-Shean was in fact no more than a small garrison town for the Egyptian administration at that time. A stele discovered at Beth-Shean relates how during a revolt against Pharaoh Seti I, Pehal (Pella, seven kilometers east of Tel Reḥov), and Hammat (Tel el-Hammah in the Jordan Valley, just south of Tel Reḥov) opposed the Egyptian domination, while Reḥov chose to remain independent of the fracas and loyal to Egypt. The Taanach Letters and Papyrus Anastasi I, both second-millennium BCE *texts, also mention Reḥov in the Beth-Shean Valley. The town is also cited in the list of conquered towns during the campaign of Pharaoh Shoshenq I (biblical Shishak) in the late-tenth century* BCE.

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The Location of the Apiary: Area C at Reḥov

Eight seasons of excavation in Area C have revealed a complex of densely built buildings, many of which with a unique architectural plan along with an abundance of finds, all dating to the Iron Age IIA. As in other parts of the lower city, three main Iron IIA strata were found in Area C, termed locally as C-2 (=general Stratum VI, the early- to mid-tenth century BCE), Stratum C-1b (=general Stratum V, the mid- to late-tenth century/early-ninth century BCE?), and Stratum C-1a (general Stratum IV, the ninth century BCE). A severe destruction terminated occupation in this area, as in the rest of the lower city, attributed by us to the Aramean wars following the fall of the Omride Dynasty, about 830 BCE. Following this devastation, the lower city was abandoned, with the result that we were able to uncover the Stratum C-1a remains just below topsoil.

Stratum C-2 (general Stratum VI) contained at least five architectural units, including a building with four small rooms (Building A) in the northwestern corner of Area C, a large rectangular hall just to its south (Building B), and partially excavated segments of buildings to the east and northeast of Building B, including a well-preserved building with rooms flanking a central courtyard (Building Y) in the northeastern corner of the area. Apparently, Stratum C-2 was abandoned, perhaps following an earthquake. Stratum C-1b (general Stratum V) continued the dense layout of the previous level, with some buildings rebuilt on the same lines as their predecessors (i.e., Building D above Building A), though most having a new architectural plan. The main structures of Stratum C-1b include a thick-walled granary with three small rooms (Building G), a partially excavated building adjoining it on its south (Building H), and segments of buildings and courtyards to the north, west and east of Building G, including Buildings E, F, M, Q, W, and S (the plan on p. 209 shows some of these buildings). Stratum C-1b ended in partial destruction and the subsequent occupation, Stratum C-1a (general Stratum IV), represents for the most part a rebuild of the damaged buildings with architectural renovations and changes. In fact, only one new edifice was constructed, namely, Building L, which is situated directly above the destruction debris that covered the Stratum V apiary. As in the rest of the lower city, we found no occupation remains in Area C following the violent destruction of Stratum IV.

The Discovery of the Beehives

The first eight beehives were discovered in the 2005 excavation season in Stratum C-1b (general Stratum V) in the southeastern corner of Area C, below Building L of Stratum C-1a. Their identification as beehives, suggested during the season, was

The apiary was discovered in Stratum C-1b (Stratum V) in the southeastern corner of Area C and dates to the the mid- to late-tenth century/early-ninth century BCE. This view of the apiary faces the northeast. *Photo courtesy of A. Mazar.*

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Note the red clay floor in the section behind the hives in this closeup of the eastern row of hives. It is the floor of Stratum IV, Building L, which seals the tumble of bricks and burnt destruction debris of the Stratum V apiary below. *Photo courtesy of A. Mazar.*

soon confirmed when Dvorah Namdar from the Weizmann Institute of Science at Reḥovot carried out a chemical analysis that revealed evidence for beeswax molecules preserved in the unfired clay walls of the hives (Mazar *et al.* in press).

In 2007, we excavated seventeen additional hives. They are composed of cylinders made of four-centimeter-thick coarse unfired clay walls that contained a large amount of straw and animal dung. The walls are friable and were preserved due to the fact that a fierce conflagration destroyed the apiary, in the process effectively firing the clay walls. All of the beehives were the same size, each measuring eighty centimeters in length with an external diameter of about forty centimeters. The capacity of each hive reached fifty-six liters. In those beehives that were best preserved, one end was closed by packed clay with a round hole about three to four centimeters in diameter in its center. This is termed the "flying hole" and allows the bees to exit and enter the hive. The opposite end of the hive remained open and was shut by a removable lid. We found at least four such lids *in situ*, all made of the same material as the hive, with a strip of a handle in the center that allowed for easy removal and replacement when necessary.

In the apiary, the beehives were arranged in three parallel rows, each containing at least three tiers. The three rows were supported on the north by a narrow brick wall that was retained on its north by a concentration of wooden beams. This wall seems to have served as a kind of terrace support separating the apiary from the higher area to its north.

The western row contained six beehives in the lowest tier and the remains of an additional four in the second tier above. In the central row, eight hives were preserved in the lowest tier, with remains of two hives in the second tier and one in the third tier. The eastern row was the best preserved and ran for five meters, containing eleven hives in the lowest tier, remains of three additional hives in the second tier, and scanty traces of still a third tier on the rows' northern end. Broad aisles separate the rows: between the western and middle rows, the aisle is about 1.85 meters wide and the aisle between the center and eastern rows is about 1.2 meters wide. In the central row, the removable lids faced east, while in the eastern row they were found to face west. In this way, the honeycombs could easily be culled from both rows by workers in the same aisle, while the bees exited from the opposite end of the hive through the flying hole.

To the south of the eastern row we found a curious feature—a raised platform built of packed clay running a length of about four meters, trenched with shallow channels running along a north–south axis. This "podium," the same width as the row of hives to its north, might have been a foundation for still more hives that had been removed in antiquity, with the channels serving as air vents or marking the location of decayed beams. This podium could have supported some nine hives, making a total of twenty-one hives in the lowest tier of the eastern row. To the south of the central row was a similar, though shorter, raised area that contained remains of charred wooden beams.

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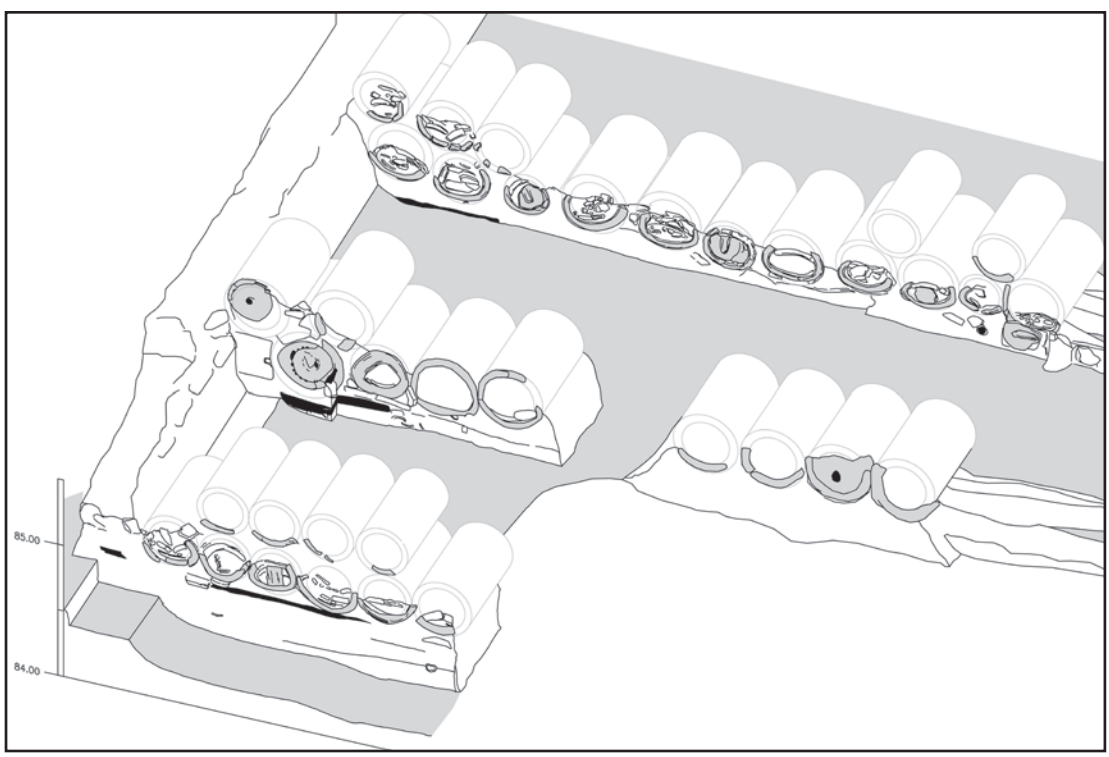
The beehives were arranged in three parallel rows, each containing at least three tiers, as can be seen in this photo of the central row, looking west. Note the lid still in place in the lower hive, with its handle intact. *Photo courtesy of A. Mazar.*



In this isometric reconstruction, the shaded gray shows the extant parts of the hives. This view is looking to the east. Note the low support wall bordering the apiary on the north. *Drawing by A. Yamim.*

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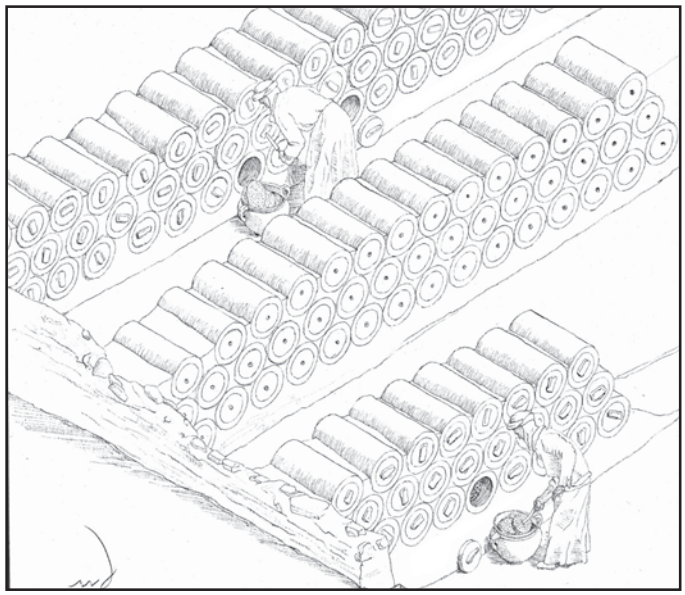

This is a perspective reconstruction of how the apiary might have looked during operation. Note how the flying holes face away from the workers, who are busy extracting honeycombs; this would have minimized the danger of getting stung when the bees left the hives. *Drawing by A. Yamim.*

The violent fire that destroyed the hives left an almost one-meter-thick layer of tumbled bricks, burnt debris, and ash. The weight of this destruction debris crushed many of the cylinders to an oval shape and caused the collapse inwards of the upper walls. Because of this pressure, those hives that were on the lowest tiers were the best preserved.

Reconstructing the apiary in its entirety depends on a number of variables, some of which remain unknown. As noted, a total of twenty-five hives were found in the lowest tier in the three rows and since we have evidence of the existence of three tiers, this would yield at least seventy-five hives in all. However, it seems that the number of hives could have been much larger. If the raised podium to the south of the eastern row held additional hives, with a total of twenty-one in the lowest tier, this row alone could have contained at least sixty hives in three tiers. It is possible that the other two rows were also originally this long, and thus we reach a total of some 180 hives. It is also possible that the apiary continued to the east and south beyond the present limits of the excavation, increasing the number of hives even more. While this reconstruction is theoretical, the extant remains clearly indicate a large-scale and well-organized apiary that was industrial in nature.

The apiary is located within a densely built-up area within the unwalled Iron Age IIA city, containing both domestic

To the south of the eastern row of hives, we found a curious raised area that was cut with shallow channels from south to north that might have served as a foundation for more hives that were not preserved. In the section behind the "podium" one can see traces of a brick wall that belonged to Stratum IV Building L that covered the apiary, sealing the fallen bricks and destruction debris related to the apiary. *Photo courtesy of A. Mazar.*

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This aerial view (taken from a Zeppelin) shows the density of the structures in Area C around the apiary. The plan opposite shows the location of the apiary in relation to its surrounding buildings, as well as the location of the cult stand. The apiary is visible on the lower right, Building F is at the top of the photo, and Building G is in the center. *Photo courtesy of SkyView. Drawing by J. Rosenberg.*

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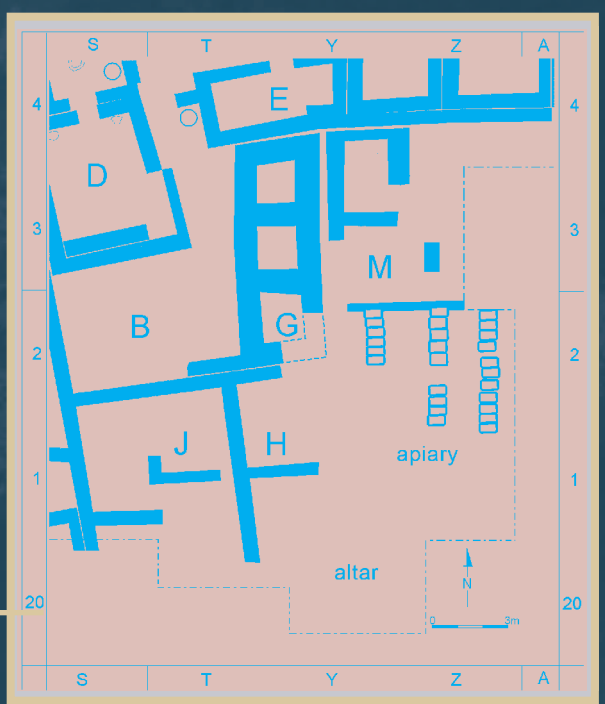
Part of Building H, looking west. The meter scale is on a wall of Stratum IV that cuts into Building H of Stratum V. The reason for the collapse of the wall of Building H at such an acute angle became clear when exposing the hives further east, as they were built on a lower level than the surrounding structures. Note the "belt" of charred wood that supported the border between the higher level to the west and the lower floor of the apiary on the east. *Photo courtesy of J. Camp.*



This horned clay altar was found in association with the apiary. Note the rather careless attachment of the two nude female figures, as well as other decorative details. *Photo courtesy of D. Harris.*

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structures and what appear to be public buildings. One of the more difficult issues we grapple with is the existence of this industry in the midst of such a crowded urban venue. The quantity of bees occupying the apiary is estimated at more than one million; how could people have lived in such an environment? The answer to this question is not simple, though beekeeping experts, with whom we consulted, along with textual evidence and ethnographic observations, indicate that this is not at all an extraordinary situation in traditional beekeeping societies. Such a situation can be seen in traditional Arab villages as well as in villages in Egypt and Africa. It seems that people learn to cohabitate with beehives and can accommodate the presence of multitudes of bees, so that the location of our apiary in the midst of a busy town, though surprising indeed, can be explained. Beehives were considered an industrial facility that produced a precious commodity and their proper protection was most likely an important issue in determining their location inside the town, despite the inconvenience.

The Tel Reḥov beehives were built in an area that was about one and a half meters lower than the floor level of the surrounding structures, such as the granary (Building G) to the northwest, as well as a partially excavated building to the west (Building H). During the destruction of this area, the walls of these buildings collapsed down onto the apiary area, with some of their walls falling at an acute angle. This sunken location too might have played a role in providing some kind of buffer zone for the apiary in relation to its surroundings. The almost one-meter-thick layer of collapsed bricks that covered the apiary and its surrounding area probably indicates that the entire area was surrounded by high brick walls, which also helped in isolating the apiary from its surroundings. The space in which the beehives are located measures about seven meters from east to west and about nine meters from north to south, and as noted above, the area most certainly continued to the east and possibly to the south as well, making it even larger. No traces of ceiling material or supports for a ceiling were found. It is, however, possible that temporary roofing was used, perhaps made of wood, reeds, or cloth. Such a roof could have covered just the rows of hives, leaving the spaces between them unroofed, and would have been essential for protecting the soft, unfired clay hives from the winter rains and shading them in the hot summer climate of the Beth-Shean Valley. Indeed,

Cultic Activity at Reḥov in the Iron II Period

This brief presentation of cultic paraphernalia illuminates an important aspect of the cultural milieu of life in ancient Reḥov, demonstrating the special nature of the town and its inhabitants at this pivotal time in the history of ancient Israel.

So far, we have recovered one complete and one almost fully restorable clay altar, along with fragments of about a dozen more, suggesting the ubiquity of these objects in daily life at ancient Reḥov. In addition to the complete altar found in conjunction with the beehives shown on p. 209, we found an almost complete altar with triangular windows cut into its façade in association with an open cult location in Area E at the eastern end of the lower city; the altar had been found smashed to pieces, possibly as a deliberate act of derision during the destruction of Stratum C-1a (=general Stratum IV) at the end of the ninth century BCE. *Among the fragmentary altars is part of a very finely made façade with three extant mold-made nude female figurines two of which are shown in the photo. These pieces were found in the destruction debris of a unique building called Building F located to the north of the apiary in Area C, which also yielded a number of other special finds, including the "Hippo"-type storage jar inscribed with the name nmš (see photo p. 212), and an extraordinary clay model shrine or "house shrine" (opposite).*

This model shrine is a heavy clay box, fifteen inches wide and eleven inches tall, with a flat base and convex roof. Above its open-doorway façade is a rope-like appliqué, possibly depicting a snake. Above this, on the roof of the box, we see an appliqué scene composed of an animal and two human heads. The animal's legs and paws are disproportionately large in relation to its body. Its two front paws clutch at the top of two human heads on both sides, and its tongue dangles down from an open mouth. Although it is difficult to identify this creature, it is probably a lion, as suggested by the open mouth and dangling tongue, which are leonine motifs commonly found in ancient Near Eastern art.

The human heads on both sides of the animal, grasped by the animal's claws, are elongated with slightly gaping mouths, as if

These fragments of an elaborate and well-made cult stand were found in Stratum IV Building F, and provide evidence of the continuity of the cult-stand tradition at Tel Reḥov from the tenth century into the ninth century BCE. *Photo courtesy of G. Laron.*

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several ethnographic examples of beehives show that such temporary roofing was employed.

Economic Aspects of the Apiary

Based on ethnographic examples, along with estimates by experts on beekeeping, it appears that a cylindrical beehive of the type and size discovered at Tel Reḥov could produce some three to five kilograms of honey per year, depending on the extent of annual blossoming, the upkeep of the beehives, and the methods used to cull the honey. In addition, between 0.5 and 0.7 kilograms of beeswax would have been produced annually from each hive. If indeed we can reconstruct at least one hundred active hives in the Tel Reḥov apiary, we can assume an annual yield of about three to five hundred kilograms of honey and fifty to seventy kilograms of beeswax. Of course, this amount can vary based on the amount of concurrently active hives and the state of their upkeep, and it could be larger if the number of hives was more than one hundred, as estimated above. Assuming that production was at its maximum capacity, such an amount of honey and beeswax would be far beyond the scale of individual consumption and would point to an industrial operation.

There were numerous uses for honey in antiquity; in Egypt honey was used as a sweetener, a salve for sores, to prepare medicines, and for rituals. Beeswax was also used for various purposes, such as casting bronze objects in the lost-wax technique, preparation of medicinal salves, writing on wooden boards coated with a layer of wax, and so on. It is thus evident that beehives were of prime economic value. This is the obvious explanation for why such a large area in the center of the busy town was devoted to this industry and why it was so efficiently set up.

But the question remains, who was the initiator and operator of this industrial undertaking? Experts estimate that a hive of the type found at Tel Reḥov could have contained a swarm of ten to fifteen thousand bees at the peak of the season. If there indeed were at least one hundred active hives, then we can reconstruct the presence of over one million bees. It seems most likely that only a strong central authority could have established and conducted such a well-planned industrial apiary in the center of the densely settled town. This has implications for our understanding of the social and economic urban system during the period of the Israelite Monarchy and the ability of

writhing in pain. It is difficult to determine their gender, though it seems they are male. There are no known parallels to this scene. The entire creation seems to have been a local product, tailor-made for a specific local ritual. We cannot know if a mythological or alternate narrative prompted this dramatic scene.

The object itself is similar to a well-known group of ceramic house shrines known from the Middle Bronze through the Iron II periods. It is difficult to say how these shrines functioned. Perhaps they held fertility figurines or other sacred objects or cultic paraphernalia, such as the silver-plated bronze bull figurine found in connection with a similarly shaped shrine found at Ashkelon, that dates to the Middle Bronze Age.

What does the presence of such an object tell us about the identity of the inhabitants of Iron Age IIA Tel Reḥov and their religion? The shrine, as well as the clay altars, indicate strong Canaanite traditions among the local population in the tenth and ninth centuries BCE. *No doubt at the time of the Israelite Monarchy the worship of Yahweh was slowly adopted by this local population. The struggle between the emerging Israelite religion and the worship of Canaanite deities, such as Ba'al and Asherah, is a prominent theme in the biblical narrative and the rich cultic objects found at Tel Reḥov might give us a material "peek behind the scenes" at this dramatic time in the history of ancient Israel.*

A view of the model shrine from Stratum IV Building F *en face*, showing the opening and the unique scene above of an animal grasping two human heads. The close-up of this scene shows the animal's claws digging into the heads of the suffering victims. *Photos courtesy of D. Harris.*

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This elaborately painted chalice was found right next to the clay altar and was also part of the ritual activity that took place in connection with the industrial activity of the apiary. *Photo courtesy of G. Laron.*

This inscribed "Hippo" storage jar was found in Stratum IV Building F (to the north of the apiary). A similar jar, which has not yet been restored, was found on the apiary floor. It is inscribed with the personal name nmš (Nimshi), which is attested in the Bible. *Photo courtesy of G. Laron.*

the central authority to carry out broad-scale economic and administrative policies such as would have been required to set up and maintain this apiary.

Cultic Activity Related to Honey Production

Some 6.6 meters (15 feet) to the south of the western row of beehives was a concentration of cultic objects found in the destruction debris resting on the southern continuation of the apiary floor. The foremost find in this group was a clay altar with four horns and two applied naked female goddesses flanking an incised tree on its façade, which we were able to restore in its entirety (see photo on p. 209). The design of this altar recalls that of a city gate and it is possible that it was meant to conjure the image of a gate leading to the deity or the temple of the deity to whom the substance that was placed or burned on the altar was offered. Surprisingly, this altar is rather carelessly made, possibly the product of household production or a non-specialized workshop. A large and elaborately painted chalice with applied petals was found near the clay altar, along with other chalices and bowls. It can be surmised that some ritual related to the production of honey, intended to secure the successful productivity of the apiary, was conducted in this venue. Such a correlation between industrial and ritual activity is well-known from other situations, such as the stone altars found in conjunction with the olive oil industry at Iron Age IIB Tel Miqne-Ekron (Gitin 1989, 1995) and the cultic activity

These are just a fraction of the dozens of pottery vessels found in association with the apiary. The ceramic types are typical of Iron Age IIA assemblages in northern Israel. *Photo courtesy of G. Laron.*

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related to the copper industry at Timna in the Aravah Valley, as well as in Cyprus (Rothenberg 1995:9–44; Muhly 1989) It is notable that there is a biblical prohibition against the burning of honey on an altar (Lev 2:11). This very prohibition is an indication that such a ritual was practiced and it is possible that on the Tel Reḥov clay altar found in conjunction with the apiary, honey was indeed burned.

The Inscription nmš

Another significant find in the destruction debris resting on the floor of the apiary was a storage jar of the typical Iron Age IIA "Hippo"-type that bore an inscription incised before firing that reads *nmš* (see photo p. 212). This apparently is the Hebrew name *Nimshi*, which occurs in the Bible as the name of the father or grandfather of Jehu, the founder of the dynasty that violently ousted the Omride dynasty. Interestingly, we found still another "Hippo"-type jar with an identical name in the destruction debris of the subsequent stratum (Stratum C-1a or general Stratum IV, dated to the late-ninth century BCE) in Building F to the north of the apiary (Mazar 2003b:178–81). Still another such inscription was found on a similar "Hippo"-type jar from nearby Tel ʿAmal in a destruction layer with pottery just like that found in Tel Reḥov Strata V–IV (Levi and Edelstein 1972:336, fig. 5). The three instances of this name incised on storage jars of the same type in this region found in contexts dating to the tenth to ninth centuries BCE raises the question whether it pertains to Jehu's family? While no certain answer can be given, it is tempting to entertain this possibility. This family may have been well-known wealthy landlords with economic interests in this region, only some twenty-one kilometers southeast of Jezreel. The apiaries might have been one of their economic enterprises in this region.

The Pottery from the Apiary and its Surroundings

A large quantity of pottery was found in the destruction debris on the apiary floor, concentrated mainly in the area to the south of the eastern and central rows of hives, with only isolated vessels found between the rows themselves. The large pottery assemblage found in Buildings H and G is identical to that found in the destruction debris and on the floor of the apiary, further supporting the picture of the surrounding buildings, particularly Building H, as being part of the apiary assemblage.

Among the dozens of restorable vessels of various types in Building H were bowls, kraters, amphorae, cooking pots, storage jars, jugs, lamps, and chalices, as well as a fine jug imported from Cyprus.[2] In fact, this assemblage does not demonstrate any particular industrial trait that would reflect the kind of work done in the apiary. Many of the vessels were red slipped and hand burnished and the most common storage jar was the so-called "Hippo"-type, which was well-known in northern Israel in the tenth and ninth centuries BCE (Gal and Alexandre 2000:44–48).

The ceramic assemblage from the apiary and Buildings G and H, which is typical of the pottery found in other Strata V–IV contexts at Tel Reḥov, can be compared to various Iron Age IIA assemblages, such as nearby Tel Amal Strata 3–4 (Levy and Edelstein 1972) and Tel el-Hammah Strata 2–3 (Cahill 2006) in the Beth-Shean Valley, as well as to Yoqne'am Strata XV–XIV (Zarzecki-Peleg 2005), Tel Jezreel (Zimhoni 1997:13–56), and Megiddo Strata VB and IVB–VA (Finkelstein, Zimhoni and Kafri 2000) in the Jezreel Valley, and to Horbat Rosh Zayit in the western Galilee (Gal and Alexandre 2000:34–122).

The Dating and Chronology of the Beehives

Those sites to which the pottery assemblage of the Stratum V apiary can be compared have been dated by the conventional chronology to the tenth and early-ninth centuries BCE, while, according to the low chronology suggested by Finkelstein (1996), they would be dated to the ninth century BCE alone. A modified conventional chronology (MCC), proposed by A. Mazar, dates these contexts to most of the tenth and ninth centuries BCE (estimated time frame about 980–840/830 BCE (Mazar 1997, 2005, 2007:146–49). C^{14} dates obtained at the University of Groningen from burnt grain found on the floors under the burnt destruction debris in Buildings G and H enable us to achieve more precise dating for this time period (for details, see Mazar *et al.* 2005:201, 223–36).[3] The samples taken from Building H include grain from an intact storage jar found in the same destruction that covered the apiary further to the east. The samples from Building G came from the destruction debris of its southern room, which had collapsed on the floor of the apiary to its southeast. An outstanding result was the consistency of dates between the two contexts. The average calibrated date that fell within the range of high probability (68 percent) was 960 to 870 BCE, with the highest probability within this range being the last quarter of the tenth century BCE. The wider range of dates (95 percent) allows a date as low as 840 BCE, though the probability of this date is much lower than in the previous range. Thus, the calibrated dates within the 68 percent probability range suggests that Stratum V is a pre-Omride city, and should be dated to the second half of the tenth century or the early ninth century BCE, in line with the conventional or modified conventional chronology. This result is of utmost importance for the ongoing debate concerning the Iron Age chronology, since the pottery of Stratum V (as well as that of IV) is identical to the pottery from the Stratum IVB–VA at Megiddo, which stands at the heart of the chronological debate.[4]

Honey and Bee-Keeping in the Bible and the Ancient Near East

The term "honey" appears fifty-five times in the Bible, sixteen of which as part of the metaphor of Israel as "the land of milk and honey." This honey has been always understood as having been produced from fruits, such as dates and figs, with bees' honey mentioned explicitly only twice, both times in relation to wild bees (Judg 14:8–9 and 1 Sam 14:27). However, careful reading of biblical metaphors mentioning honey led Forti (2006) to suggest that they refer mostly to bee's honey, through in her view, due to the lack of agriculture in the Bible,

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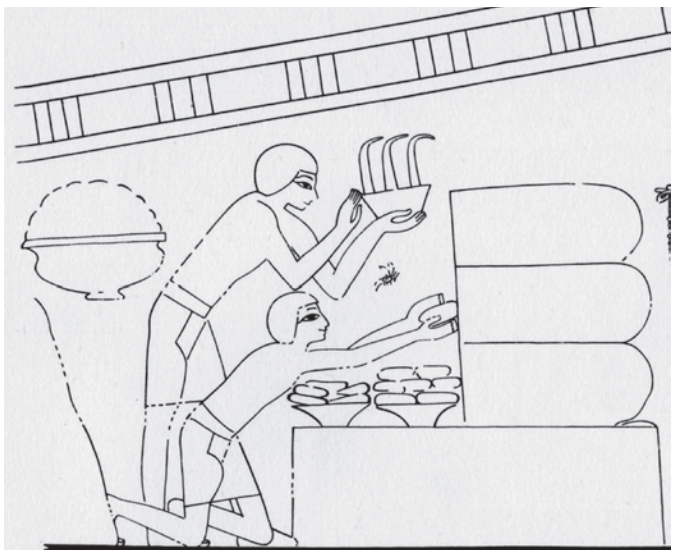
the references are to honey collected in nature. Indeed, in no case does the Bible mention bee rearing as a productive industry. The discovery of the beehives at Tel Reḥov shows that this was a well developed economic branch during the First Temple period. We can now assume that at least some of the notations of honey in the Bible pertain to bees' honey.

Egyptian sources shed interesting light on the production of honey in Canaan. The wealth of honey, oil, and wine is noted in the description of the land of *'-r-r* in Canaan in Sinuhe's biography attributed to the Middle Kingdom (Lichtheim 1973: 226). Sources dating to the reign of Thutmosis III numerate the amounts of honey imported from Canaan to Egypt, for example one shipment with 430 jars and another with 264 jars paid as taxes (Breasted 1906, 2: nos. 462, 518).

Bees' honey (*bit*) in ancient Egypt figures prominently in both texts and pictorial depictions (Crane 1983; Serpico and White 2000; Kritsky 2007). Four well-known wall paintings and reliefs that deal with the subject include a Fifth Dynasty relief from the Sun Temple of Neuserre at Abu Gurob, two from tombs of the New Kingdom Eighteenth Dynasty (Tomb of Rekhmire [TT100] and Tomb of Amenhotep [TT73] at Thebes), and still another from the tomb of Pabasa (TT279) of the Twenty-Sixth Dynasty (Crane 1983:35–39; Kritsky 2007). In all these cases, the hives are cylindrical and arranged in tiers, almost identical to the hives from Tel Reḥov. The illustrations show how the beekeepers smoked out the bees and extracted honeycomb into large bowls, as well as how the honey was then processed and stored in jars.

Egyptian texts detail the numerous uses of honey, which include sweetening food, the process of mummification, cultic practices, and medicine and salves, which utilized the antibiotic quality of honey to cure sores. Jars of honey were often given as royal gifts (Breasted 1906, 1: no. 366) and honey is mentioned along with other precious commodities such as gold, silver, copper, incense, and oil in the Harris Papyrus. Beeswax was



A drawing depicting the smoking out of honey from cylindrical hives from the tomb of Rekhmire in Egypt. *Drawing courtesy of The Metropolitan Museum of Art, NY.*

During a recent visit to the Galilean village of Nahaf, we were amazed to see the great similarity between the beehives kept by the Halabi family in their yard and our three-thousand-year-old hives. The mother of the family was kind enough to demonstrate how she makes the hives from clay mixed with straw and dung. *Photos courtesy of A. Mazar.*

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Among the traditional hives displayed at the Museum of Settlement at Kibbutz Yifat was one with a lid that is almost identical to the lids of the Tel Reḥov hives. *Photo courtesy of A. Mazar.*

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considered to possess magical qualities and was also used for practical purposes such as boat building, glue for paint, to attach a blade to its handles, to style wigs, and to cast in the "lost wax" technique; from the Ptolemaic period on, it was also used for writing on tablets. The fact that the symbol of Lower Egypt was a bee and that one of the titles of the pharaoh was "Bee," indicates the central importance of bee rearing and honey and beeswax production in ancient Egypt.

Administrative texts from Ugarit mention honey (*nbt*, Akkadian *nubtu*), while literary and ritual Ugaritic texts mention it as a substance that was sacrificed to the gods. In Hittite literature, the bee is a symbol of abundance and plays a central role in the myths of the "missing deities" dating to the Hittite Old Kingdom, particularly the myth of Telipinu (Collins 2002:245–47). The Hittite laws stipulate severe punishment for thieves of bee swarms and hives, an indication that such installations indeed existed in ancient Hatti (Crane and Graham 1985:31–32). A particularly interesting reference to beehives appears on a Neo-Assyrian stele dating to the eighth century BCE, in which the ruler of Suhu on the Middle Euphrates boasts of how he initiated the rearing of bees in hives, an act never before undertaken by his forefathers (Dalley 1984:202–3; Cavigneaux and Ismail 1990:403, col. IV, lines 13–15).[5]

Many sources, among them the Talmudic literature, note the rearing of bees during the Hellenistic and Roman periods.[6] Notably, Columella, the Roman historian who provides the most comprehensive account of beekeeping in antiquity, actually derided the use of clay to build hives as one of the least suitable materials. Talmudic sources indicate that most of the beehives of that period in Italy and in Israel were portable and were to be found within the confines of the towns, adjacent to dwellings.

While it is known that fired jars served as hives in the Classical period and despite the wealth of written and pictorial sources, no beehives or apiaries of commercial scope had ever been revealed in an archaeological excavation until the

In Middle Egypt, apiaries such as the one shown in this picture contain cylindrical hives stacked in tiers in the hundreds, similar to the arrangement at Tel Reḥov. *Photo courtesy of G. Kritsky.*

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Authors Amihai Mazar and Nava Panitz-Cohen, joined by Ido Wachtel on the left, proudly display the eastern row of hives. *Photo courtesy of the Tel Rehov Expedition.*

find at Tel Reḥov. This discovery has shed light on a hitherto unknown branch of the ancient economy, and, in our case, we are fortunate that we can place the find within its context in the society, culture, and economy of ancient Israel.

Ethnographic Analogies

Cylindrical hives similar to those found at Tel Reḥov are well-known as the most typical traditional hive throughout the Mediterranean basin and the Middle East. It is, in fact, amazing to see the almost unchanged continuity in the technology, shape, and size of the hives in antiquity compared with modern ethnographic examples. Most of the traditional hives were located inside the settlements and can be found adjacent to houses. Numerous such hives have been documented in traditional Arab villages (for example, Safrai 1988:215, fig. 9, 221, fig. 19), as an entire wall of plastered hives in the village of Ra'i to the northwest of Shechem (Zertal and Mirkam 2000:unnumbered color photo) and clay hives decorated with reliefs in the caves in the southern Hebron Hills (Havakuk 1985: unnumbered photo). On a recent visit to the village of Nahaf in the Galilee, we were witness to a group of beehives built in the courtyard of the Halabi family, that were virtually identical to our hives from Tel Reḥov in both formation technology and dimension.[7] Cylindrical beehives from the Druze village of Gath in the western Galilee that are on display in the Museum of Settlement in Kibbutz Yifat have handles that are uncannily identical to those found on the Reḥov hives. Ethnographic evidence from Middle Egypt shows hundreds of clay cylindrical hives stacked to the height of eleven tiers (Kritzky 2007:64) and similar traditional hives have been documented in various countries in the eastern Mediterranean and the Near East. They are usually made of unfired mud, yet sometimes they are made of fired pottery tubes, reeds, or trunks of date palms.

Scientific Analysis of the Beehives

Three scientific studies have so far been conducted on the Tel Reḥov apiaries. Dvorah Namdar of the Weizmann Institute of Science and her colleagues have identified molecules of beeswax embedded in the walls of the hives (Mazar *et al.* in press). Guy Bloch of the Institute of Life Sciences of the Hebrew University of Jerusalem, assisted by our team member Ido Wachtel, is presently studying the biological remains from charred honeycombs discovered in two of the hives. Finally, Mina Evron of Haifa University is examining the pollen remains from the beehives. The results of these last two studies will be published in due time.

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Conclusions

The discovery of the beehives at Tel Reḥov is unique since it appears that no apiaries have ever been discovered in the archaeology of the Old World. It comprises an innovation in the archaeological study of ancient economies in Israel and its neighbors during the period of the Israelite Monarchy. Based on the ceramic evidence and C^{14} dates, the apiary at Tel Reḥov was in use during the latter part of the United Monarchy and/or during the initial period of the Northern Kingdom of Israel, prior to the Omride Dynasty. The organized establishment and efficient operation of the Reḥov apiary, as well as its related cultic practices, indicate that there had been a robust central authority that was able to conduct such a specialized industry and to force the populace to tolerate a huge number of bees in the center of their town. Such an endeavor could not have been the work of a private person and the question remains who exactly this authority was—a local ruler or some more-centralized governing body? From where did the specialized know-how to build such an operation come? Could it be from Egypt, the main civilization where such an industry is textually and pictorially documented in the ancient sources? Finally, what were the reasons for the termination of this lucrative and well-run industry with the destruction of this part of the town at the end of Stratum V? Could this have been the result of an historical event like Shoshenq I's raid? The pharoah mentions Reḥov in his list of conquered cities. Or was there another reason for the violent and fiery destruction of the apiary and its surroundings? Answers to these and other interesting questions related to the unique find of the Iron Age IIA beehives from Tel Reḥov await further research.

Notes

1. The excavations have been carried out under the direction of Amihai Mazar on behalf of the Institute of Archaeology of the Hebrew University. Nava Panitz-Cohen was director of the excavations in Area C, which is the focus of this paper. In the study of the beehives we consulted the following beekeeping experts from the Ministry of Agriculture in Israel: H. Efrat, Y. Slabetsky, and Y. Weiss, as well as D. Namdar from the Weizmann Institute, Reḥovot, and G. Bloch from the Institute of Life Sciences of the Hebrew University, who have conducted various studies of our finds.

2. For drawings and discussion, see Mazar *et al.* (2005:225–29).

3. The C^{14} measurements of samples from Tel Reḥov became possible due to cooperation between our expedition and H. Bruins of Ben-Gurion University of the Negev and Johannes Van der Plicht of Groningen University, the Nederlands. A detailed publication can be found in Mazar *et al.* (2005).

4. For recent summaries, see Finkelstein (2005) and Mazar (2005).

5. We thank Tallay Ornan for this reference.

6. For references, see Forbes (1966); Crane and Graham (1985:149–53); Safrai (1988).

7. We thank Y. Slabetky of the Israel Ministry of Agriculture and the Halabi family for arranging and hosting this visit.

References

Breasted, J. H.
1906 *Ancient Records of Egypt*. Chicago: University of Chicago Press.

Cahill, J.M.
2006 The Excavations at Tell el Hammah: A Prelude to Amihai Mazar's Beth-Shean Valley Regional Project. Pp. 429–60 in *"I Will Speak the Riddles of Ancient Times": Archaeological and Historical Essays in Honor of Amihai Mazar,* ed. A. M. Maeir and P. de Miroschedji. Winona Lake, IN: Eisenbrauns.

Cavigneaux, A., and Ismail, B. K.
1990 Die Statthalter Von Suhu und Mari im 8. Jh. V. Chr. *Baghdader Mitteilungen* 21: 322–456.

Collins, B. J.
2002 Animals in Hittite Literature. Pp. 237–50 in *A History of the Animal World in the Ancient Near East*, ed. B. J. Collins. Leiden: Brill.

Crane, E.
1983 *The Archaeology of Beekeeping*. London: Duckworth.

Crane, E., and Graham, A. J.
1985 Bee Hives of the Ancient World. *Bee World* 66: 23–41; 148–70.

Dalley, S.
1984 *Mari and Karana, Two Old Babylonian Cities*. New York: Gorgias.

Finkelstein, I.
1996 The Archaeology of the United Monarchy: An Alternative View. *Levant* 28: 177–88.

Finkelstein, I., Zimhoni, O., and Kafri, A.
2000 The Iron Age Pottery Assemblages from Areas F, K and H and their Stratigraphic and Chronological Implications. Pp. 244–324 in *Megiddo III: The 1992–1996 Seasons*, ed. I. Finkelstein, D. Ussishkin and B. Halpern. Tel Aviv: Emery and Claire Yass Publications in Archaeology, Tel Aviv University.

Forbes, R. J.
1966 *Studies in Ancient Technology*, vol. 5. 2nd edition. Leiden: Brill.

Forti, T.
2006 Bee's Honey: From Realia to Metaphor in Biblical Wisdom Literature. *Vetus Testamentum* 56: 327–41.

Gal, A., and Alexandre, Y.
2000 *Horbat Rosh Zayit: An Iron Age Storage Fort and Village.* IAA Reports No. 8. Jerusalem: Israel Antiquities Authority.

Gitin, S.
1989 Incense Altars from Ekron, Israel and Judah: Context and Typology. *Eretz Israel* 20: 52*–67*.
1995 Tel Miqne-Ekron in the 7th Century B.C.E.: The Impact of Economic Innovation and Foreign Cultural Influences on a Neo-Assyrian Vassal City-State. Pp. 61–79 in *Recent Excavations in Israel: A View to the West: Reports on Kabri, Nami, Miqne-Ekron, Dor and Ashkelon,* ed. S. Gitin. Archaeological Institute of America, Colloquia and Conference Papers 1: Dubuque, IA: Kendall/Hunt.

Havakuk, J.
1985 *Life in the Caves of the Southern Hebron Hills.* Tel Aviv: Ministry of Defense. (Hebrew)

Kritsky, G.
2007 The Pharaohs' Apiaries. *Kmt* 18: 63–69.

Published in Near Eastern Archaeology (ISSN 1094-2076), Volume 70, Number 4, December 2007

Levi, S., and Edelstein, G.
1972 Cinq Années de Fouilles à Tel ʿAmal (Nir David). *Revue Biblique* 79: 325–67.
Lichtheim, M.
1973 *The Old Kingdom.* Vol. 1 of *Ancient Egyptian Literature: A Book of Readings*. Berkeley and Los Angeles: University of California Press.
Mazar, A.
1997 Iron Age Chronology: A Reply to I. Finkelstein. *Levant* 29: 157–67.
1999 The 1997–1998 Excavations at Tel Reḥov: Preliminary Report. *Israel Exploration Journal* 49: 1–42.
2003a The Excavations at Tel Reḥov and their Significance for the Study of the Iron Age in Israel. *Eretz Israel* 27: 143–60. (Hebrew)
2003b Three 10th–9th Century B.C.E. Inscriptions from Tel Reḥov. Pp. 171–84 in *Saxa loquentur: Studien zur Archäologie Palästinas/Israels. Festschrift für Volkmar Fritz zum 65. Geburtstag*, ed. C. G. Den Hertog, U. Hübner and S. Münger. Alter Orient und Altes Testament, 302. Münster: Ugarit Verlag.
2005 The Debate over the Chronology of the Iron Age in the Southern Levant: Its History, the Current Situation, and a Suggested Resolution. Pp. 5–30 in *The Bible and Radiocarbon Dating: Archaeology, Text and Science*, ed. T. L. Levy and T. Higham. London: Equinox.
2007 The Spade and the Text: The Interaction between Archaeology and Israelite History Relating to the Tenth–Ninth Centuries BCE. Pp. 143–71 in *Understanding the History of Ancient Israel*, ed. H. G. M.Williamson. Proceedings of the British Academy, 143. London: British Academy.
2008 Reḥov, Tel. Pp. 2013–18 in *The New Encyclopedia of Archaeological Excavations in the Holy Land.* Volume V, ed. E. Stern. Jerusalem: Israel Exploration Society.
in press Tel Reḥov: The Contribution of the Excavations to the Study of the Iron Age in Northern Israel. *Proceedings of the 2nd International Congress on the Archaeology of the Ancient Near East.* Winona Lake, IN: Eisenbrauns.
Mazar, A.; Bruins, H.; Panitz-Cohen, N.; and van der Plicht, J.
2005 Ladder of Time at Tel Reḥov: Stratigraphy, Archaeological Context, Pottery and Radiocarbon Dates. Pp. 193–255 in *The Bible and Radiocarbon Dating: Archaeology, Text and Science*, ed. T. Levy and T. Higham. London: Equinox.
Mazar, A.; Namdar, D.; Panitz-Cohen, N.; Neumann, R; and Weiner, S.
in press The Iron Age Beehives at Tel Reḥov in the Jordan Valley: Archaeological and Analytical Aspects. *Antiquity.*
Muhly, J.
1989 The Organization of the Copper Industry in Late Bronze Age Cyprus. Pp. 298–314 in *Early Society in Cyprus*, ed. E. Peltenburg. Edinburgh: Edinburgh University Press.
Serpico, M., and White, R.
2000 Oil, Fat and Wax. Pages 390–429 in *Ancient Egyptian Materials and Technology*, ed. P. T. Nicholson and I. Shaw. Cambridge: Cambridge University Press.
Rothenberg, B.
1995 Studies of Timna 1959–1990. Pp. 1–45 in *Eilat: Studies in the Archaeology, History and Geography of Eilat and the Aravah*, ed. Y. Aviram. Jerusalem: The Israel Exploration Society. (Hebrew)
Safrai, Z.
1988 Beekeeping and Honey Production in the Land of Israel During the Roman Period. *Israel –People and Land: Eretz Israel Museum Yearbook*, new series, 4: 211–14. (Hebrew)
Sagrillo, T. L.
2001 Bees and Honey. Pp. 172–74 in *The Oxford Encyclopedia of Ancient Egypt*, ed. D. B. Redford. Oxford: Oxford University Press.
Zarzecki-Peleg, A.
2005 Part 1: Stratigraphy and Architecture. Pp. 3–232 in *Yoqne'am II: The Iron Age and the Persian Period*. Qedem Reports 6, ed. A. Ben-Tor, A. Zarzecki-Peleg, and S. Cohen-Anidjar. Jerusalem: Hebrew University of Jerusalem and Israel Exploration Society.
Zertal, A., and Mirkam, N.
2000 *The Manasseh Hill Country Survey Volume III*. Tel Aviv: Ministry of Defense Publishing and Haifa University Press. (Hebrew)
Zimhoni, O.
1997 *Studies in the Iron Age Pottery of Israel: Typological, Archaeological and Chronological Aspects*. Tel Aviv: Journal of the Institute of Archaeology of Tel Aviv University Occasional Publications 2. Tel Aviv: Tel Aviv University.

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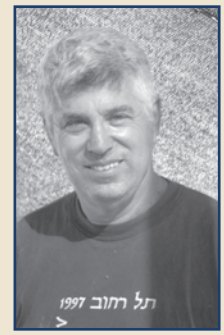

Amihai Mazar holds the Eleazar Sukenik Chair in the Archaeology of Israel at the Institute of Archaeology, the Hebrew University of Jerusalem. He has directed numerous archaeological projects including a survey of the aqueducts of Jerusalem; excavations at Tell Qasile, Giloh, the "Bull Site," Tel Batash (biblical Timnah), Tel Beth Shean, and currently the excavations at Tel Reḥov (since 1997). He is the author of Archaeology of the Land of the Bible *(1990) and has authored or edited seven volumes of archaeological reports on the excavations at Tell Qasile, Tel Batash, and Tel Beth Shean.*

Nava Panitz-Cohen, a graduate of the Institute of Archaeology at the Hebrew University of Jerusalem, is an instructor at the Department of Archaeology, the Hebrew University of Jerusalem. She has served as a research assistant to Professor Amihai Mazar for the past nineteen years. She has excavated at numerous sites, including Tel Batash, Tel Beth Shean, and Tel Reḥov.