



SALVAGE EXCAVATIONS AT TEL QASHISH (TELL QASIS) AND TELL EL-WA'ER (2010–2013)

Edwin C. M. van den Brink | Matthew J. Adams (eds.)

Salvage Excavations at Tel Qashish (Tell Qasis)
and Tell el-Wa'er (2010–2013)

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Matthew J. Adams

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Edited by

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In Memoriam
Sharon Zuckerman
(1965–2014)



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Preface

This volume is the first to appear in the *Jezreel Valley Regional Project Studies* series, which was conceived to be a venue for the publication of the extensive new primary and synthetic data generated by teams under the collaborative framework of the Jezreel Valley Regional Project (JVRP), including archaeological reports, environmental studies, and historical analyses. The (JVRP) is a long-term, multi-disciplinary survey and excavation project investigating the history of human activity in the Jezreel Valley from the Paleolithic through the Ottoman period. The project strives for a total history of the region using the tools and theoretical approaches of such disciplines as archaeology, anthropology, geography, history, ethnography, and the natural sciences, within an organizational framework provided by landscape archaeology. The project is also a framework for collaboration, facilitating interaction, collegiality, publication, and resources-sharing among its independent member projects, which currently include the *Castra Legionis VI Ferrata* Excavations, The Tel Aviv University Megiddo Expedition, The Tel Shimron Excavations, and The Tell Abu Shusha Excavations, as well as other initiatives currently in development.

The current volume brings to publication together several final reports of salvage excavations carried out by the Israel Antiquities Authority (IAA) in the vicinity of Tel Qashish between the years 2010 and 2013. These excavations, carried out in advance of major national development projects, provide a rare

window into the archaeological remains within the landscape between tells which usually receive such little attention from research excavations. These remains between tells have much to contribute to the overall story of the region, contributing data either non-existent or inaccessible on multi-period settlement sites. They are also the remains that are at the most risk of destruction by modern development. As the national body responsible for the antiquities of Israel, the IAA carries out hundreds of excavations across the country every year, a majority of them in the landscape between tells and is therefore the most important producer of knowledge concerning these understudied components of the archaeological landscape. The salvage excavations presented herein reveal new data on the Paleolithic period, Early Bronze Age, and Late Bronze Ages in the Jezreel Valley and contribute greatly to our knowledge thereof.

Additional volumes in the JVRP Studies series currently in preparation include *Tel Megiddo East 1: The 2010-2013 Seasons*; *Castra Legionis VI Ferrata 1: The Principia and Related Studies*; *Stability and Change in the Jezreel Valley from 1200 to 900 BCE*; and *Current work in the Jezreel Valley 2022*.

Matthew J. Adams
Margaret E. Cohen

Series Editors,
Jezreel Valley Regional Project Studies

Acknowledgments

We wish to thank collectively the various members of the excavation teams for their hard work during the years of excavation and the preparation of this publication. We recognize that salvage excavations can be both rewarding and thankless, and we wish to extend our warm gratitude to all of those who participated in the projects presented herein. Each are thanked individually in the chapters relevant to their work.

Special thanks are also due to Dr. Viviana Moscovich who worked tirelessly over many months

to bring order and harmony to the varied reports assembled here. Her invaluable assistance is greatly appreciated.

Finally, this publication would not have been possible without the support of the Israel Antiquities Authority's technical staffers and without the courteous consent of its Publication Committee, the latter presently headed by Dr. Zvi Greenhut.

The Editors

Abbreviations

ÄAT	Ägypten und Altes Testament
ABS	Archaeology and Biblical Studies
ADPV	Abhandlungen des Deutschen Palästinavereins
<i>AnSt</i>	<i>Anatolian Studies</i>
ASL	above sea level
BARIS	British Archaeological Reports International Series
<i>BASOR</i>	<i>Bulletin of the American Schools of Oriental Research</i>
BASORSup	Bulletin of the American Schools of Oriental Research Supplement Series
<i>BBSAJ</i>	<i>Bulletin of the British School of Archaeology in Jerusalem</i>
<i>BSA</i>	<i>Bulletin on Sumerian Agriculture</i>
CHANE	Culture and History of the Ancient Near East
CTE	core trimming elements
<i>ErIsr</i>	<i>Eretz Israel</i>
GBW	gray burnished ware
<i>HA-ESI</i>	<i>Hadashot Arkheologiyot-Excavations and Surveys in Israel</i>
HUJ	Hebrew University of Jerusalem
IAA	Israel Antiquities Authority
<i>IEJ</i>	<i>Israel Exploration Journal</i>
ill(s).	illustration(s)
INAA	instrumental neutron activation analysis
<i>JArS</i>	<i>Journal of Archaeological Science</i>
<i>JPOS</i>	<i>Journal of the Palestine Oriental Society</i>
JVRP	Jezreel Valley Regional Project
LBNL	Laurence Berkeley National Laboratory
MNI	minimum number of individuals
MP	Middle Paleolithic
MURR	University of Missouri Research Reactor
<i>NEA</i>	<i>Near Eastern Archaeology</i>
NBK	naturally backed knives
NISP	number of identified specimens
OBO	Orbis Biblicus et Orientalis
OIP	Oriental Institute Publications
<i>OJA</i>	<i>Oxford Journal of Archaeology</i>
OSL	optically stimulated luminescence
PE	primary elements
<i>PEQ</i>	<i>Palestine Exploration Quarterly</i>
pers. comm.	personal communication
PPN	Pre-Pottery Neolithic
REE	rare earth elements
SAOC	Studies in Ancient Oriental Civilization

SMNIA	Sonia and Marco Nadler Institute of Archaeology Monograph Series
TA	<i>Tel Aviv</i>
TDA	total diagnostic assemblage
TQS	Tel Qashish South
TQW	Tel Qashish West
UP	Upper Paleolithic
ZDPV	<i>Zeitschrift des Deutschen Palästina-Vereins</i>

Part I

Introduction

Chapter 1

Introduction: The History of the Project and Overview of the Sites

Edwin C. M. van den Brink (*Israel Antiquities Authority*)

Matthew J. Adams (*The W.F. Albright Institute of Archaeological Research*)

This volume is the first volume of the Jezreel Valley Regional Project Studies series, bringing together several final reports relating to salvage excavations carried out by the Israel Antiquities Authority (IAA) between the years 2010 and 2013. These followed in the wake of a number of intensive infrastructure development plans that were envisioned in the immediate environs of Tel Qashish in the northern Jezreel Valley, and that have since come to fruition (figs. 1.1–4). These plans included construction of a transnational natural gas pipeline, a new major highway intersection, and the new *Rakevet HaEmek*, “Valley Railway,” linking Haifa–‘Afula–Bet She’an, the latter being a reinvention of one of the most important segments of the Ottoman Hejaz railway. The gas line and the railway were planned to pass within 150 m of the northern and western flanks of Tel Qashish before crossing the Kishon River to the south. The new intersection expanding the cross-Israel Highway 6 and the widening of Highway 70 was located immediately to the west of Tel Qashish. Considering the known remains at Tel Qashish and the considerable density of archaeological remains in the Jezreel Valley generally, trial excavations were conducted by the IAA at key locations in the landscape to be impacted by the infrastructure plans, and salvage excavations carried out as needed.

Setting of the Sites

Given the present excavations’ close proximity to Tel Qashish (NIG 210349-732351/210675-732569),

the latter will serve as a natural point of departure and reference in the landscape (figs. 2.2–4). The environs of this tell and the landscape history are described by Oren Ackermann and Noam Greenbaum (ch. 2, this volume, with additional discussion in ch. 3). Tel Qashish (Hebrew, תל קשיש, from Arabic, تل القشيش, “Mound of the Husk”) is a relatively small, elongated tell about 270 × 160 m at its base (ca. 28 m ASL) and rising to about 28 m (56 m ASL) above the surrounding plain. It is located in the northwestern part of the Jezreel Valley, on the northern bank of the perennial Kishon River that circumscribes its west and south flanks (figs. 1.3–5). The Kishon, the second largest river in Israel reaching the Mediterranean, is the primary drainage vehicle for the Jezreel Valley and the surrounding mountains of Manasseh on the west and south and the Gilboa and Nazareth ranges on the east and north. After passing Tel Qashish, the river enters the narrow Kishon water gap between Mount Carmel and the Tiv’on hills before entering the Akko plain and debouching into the Mediterranean next to Haifa, in the Kishon estuary north of the Carmel Ridge (fig. 1.5; Artzy 2006). The site’s strategic location at the mouth of this pass between the Jezreel Valley and the Akko plain was probably key to its long history.

A natural spring, ‘En Qashish, is located about 100 m south of the mound that invited habitation in this area already during the Levantine Middle Paleolithic where two sites have been discovered, ‘En Qashish and ‘En Qashish South (fig. 1.3; part 2, this volume). About 500m northwest of Tel Qashish, on

the opposite side of the Kishon, is the small mound of Tell el-Wa'er (Hebrew: תל אל-וער, Arabic: تل الوعر; part 3, this volume). Two kilometers to the south of Tel Qashish is the prominent mound of Tel Yoqne'am (Hebrew: תל יָקְנָעַם) or Tell Qamun (Arabic: تل قامون), the largest and longest lived site (Early Bronze Age through Ottoman) close to the salvage projects reported on here (fig. 1.6; Ben-Tor, Avisar, and Portugali 1996; Ben-Tor, Zarzecki-Peleg, and Cohen-Anidjar 2005; Ben-Tor, Ben-Ami, and Livneh 2005).

Previous Archaeological Research at and around Tel Qashish

Tel Qashish

Trial excavations (two trenches) were conducted in Tel Qashish as early as in the 1920s (Garstang 1922) yielding solely Early Bronze Age pottery. The site was surveyed in the early 1950s by Raphael Giveon (1954) who found pottery ranging from the Middle Bronze Age to the Hellenistic period. Another survey of the site was conducted in the 1970s (Raban 1982; site 11) identifying architectural remains from the Middle Bronze, Iron Age, and Persian periods, as well as material culture from all periods from the

Chalcolithic through "Arabic periods" (Raban 1982, xi). As part of the Yoqne'am Regional Project Amnon Ben-Tor and Yuval Portugali (1987) surveyed

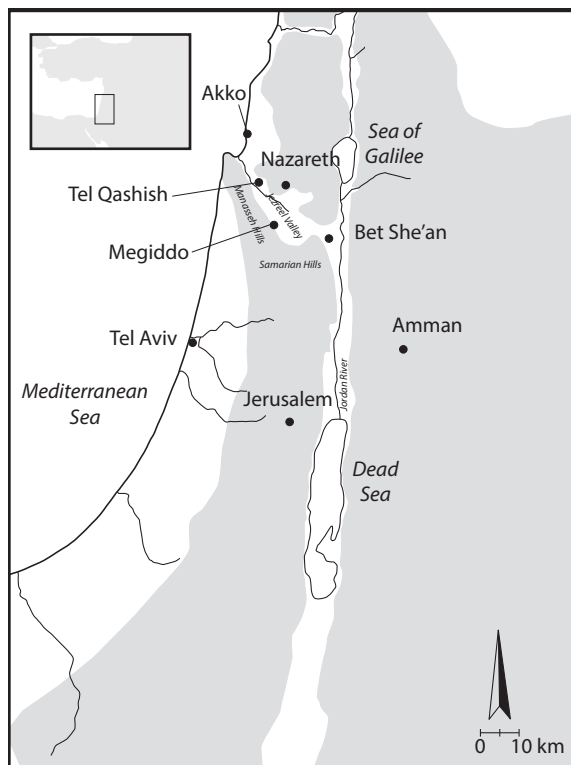


Fig. 1.1. General map of the southern Levant.

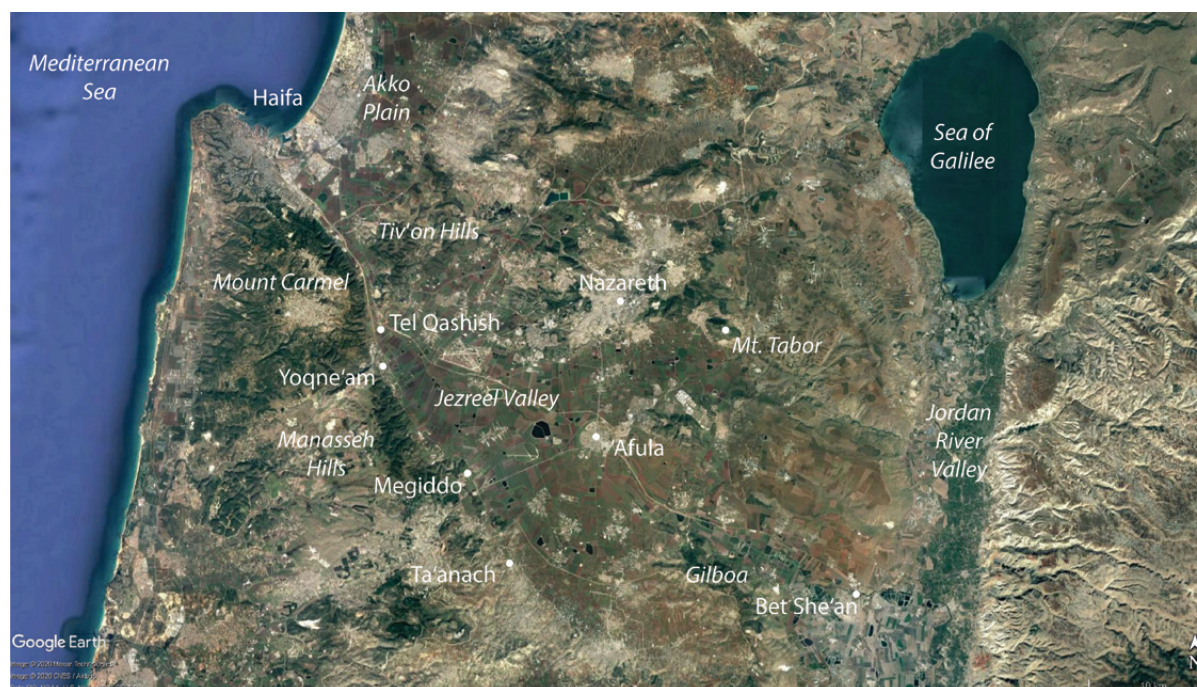


Fig. 1.2. Map of the Jezreel Valley. Courtesy of Google Earth.

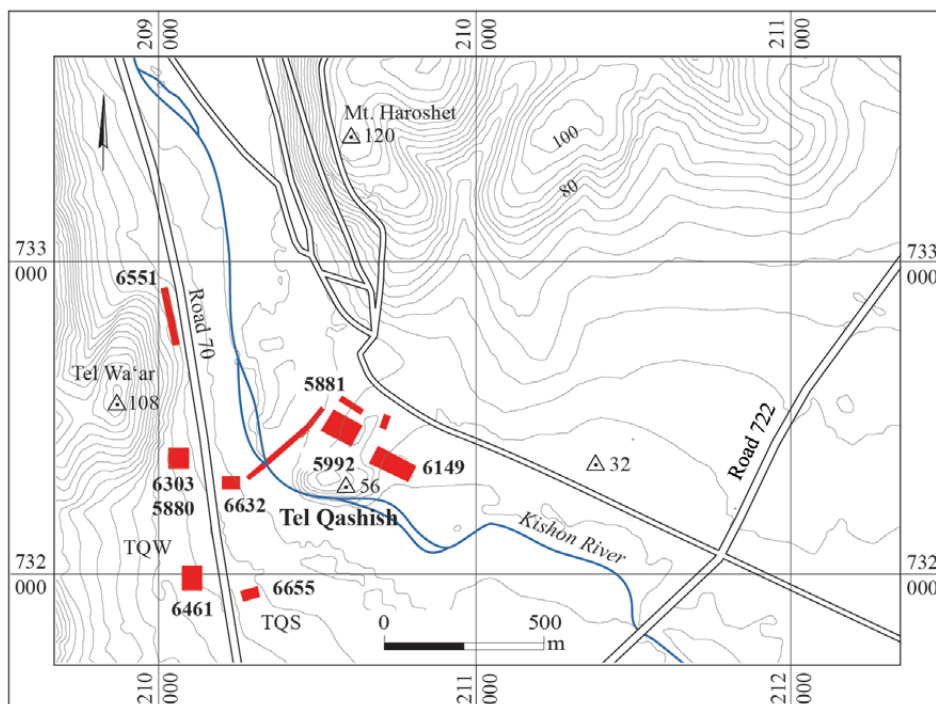


Fig. 1.3. Map of Tel Qashish region with the locations of the salvage excavations by permit number.



Fig. 1.4. Map of Tel Qashish and adjacent sites. Orthophoto from 2011 prior to the infrastructure construction works, courtesy of the JVRP.



Fig. 1.5. Aerial view of Qashish region after the completion of infrastructure works, looking north-northwest through the Kishon water gap, with the plain of Akko and the coast in the distance. Courtesy of the JVRP.

the site and between 1978 and 1987 carried out eight seasons of excavation. The project identified fifteen distinctive archaeological strata with remains dating to the late Early Bronze Age I (EB IB) through the Ottoman period (Ben-Tor, Bonfil, and Zuckerman 2003).

Two specific periods of occupation at Tel Qashish should be mentioned at the outset in the context of the presentation of the salvage excavations to be submitted, the Early Bronze Age I and the Late Bronze Age IIB. The earliest *in situ* remains excavated at Tel Qashish are from the late Early Bronze Age I (EB IB; Strata XIII–XV). While only narrowly exposed, late EB I Qashish consisted of large well-built houses, and the surveys found EB IB pottery extensively beyond the topographical boundaries of the mound, suggesting the site during that period was larger than the tell itself (Ben-Tor and Bonfil 2003). During the succeeding EB II–III period, the site contracted to the boundaries of the tell and was fortified. In the Late Bronze Age (Strata VII–V), the site has the typical material cultural assemblages of nearby sites such as Megiddo and Yoqne'am, and suf-

fered the similar fate of being destroyed in the LB IIB (Stratum V; Ben-Tor, Bonfil, and Zuckerman 2003).

While the site was tentatively identified with “Helkath” mentioned in the list of 119 cities conquered by Pharaoh Thutmose III (Aharoni 1959), Amnon Ben-Tor, Ruhama Bonfil, and Sharon Zuckerman (2003,1) propose the site to be “Dabbesheth” from the Book of Joshua (Josh 19:11). However, no conclusive identification of the site with an ancient toponym has been made and these equations remain speculative.

Qiryat Haroshet

While not the subject of the reports in this volume, it is worth mentioning the salvage excavation at Qiryat Haroshet, 1.5 km northwest of Tel Qashish (figs. 1.4–5). Prior to a development project initiated by the municipality of Qiryat Haroshet on the western slopes of the ridge of the Tiv'on Hills, two seasons of excavation during 1998–1999 were carried out by the Recanati Institute for Maritime Studies of the



Fig. 1.6. Aerial view of Qashish region after the completion of infrastructure works, looking south toward Yoqne'am. Courtesy of the JVRP.

University of Haifa (Salmon 2008). These revealed four burial caves that appear to be part of a larger burial ground that was started during the EB IA and remained in use until at least the EB IB (Salmon 2008). The excavator suggested that the cemetery was part of the funerary landscape of EB Qashish. One may assume that the mortuary population derived from the nearby EB IA site at Tell el-Wa'er (see below) and from late EB I Tel Qashish itself.

Tell el-Wa'er and Tel Qashish West

Tell el-Wa'er, situated on a hillock 500 m northwest of Tel Qashish on the opposite side of the Kishon River (figs. 1.3–4, 7; 3.1–2), was identified more than a century ago (Conder and Kitchener 1881–1883, maps; von Mülinen 1908, 211). Pottery sampled from its surface during an archaeological survey for the map of Yagur included sherds from the Iron, Persian, Hellenistic, Roman, Byzantine, and Early Islamic periods (Olami, Sender, and Oren 2004, 61*, site 189). In addition, two caves were identified on this hillock (site 188). Excavations at the foot of Tell el-Wa'er were conducted in 2010 by the IAA, and

uncovered EB IA settlement remains (part 3, this volume). Another locality nearby, also excavated in 2010, was labeled Tel Qashish West (TQW) by its excavators, and revealed Mousterian finds (ch. 3, this volume; Yaroshevich, Khalaily, and Kirzner 2011).

'En Qashish

The site of 'En Qashish, some 100 meters south of the mound and the Kishon River (figs. 1.3–5; 3.1–2) was identified during a survey conducted in 2004 by the IAA around the junction of Yoqne'am. It was subsequently probed in a series of excavations conducted by a team from the Hebrew University, Jerusalem in 2005, 2009–2011, yielding the remains of an open-air Mousterian campsite from the Middle Paleolithic (70,000–60,000 YBP; Hovers et al. 2008; ch. 3, this volume). The site was further extensively probed in 2013 by the IAA (permit A6866/2013; Barzilai et al. 2015; Ekshtain et al. 2019), revealing a sequence of seasonal, short-lived Middle and Upper Paleolithic camp site occupations (ch. 3, this volume).



Fig. 1.7. Aerial View of the hillock of Tell el-Wa'er. The Tell el-Wa'er excavations were conducted near the northern base of the hill near the highway (right) and the TQW excavations were conducted near the southern base of the hill near the infrastructure installation (left).

'En Qashish South

Archaeological test trenching performed prior to the construction of a highway segment at 300 m south of the eponymous spring of 'En Qashish were followed in 2012–2013 by trial and salvage excavations conducted by the IAA (figs. 1.3–4; permit A6655/2013), initially in five distinct subareas marked A–E. Epipaleolithic *in situ* deposits were found in Areas D and E. These two subareas were subsequently extended into Areas E/F (southern area) and D/G (northern area), each covering *about* 120m², exposing further open-air *in situ* Epipaleolithic occupation remains (Yaroshevich et al. 2014, 2016).

The 2010–2013 Excavations

Between the years 2010–2013 five salvage excavations were conducted in the vicinity of Tel Qashish by the IAA, revealing Middle and Epipaleolithic at Tel Qashish West and Tel Qashish South (part 2, this volume), early Early Bronze Age I at Tell el-Wa'er

(EB IA; part 3, this volume), late Early Bronze Age I at Tell Qashish (EB IB; part 4, this volume), Late Bronze Age II at Tel Qashish (part 5, this volume), and some early Roman remains (ch. 11, this volume). The final reports of these excavations form the core of the present volume.

Tel Qashish West: The Middle Paleolithic Excavations

The salvage excavations conducted by the IAA (permit A5880/2010) at Tel Qashish West (figs. 1.3–4, 7; 3.1–2), located at the foot of Tell el-Wa'er and distanced just a few hundred meters from a natural flint source, were carried out prior to the construction of a natural gas terminal. Three excavation areas were opened in the area and sixteen squares were excavated (part 2, this volume), revealing three layers; Only the middle one (Layer 2) contained *in situ* remains, yielding rich flint assemblages characterized by an abundance of Levallois items diagnostic of the Middle Paleolithic. The site is roughly contemporary with the nearby occupation of 'En Qashish re-

ferred to above. Both indicate the in-situ occupation of Neandertals who used these two sites alternately according to the seasonal flooding of the Kishon.

Tel Qashish South: The Middle Paleolithic/ Epipaleolithic Excavations

The site labeled Tel Qashish South (figs. 1.3–4; 3.1–2) was probed in 2012 by the IAA (permits A6461/2012, A6506/2012, and A6632/2012) in three separated localities about 300–400 m south from Tel Qashish, yielding mixed flint assemblages, with Levallois items appearing side by side with bladelet-oriented debitage characteristic of the Epipaleolithic (Yaroshevich 2012, 2013, 2014, 2015; part 2, this volume).

Tell el-Wa'er: The Early Bronze Age IA Excavations

Salvage excavations on behalf of the IAA were conducted by the IAA (permit A6551/2012), in a 10 m × 80 m strip of cultivated land at the northeastern edge of Tell el-Wa'er (figs. 1.3–4, 7; 3.1–2; 4.1; part 3, this volume), along a segment of the planned route of the Haifa–Afula railway line and Highway 6, and parallel and west of Road 70, revealing segments of fifteen oval buildings of a hitherto unknown Early Bronze Age IA settlement almost immediately beneath the present-day surface, founded on the sloping bedrock (fig. 4.4). The site should be viewed alongside Yiftahel Stratum II as representative of the early phase of the Early Bronze Age I (chs. 5–6, this volume), and suggestive of the changes in settlement patterns following this early phase into the later phase, where extensive areas in and around Tell Qashish were preferred. Chapters 4–9 present the final publication of these excavations.

Tel Qashish North, Areas A–F: The Early Bronze Age IB Excavations

Excavations were conducted by the IAA over six distinct areas north of Tel Qashish (Areas A–F; figs. 1.3–6, 8; 10.1–4) over the course of three subsequent trial and salvage excavations (permits A5881/2010, A5992/2010, and A6149/2011; part 4, this volume; van den Brink and 'Ad 2011). Seventy squares distributed over four adjoining areas (A–D) within the

cultivated fields north and west of Tel Qashish were probed initially (fig. 1.8). Subsequently additional eighty squares were excavated in Areas F and E.

A dense spread of late EB I dwelling remains and several storage facilities, clearly part of a settlement, less than 100 m north of the actual Tel of Qashish, that is, in Areas E South/North and F, seem to have constituted the core of the site. In order to distinguish the former from the contemporary settlement remains at Tel Qashish, Strata XV–XIV, Areas E and F were designated as “the lower village,” and the Tel Qashish, Strata XV–XIV remains as “the upper village.” The remaining four areas probed slightly further to the west (Areas C and D) and north (Areas A and B), seem to be peripheral to it. Areas C and D, characterized by an almost continuous spread of small limestone surfaces and a single, rectangular structure can best be typified as a late EB I agricultural activity area. Outlying Areas A and B yielded only sporadic late EB I potsherds near or close to the natural limestone bedrock. The only structural remains here are a segment of an early Roman stone-paved road in Area A1, and a bedrock cavity containing a Late Bronze Age II ritual pottery cache in Area B (see below).

Overall, these excavations outside the boundaries of Tel Qashish are complementary to the finds from the tell, Strata XV–XIV. In the Early Bronze Age IB, the settlement consisted of a core of well-built houses on the tell, which sprawled into the lower village of the salvage excavations, which included additional domestic units and grain storage facilities (Areas E North and South–F) as well as agricultural installations and industrial areas (Areas C–D).

In the transition to the EB II/III, the core of the tell proper was fortified and its margins abandoned. This is a phenomenon that can be seen at EB I–II transitional sites around the region (e.g. Yoqne'am and Megiddo, Level J-4 to Level J-5; Adams 2013).

Tel Qashish North, Area B: The Late Bronze Age II Excavation

Nine squares were excavated down to natural bedrock in Area B, revealing mainly spreads of EB IB pottery without any structural remains (figs. 1.3–6, 8). In one of the squares a narrow bedrock cavity (depth ca. 3 m) was excavated, containing a cache of locally produced and imported ritual ceramic ves-

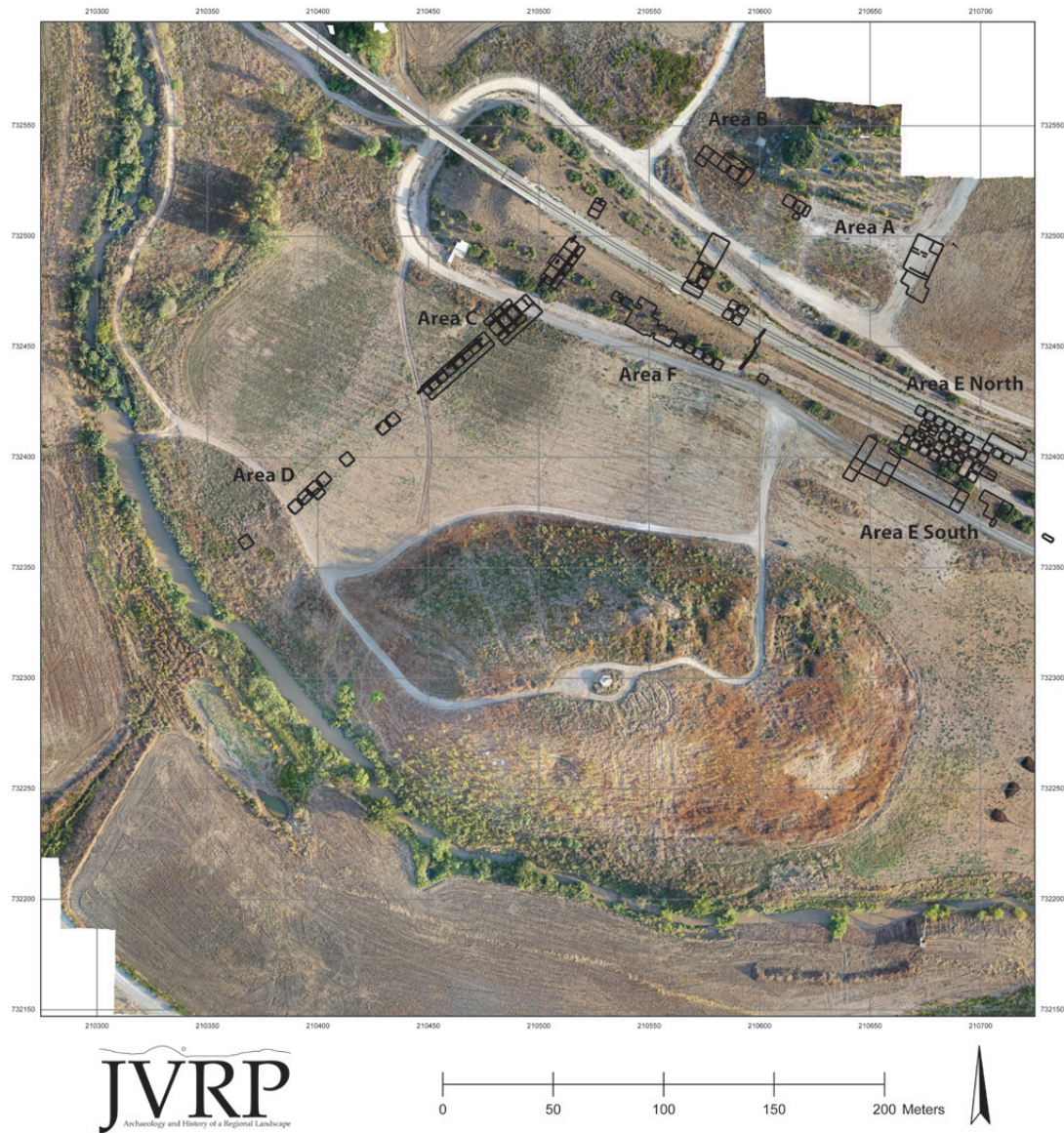


Fig. 1.8. Map of Tel Qashish showing excavation Areas A–F over 2020 orthophoto, post infrastructure construction.
Courtesy of the JVRP.

sels, dating to the Late Bronze Age II (part 5, this volume; van den Brink, Segal, and Ad 2012; Ziffer et al. 2018)). The study of the ceramic assemblage indicates that the cache resulted from the disposal of temple objects in a one-time event. The deposit was done carefully and in an organized fashion not typical of more haphazard cultic favissae known from other sites, and the excavators suggest that the cache indeed is not a typical cultic favissa. They conclude that this was a deliberate concealment of the cultic vessels, probably in the face of a specific threatening

event in the region. It is tempting to interpret this alongside the destruction of Tel Qashish Stratum V, and the collapse of LBA society across the region.

After this brief introductory overview, in the following chapters we will delve deeper, in chronological order, into the various find categories and findings deriving from the five above-mentioned relevant sites, starting with the Middle Paleolithic and ending with the Late Bronze Age II.

References

- Adams, Matthew J.
2013 "Area J, Part III: The Main Sector of Area J." In *Megiddo V: The 2004–2008 Seasons*, edited by Israel Finkelstein, David Ussishkin, and Eric Cline, 47–118. 3 vols. SMNIA 31. Tel Aviv: Institute of Archaeology.
- Aharoni, Yohanan
1959 "Zephath of Thutmose." *IEJ* 9: 110–22.
- Artzy, Michal
2006 "The Carmel Coast during the Second Part of the Late Bronze Age: A Center for Eastern Mediterranean Transshipping." *BASOR* 343: 45–63.
- Barzilai, Omry, Ariel Malinsky-Buller, Ravid Ekshtain, and Erella Hovers
2015 "En Qashish ('Ein Qashish)." *HA-ESI* 127. http://www.hadashot-esi.org.il/report_detail_eng.aspx?id=24852&mag_id=122.
- Ben-Tor, Amnon, and Ruhama Bonfil
2003 "The Stratigraphy of the Early Bronze Age." In *Tel Qashish: A Village in the Jezreel Valley; Final Report of the Archaeological Excavations (1978–1987)*, edited by Amnon Ben-Tor, Ruhama Bonfil, and Sharon Zuckerman, 10–30. Qedem Reports 5. Jerusalem: Hebrew University of Jerusalem.
- Ben-Tor, Amnon, and Yuval Portugali
1987 *Tell Qiri: A Village in the Jezreel Valley; Report of the Archaeological Excavations 1975–1977*. Qedem 24. Jerusalem: Hebrew University of Jerusalem.
- Ben-Tor, Amnon, Miriam Avissar, and Yuval Portugali
1996 *Yoqne'am I: The Late Periods*. Qedem Reports 3. Jerusalem: Hebrew University of Jerusalem.
- Ben-Tor, Amnon, Doron Ben-Ami, and Ariella Livneh
2005 *Yoqne'am III: The Middle and Late Bronze Ages; Final Report*. Qedem Reports 7. Jerusalem: Hebrew University of Jerusalem.
- Ben-Tor, Amnon, Ruhama Bonfil, and Sharon Zuckerman
2003 *Tel Qashish: A Village in the Jezreel Valley; Final Report of the Archaeological Excavations (1978–1987)*. Qedem Reports 5. Jerusalem: Hebrew University of Jerusalem.
- Ben-Tor, Amnon, Anabel Zarzecki-Peleg, and Shlomit Cohen-Anidjar
2005 *Yoqne'am II: The Iron Age and Persian Period; Final Report of the Archaeological Excavations (1977–1988)*. Qedem Reports 6. Jerusalem: Hebrew University of Jerusalem.
- Brink, Edwin C. M. van den, and Uzi 'Ad
2011 "Tel Qashish." *HA-ESI* 123. http://hadashot-esi.org.il/report_detail_eng.aspx?id=1894&mag_id=118.
- Brink, Edwin C. M. van den, Orit Segal, and Uzi 'Ad
2012 "A Late Bronze Age II Repository of Cultic Paraphernalia from the Environs of Tel Qashish in the Jezreel Valley, Israel." In *Temple Building and Temple Cult in the Levant (2.–1. Millennium BC)*, edited by Jens Kamlah, 421–34, pls. 55–62. ADPV 41. Weisbaden: Harrassowitz.
- Conder, C. R., and H. H. Kitchener
1881–1883 *The Survey of Western Palestine: Maps*. 3 vols. London: Committee of the Palestine Exploration Fund.
- Ekshtain, Ravid, Ariel Malinsky-Buller, Noam Greenbaum, Netta Mitki, Mareike C. Stahlschmidt, Ruth Shach-Gross, Nadav Nir, Naomi Porat, Daniella E. Bar-Yosef Mayer, Reuven Yeshurun, Ella Been, Yoel Rak, Nuha Agha, Lena Brailovsky, Masha Krakovsky, Polina Spivak, Micka Ullman, Ariel Vered, Omry Barzilai and Erella Hovers
2019 "Persistent Neanderthal Occupation of the Open-Air Site of 'Ein Qashish, Israel." *PLoS ONE* 14(6): e0215668. DOI: 10.1371/journal.pone.0215668.
- Garstang, John
1922 "Report: Tell el Kussis." *BBSAJ* 2: 16–17.
- Giveon, Raphael
1954 "Emeq Yizreel." *Teva Va-Aretz* 10: 515–18. [Hebrew]
- Hovers, Erella, Ariel Malinsky-Buller, Ravid Ekshtain, Maya Oron, and Reuven Yeshurun
2008 "Ein Qashish—A New Middle Paleolithic Open-Air Site in Northern Israel." *Journal of the Israel Prehistoric Society* 38: 7–40.
- Mülinen, Eberhard Graf von
1908 "Beiträge zur Kenntnis des Karmels." *ZDPV* 31: 1–258.
- Olami, Ya'akov, Shlomo Sender, and Eldad Oren
2004 *Map of Yagur (27): Archaeological Survey of Israel*. Jerusalem: Israel Antiquities Authority. http://www.antiquities.org.il/survey/newmap_en.asp?zoom=8.0000;xy:34.80852508545,31.29804992675;mapname=27.
- Raban, Avner
1982 *Archaeological Survey of Israel: Nahalal Map (28)* 16–23. Jerusalem: Archaeological Survey of Israel.
- Salmon, Yossi
2008 "Qiryat Haroshet—An Early Bronze Age Cemetery in the Vicinity of Tel Qashish." *Contract Archaeology Reports* 3: 5*–31*. http://excavations.haifa.ac.il/html/html_eng/Qiryat_Haroshet_1998.pdf.

Yaroshevich, Alla

2012 "Tel Qashish (South)." *HA-ESI* 124. http://www.hadashot-esi.org.il/Report_Detail_Eng.aspx?id=2168.

2013 "Tel Qashish (South)." *HA-ESI* 125. http://www.hadashot-esi.org.il/Report_Detail_Eng.aspx?id=2240.

2014 "Tel Qashish (South)." *HA-ESI* 126. http://www.hadashot-esi.org.il/Report_Detail_Eng.aspx?id=9568.

2015 "Tel Qashish (South) (B)." *HA-ESI* 127. http://www.hadashot-esi.org.il/report_detail_eng.aspx?id=23822&mag_id=122.

Yaroshevich, Alla, Hamudi Khalaily, and Dan Kirzner

2011 "Tel Qashish (West) Preliminary Report." *HA-ESI* 123. http://www.hadashot-esi.org.il/report_detail.asp?id=1842&mag_id=118. [Hebrew]

Yaroshevich, Alla, Nuha Agha, Elisabetta Boaretto, Lena Brailovsky, Valentina Caracuta, Noam Greenbaum, Dan Kirzner, Aviram Oshri, Naomi Porat, Yoel Roskin, Ariadna Shukrun, Polina Spivak, Katia Zutovsky, and Omry Barzilai

2014 "Investigating Pre-Agricultural Dynamics in the Levant: A New Stratified Epipaleolithic Site at 'En Qashish South, Jezreel Valley, Israel." *Antiquity Project Gallery* 88(342). <https://www.antiquity.ac.uk/projgall/yaroshevich342>.

Yaroshevich, Alla, Ofer Bar-Yosef, Elisabetta Boaretto, Valentina Caracuta, Noam Greenbaum, Naomi Porat, and Joel Roskin

2016 "A Unique Assemblage of Engraved Plaquettes from Ein Qashish South, Jezreel Valley, Israel: Figurative and Non-Figurative Symbols of Late Pleistocene Hunters-Gatherers in the Levant." *PLoS ONE* 11(8): e0160687. DOI: 10.1371/journal.pone.0160687.

Ziffer, Irit, Edwin C. M. van den Brink, Orit Segal, and Uzi Ad

2018 "A Unique Human Head-Cup from the Environs of Tel Qashish in the Jezreel Valley, Israel." In *The Adventures of the Illustrious Scholar: Papers Presented to Oscar White Muscarella*, edited by Elizabeth Simpson, 406–20. CHANE 94. Leiden: Brill.

Chapter 2

The Environs of Tel Qashish: Physiography and Geomorphology

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General Environmental Background

The site of Tel Qashish is located on a chalky hill (ca. 35m ASL) east of Road 70 and north of the modern city of Yoqne'am (figs. 2.1 and 2.2). The site is located at the juncture of four main geographical structures: (1) the Mount Carmel ridge to the west, (2) the Tiv'on hills (part of the lower Galilee) to the northeast, (3) the Jezreel Valley to the southeast, and (4) the adjacent meander of the Kishon River.

The Kishon River, the second largest river crossing the Coastal Plain in Israel, with a channel length of 70 km, and drainage area of 1100 km² (Kishon Authority 2012), drains the Jezreel Valley to the Mediterranean Sea. Near the site of Tel Qashish, the channel and the valley change dramatically, with the channel direction shifting from northwest to north, and the valley narrowing from about 13 km to less than 700 m, as the channel enters the Kishon Water Gap between Mount Carmel and the Tiv'on hills.

Geologically, the site is located next to and parallel to the Carmel fault, which stretches along the eastern side of Mount Carmel. Various rock-formation exposures occur in the site's environs: the Carmel slope, composed mainly of limestone of the Turonian Age Binna Formation, a few small exposures of chalk of the Senonian Age Paleocene Epoch Mount-Scopus group, and chalk of the Adulam and Maresha Formations of the Eocene Epoch (Segev and Sass 2009).

The Kishon floodplain is composed of thick Quaternary alluvium covered by thick vertisols. The

Tiv'on hills are composed mainly of Adulam and Maresha formations chalk of the Eocene Epoch. A few Miocene basalt exposures occur within the Jezreel Valley and on the contact line between the southeast part of the Tiv'on hills and the Jezreel Valley (Sneh, Bartov, and Rosensaft 1998).

The slopes of Mount Carmel and the Tiv'on hills are covered by rendzina soils with abundant patches of terra rossa soil covering limestone and dolomite. The Jezreel Valley is composed of grumusol (vertisols) and hydromorphic and gley soils (Dan et al. 1975; Dan, Fine, and Lavee 2007; Singer 2007).

The climate is Mediterranean, characterized by hot, dry summers and cold, rainy winters. The annual mean temperature is 17°C, with mean temperatures of 13°C in January and 25°C in August (Shahar 2007). The rainy season generally lasts from October to May, with a mean annual rainfall of 600 mm (Israel Meteorological Service 1990). On the eastern slopes of Mount Carmel, the vegetation is composed of Mediterranean maqui as well as dwarf and dense shrubs. The most abundant species are pine (*Pinus halepensis*), kermes oak (*Quercus calliprinos*), terebinth (*Pistacia terebinthus*), bay laurel (*Laurus nobilis* L.), Judas tree (*Cercis siliquastrum* L.), Syrian maple (*Acer obtusifolium* Sm.), and strawberry tree (*Arbutus andrachne* L.). On the Tiv'on hills, the primary tree species is Tabor oak (*Quercus ithaburensis*), with the occurrence of a variety of annuals and geophytes (Ministry of Environmental Protection 2011). The Jezreel Valley is dominated by agricultural cultivation.

Research Aims

In this study, we conducted a geomorphological field study in order to describe the geomorphological and paleo-landscape of the environs of Tel Qashish, and to study the connection between the physical structure of the site's environs and its location. A separate study was conducted in the area of Tel Qashish West with relevance for the Middle Paleolithic site west of the Kishon (see ch. 3, this volume). The present study was conducted in collaboration with the salvage excavations of the Early Bronze Age settlement at Tell Qashish (Areas A–F; see Part IV, this volume).

Methodology

The geomorphological and landscape history of the site was reconstructed through a geomorphological field survey. The following representative sections were tested from west to east within the areas of the Tel Qashish excavations (fig. 2.2):

Area D, Square ZY29

The lowest point of the excavation area, near the Kishon River channel, which encountered the Kishon floodplain.

Area C, Square L29

The central part of the excavation area, in the west part of the site.

Area B, Square D16

Near the top of the excavation area, in the west part of the site.

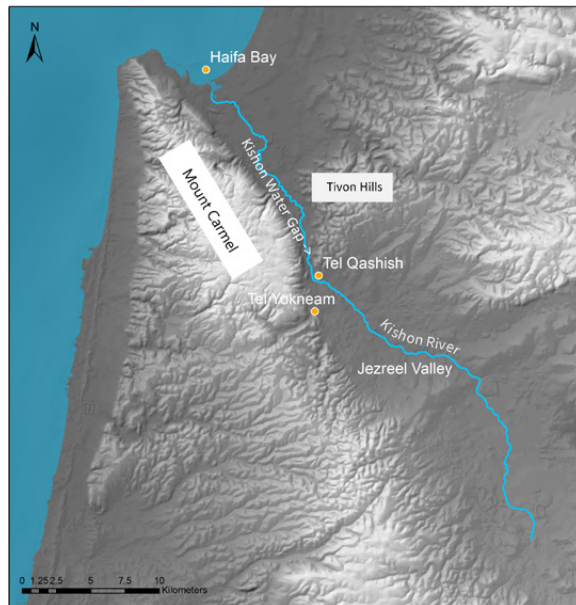


Fig. 2.1. Location of the site and main geographical features.

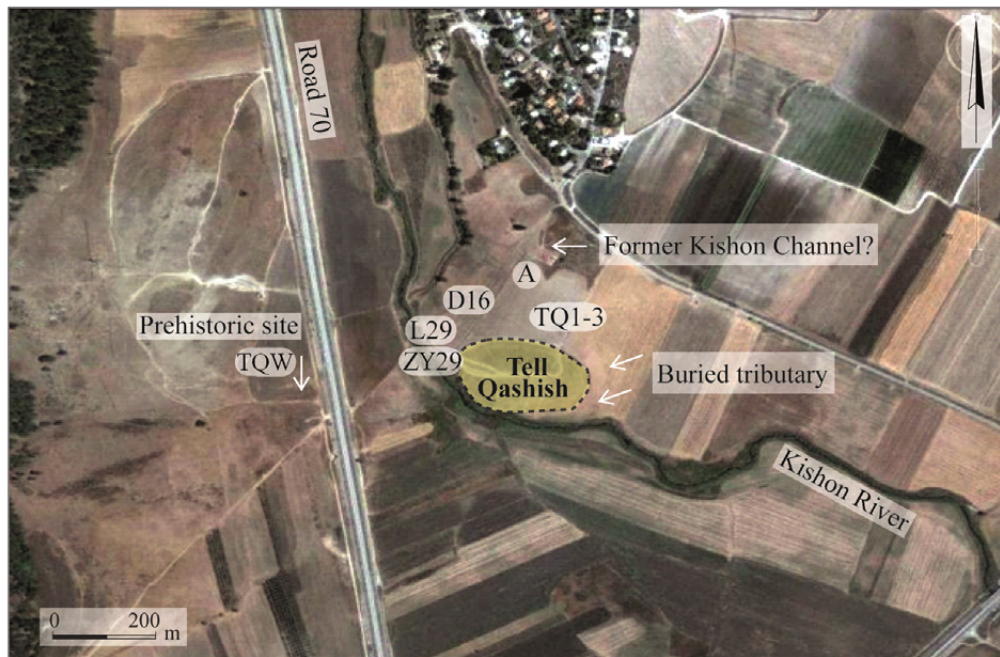


Fig. 2.2. Air photograph of the area and location of the studied sections.

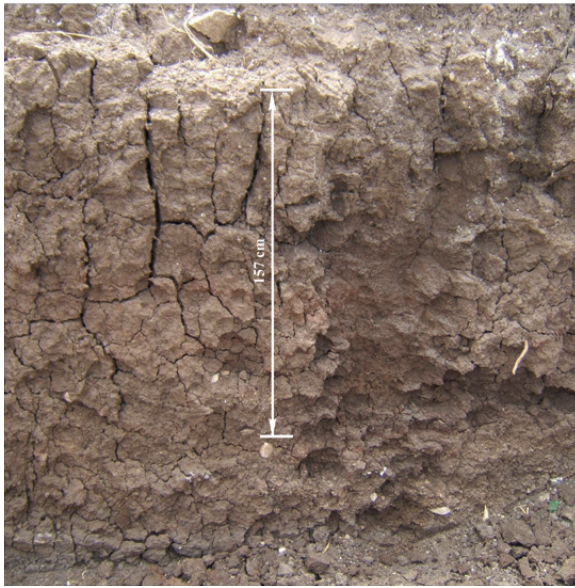


Fig. 2.3. Square ZY29, looking east.



Fig. 2.4. Square L29: Trench probe.

Area A

The highest point of the excavation area.

Area E, Sections TQ1-3E

The slopes on the east part of the site.

In the field, sediments were described according to their structure, texture, gravel content and type, sediment compaction, pedological characterizations, unit boundaries, and color. In the laboratory, the distribution of fine material (grains <2 mm) was measured by sedimentation using the hydrometer method (Klute 1986). Dating of the sedimentary units was based on flint artifacts and ceramic finds in the relevant strata. The optically stimulated luminescence (OSL) dating method was applied to one section in Square L29 to date the grumusol (which was void of ceramic finds) below the archaeological level.¹ The study of the effect and benefits of the physical structure of the site's environs on its location was conducted through field survey and analysis of the shaded relief image (fig. 2.1).

Results

The results are summarized and presented in tables 2.1–7 at the end of the chapter. In general, it seems that the Early Bronze Age remains at Tel Qashish were located on the ancient floodplain of the Kishon River and the western and eastern slopes of the tell (fig. 2.2).

Geomorphology and Sedimentology

The Kishon Floodplain: Area D, Square ZY29

This section was cut in the lowest area of the excavation adjacent to the Kishon River channel (figs. 2.2, 2.3; table 2.1). The exposure, which includes gray mottling and alluvial sediments with laminae of granular grains (fig. 2.4), suggests low-energy flows and flooding events of the Kishon River.

The Main Site Slopes

Square L29

A section in a mechanically dug trench close to Square L29, on the western slope of the tell (figs. 2.2, 2.4, 2.5; tables 2.2–3), revealed chalky bedrock at a depth of 220 cm. The bedrock is overlain by a 120 cm layer of clayey grumusol (the lower grumusol)

¹ The analysis was conducted at the OSL dating laboratory of the Geological Survey of Israel, Jerusalem.

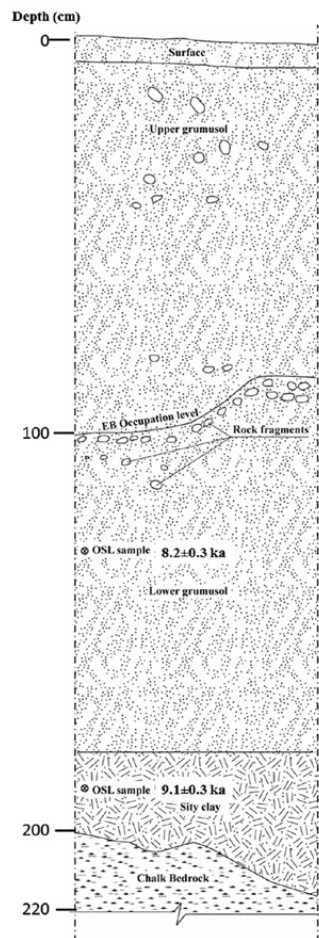


Fig. 2.5. Square L29.

dated by OSL (table 2.3) to about 8–9 ka BP. The Early Bronze Age occupation level was found on top of this layer. After the late EB I occupation was abandoned, a 70-cm layer of grumusol (the upper grumusol) covered this part of the site.

Square D16

This section, cut into the higher part of the western slope (figs. 2.2, 2.6; table 2.4), revealed that the chalky bedrock is situated about 60 cm below the present surface. The bedrock is overlain by chalky colluvial pale rendzina.

Area A

This area, the highest excavation point at 37.29 m ASL, is located on the topographic saddle north of the tell (fig. 2.2). Rounded pebbles and cobble-sized gravels were found deposited over the chalky bedrock, probably representing a former level and location (on a geological time scale) of the Kishon River,

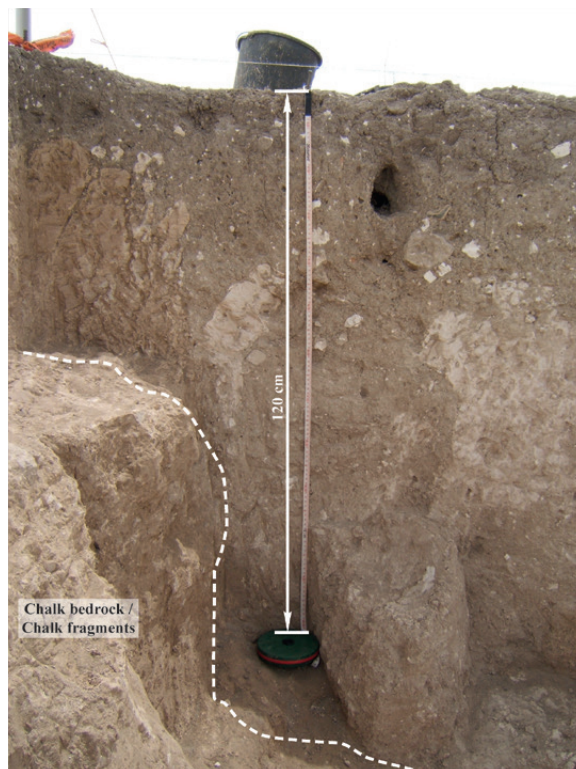


Fig. 2.6. Square D16, looking at azimuth 210°. The dashed line marks the contact between the chalky bedrock and the chalky fill sediment.

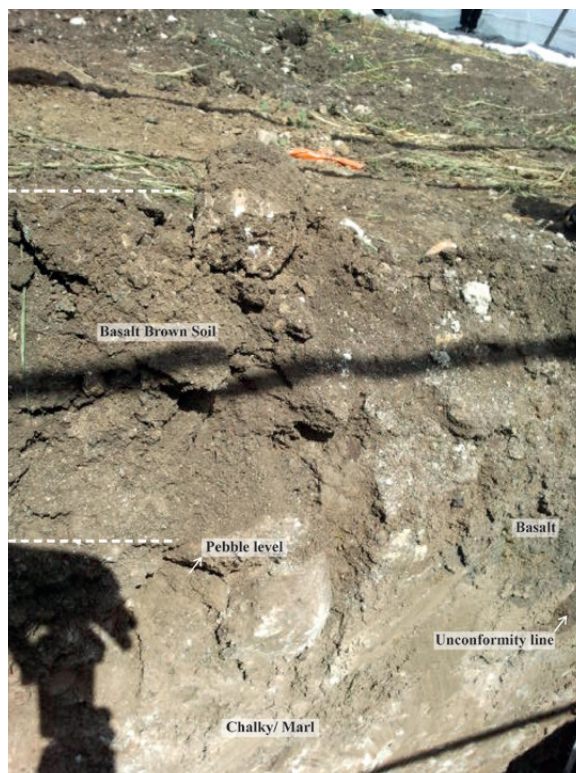


Fig. 2.7. Trench probe section TQ1.

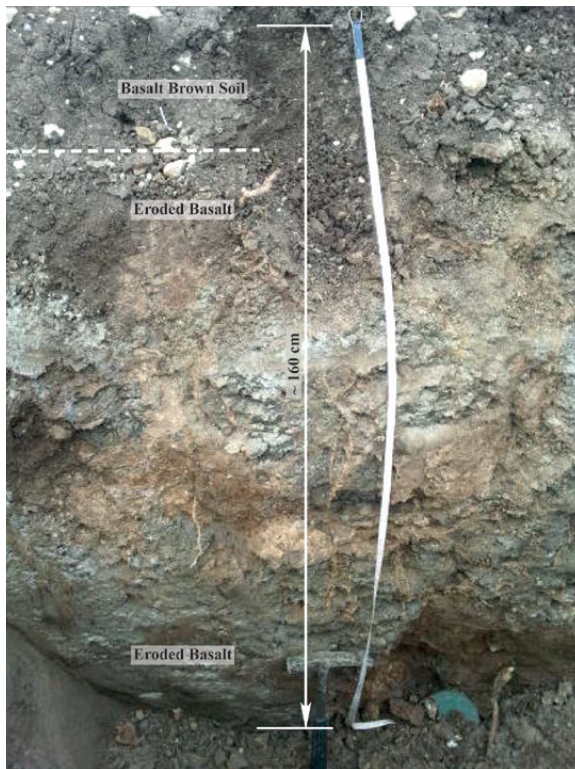


Fig. 2.8. Trench probe section TQ2.



Fig. 2.9. Trench probe section TQ3.

about 17 m above the current channel and northeast of the main EB I site.

Area E, Sections TQ1–3

Testing the soil and the sediments in the eastern part of the main site through three mechanically dug trenches (figs. 2.2, 2.7–9; tables 2.5–7) revealed that the surface was composed of colluvial/alluvial soil. This soil deepens to the east, toward a small buried tributary (fig. 2.2), from about 25 cm to about 115 cm. Archaeological deposits diminish toward the east, while the soil depth increased. The colluvial/alluvial soil overlies Eocene chalk and Miocene lower basalt. During the Early Bronze Age, the surface in this part of the site was apparently about 50 cm lower than today, with an active small tributary to the east of the site (fig. 2.9).

Advantages of the Site's Location

The tell is located at the strategic Kishon Water Gap, an ancient pass leading from the coastal bay of Haifa inland to the Jezreel Valley, which further connected to other inland valleys, such as the Jordan River

Valley (figs. 2.1–2). The value of the site's location in the EB I (and perhaps later) can be determined by a combination of the following physiographic characteristics: (1) the relatively high location in the landscape, about 17 m above the surrounding area, and overlooking the Kishon Water Gap pass; (2) the site was protected by the Kishon River on the western and southern sides and by a small (now buried) tributary channel on the east. These channels may have had perennial flows in the past, thus, serving as a natural defensive feature; (3) the Kishon River served as a permanent water source for the inhabitants of Tel Qashish and its immediate environs. It is important to note, however, that flow energy of the river at this point was relatively low due to a low channel gradient of less than 0.5 percent (Vachtman 2005). The narrow Kishon Water Gap contributed to the water low-energy flows in the past due to coastal sand intrusion and blockage or slowing down of the streamflow (Greenbaum et al. 2014), and, as observed over the last few decades, due to the large sediment yields sourcing from the cultivated areas upstream (Vachtman 2005).

References

- Dan, Joel, Zvi Raz, Dan H. Yaalon, and Hanna Koyumdjisky
1975 *The Soil Association Map of Israel, 1:500,000*. Bet Dagan: Volcani Institute.
- Dan, Joel, Pinchas Fine, and Hanoch Lavee
2007 *The Soils of the Land of Israel*. Tel Aviv: Tel Aviv University; Eretz. [Hebrew, English abstract]
- Greenbaum, Noam, Ravid Ekshtain, Ariel Malinsky-Buller, Naomi Porat, and Erella Hovers
2014 "The Stratigraphy and Paleogeography of the Middle Paleolithic Open-Air Site of 'Ein Qashish, Northern Israel." *Quaternary International* 331: 203–15.
- Israel Meteorological Service
2000 *Precipitation (mm): Average Annual Amount, Map 11. Period 1961–1990*. Jerusalem: State of Israel, Ministry of Transport.
- Kishon Authority. <http://www.kishon.org.il/>.
- Klute, Arnold, ed.
1986 *Methods of Soil Analysis: Part I—Physical and Mineralogical Methods*, 2nd ed. Agronomy Monographs 9.1. Madison, WI: American Society of Agronomy.
- Ministry of Environmental Protection
30.11.2011 *Interactive Map: State of Israel*. [http://gis.svi-va.gov.il/website/moe/html/gis/interactiveMap1.htm#4\\$0&40](http://gis.svi-va.gov.il/website/moe/html/gis/interactiveMap1.htm#4$0&40) (accessed November 30, 2011). [Hebrew]
- Segev, Amit, and Eytan, Sass
2009 *Geological Map of Israel 1:50,000. Sheet 3-III, Atlit*. Jerusalem: Geological Survey of Israel.
- Shahar, Arie
2007 *Universal Carta Atlas*. Jerusalem: Carta. [Hebrew]
- Singer, Arie
2007 *The Soils of Israel*. Berlin: Springer.
- Sneh, Amihai, Yosef Bartov, and Marcelo Rosensaft
1998 *Geological Map of Israel 1:200,000, Sheet 1*. Jerusalem: Geological Survey of Israel.
- Vachtman, Dina
2005 "Transport of Suspended Sediments in Nahal Kishon and Nahal Alexander to the Continental Shelf of Israel." MA thesis, University of Haifa. [Hebrew]

Table 2.1. Square ZY29, general description.

Unit	Depth from the surface (cm) ^a	Color ^b	Texture	Structure	Note
Grumusol	0–10	10YR 5/1 gray (dry)	Clay loam	Granular and massive, subangular blocky	Surface layer; soft lower transition to the layer below is gradual to clear.
	10–30	10YR 4/2 dark grayish brown	Silty clay loam	Subangular blocky	Anthropogenic chalk fragments (their utility is not understood); transition to the layer below according to the lower line of the rock fragments.
Hydromorphic grumusol	30–175	10YR 3/1 very dark gray	Clay (depth 30–150 cm), Sandy clay loam (depth 150–175 cm)	Subangular blocky to prismatic	Clay stains in the following colors: 7.5YR 4/1 dark gray, 7.5YR 3/3 dark brown, 7.5YR 3/1 very dark brown; at depths of 130–135 cm and 150–157 cm, grit to granular lamina.

a Absolute height of top of section is 23.80 m ASL. Absolute height of bottom of section is 21.78 m ASL.

b Based on the Munsell Soil Color Chart. Sample color was checked in dry conditions unless stated otherwise.

Table 2.2. Probe trench section, Square L29, general description.

Unit	Depth from the surface (cm) ^a	Color ^b	Texture	Structure	Note
Upper grumusol	0–10		Clay	Granular and massive to subangular blocky	Surface layer.
	10–70		Clay		Soil peds slightly hard to hard, with clay skin and diagonal cracks.
Early Bronze Age occupation level	70–100		Clay	Subangular blocky to prismatic	Occupation level with archaeological finds, subrounded rock fragments up to 15% of the layer; calcium carbonate sediments coat the rock fragments; signs of secondary calcium carbonated.
Lower grumusol	100–220		Clay changes to silty clay at 180 cm		Similar to the description of 10–70 and 70–100 cm; rock fragments are present at a depth of 130–220 cm; land snails are found in clumps at depth 130–220 cm; abrupt and wavy boundary to bedrock. OSL dating: 130–140 cm: 8.2±0.3 ka 185–190 cm: 9.1±0.3 ka
Chalk					Bedrock.

a Absolute height of top of section is 27.07 m ASL.

b Based on the Munsell Soil Color Chart. Sample color was checked in dry conditions unless stated otherwise.

Table 2.3. Square L29, luminescence OSL dating results.

GSI lab no.	Description	Depth (cm)	Moisture (%)	K (%)	U (ppm)	Th (ppm)	Ext. α ($\mu\text{Gy/a}$)	Ext. β ($\mu\text{Gy/a}$)	Ext. γ ($\mu\text{Gy/a}$)	Cosmic ($\mu\text{Gy/a}$)	Total dose ($\mu\text{Gy/a}$)	No. of aliquots	O-D (%)	De (Gy)	Age (ka)
ACK-21	Grumusol	130–140	10	0.91	1.4	7.4	8	710	591	177	1486 $\pm$ 40	17/18	14	12.3 $\pm$ 0.4*	8.2 $\pm$ 0.3*
ACK-22	Grumusol	185–190	10	0.69	1.5	8.7	10	800	674	166	1950 $\pm$ 43	18/18	8	15.1 $\pm$ 0.4*	9.1 $\pm$ 0.3*

– Quartz samples (88–125 mm). De was obtained using the single aliquot regeneration (SAR) dose protocol on 2 mm aliquots, using preheats of 10 s @ 180–280°C. γ , β and α dose rates were calculated from the concentration of U, Th and K, and the cosmic dose estimated from sample burial depth.

– No. of aliquots: The number of measured aliquots used for De calculations.

– O-D: Overdispersion, the degree of scatter.

* For samples with OD <20 percent De (and ages) were calculated using the central age model.

Table 2.4. Square D16, general description.

Unit	Depth from the surface (cm) ^a	Color ^b	Texture	Structure	Note
Chalky soil	0–10	10YR 6/1 gray	Clay loam	Granular and massive	Surface layer, soft; low boundary is gradual to clear.
	10–40	10YR 7/1 light gray	Silty clay	Granular and massive to subangular blocky	Angular to subangular chalk fragments; the transition to the layer below according to the appearance of ceramic sherds at a depth of 40 cm.
Chalky fill sediments	40–120	10YR 7/1 light gray	Clay	Granular and massive to subangular blocky	Fill in a depression/trench, slightly hard, with chalky fragments; the layer contains ceramic sherds from the Early Bronze Age; sharp and wavy low boundary.
Chalk	From ~60 cm to 120cm			Bedrock fragments	Part of the unit composed of chalky fragments; a massive chalk bedrock at the side and the bottom a massive chalk bedrock.

a Absolute height of top of section is 34.98 m ASL.

b Based on the Munsell Soil Color Chart. Sample color was checked in dry conditions unless stated otherwise.

Table 2.5. Probe trench section, TQ1, general description.

Unit	Depth from the surface (cm)	Color (wet) ^a	Texture	Structure	Note
Basalt brown soil	0–15	10YR 4/2 dark grayish brown	Clay loam	Granular and massive	Eroded basalt gravel, gradual low boundary.
	15–75	10YR 4/2 dark grayish brown	Clay loam	Granular and massive	Sharp low boundary.
Chalky/Marl	75–160	10YR 7/3 Very pale brown		Bedrock	Eocene? Chalky marl; “aked” upper level characterized by reddish color (hue?) and baked rounded pebbles, up to 20 cm long; the pebbles are natural, evidence of unconformity line.

a Based on the Munsell Soil Color Chart. Sample color was checked in dry conditions unless stated otherwise.