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Conflict and Consumption:

Foodways, Practice, and Identity

at New Kingdom Jaffa

A dissertation submitted in partial satisfaction of the

Requirements for the degree Doctor of Philosophy

in Archaeology

by

Jacob Carl Damm

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ABSTRACT OF THE DISSERTATION

Conflict and Consumption:

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Professor Aaron A. Burke, Chair

During the Late Bronze Age (c. 1640/1540 – 1100 BCE), the installation of Egyptian garrisons throughout the southern Levant made Egypto-Levantine interaction the primary discursive relationship defining cultural expression in the region. To date, focus has predominantly been on how elites navigated the new imperial system, a product of the types of data published by early modern excavations. To expand upon this past work and assess Egypto-Levantine interaction across a broader socio-economic spectrum, I utilize new data from the garrison site of Jaffa (modern Israel) in a practice-based analysis of garrison foodways. From archaeobotanical and ceramics data, I demonstrate human entanglements that occurred at the site over the course of more than three centuries of occupation, discussing how interaction unfolded on a day-to-day basis in the imperial periphery. Specifically, I articulate the presence of multiple communities of practice with roots in both Egyptian and Levantine modes of doing. At no point in the history of the site did one tradition dominate, but rather garrison foodways were a complex product of acceptance, accommodation, indifference, and rejection, resulting in a hybrid foodways inseparable from the colonial system. The greater part of food preparation was purely Levantine in character, likely signifying the entanglement of the local population in the sustenance of the colonial system. And yet, certain modifications to traditional Levantine foodways seem designed to accommodate Egyptian tastes. Other elements of foodways—namely ceramics production/consumption and beer production—attest to a complex *chaîne opératoire* with roots in Egypt, with their expression suggesting a tension between top-down forces provisioning the garrison and local, bottom-up consumption practices. This especially manifests with dining practices, as shifting patterns in the use and appreciation of locally manufactured Egyptian-style or Levantine ceramics correlate with violent disruptions at the site. While it is not always possible to tie foodways to specific identities, they reveal a complex picture of mutual transformation that cannot be separated from the colonial context of the site, detailing entanglements between locals and imperial personnel wherein actors from all sides episodically drew upon foodways to navigate life in an unstable imperial periphery.

The dissertation of Jacob Carl Damm is approved.

John K. Papadopoulos

Gregson T. Schachner

Monica L. Smith

Stuart Tyson Smith

Aaron A. Burke, Committee Chair

University of California, Los Angeles

2021

To my family.

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Acknowledgments

The prospect of thanking everyone who had a hand in the successful completion of this dissertation is a daunting one. To say that I have been blessed by an extraordinary array of goodwill and support throughout my entire life is a gross understatement. Family, friends, mentors, colleagues, all of them had a hand in my successes. Some of the people I will thank are no longer with us, and while the world is a little bit darker without their presence, I can only hope that I have honored their kindness and support by reaching this milestone. In what follows, there is no hierarchy to be had, I will proceed through academic and institutional support, eventually moving into those of a more personal nature. Each had an important role in my development as a scholar and person. Having said that, I will, of course, conclude with my family, as a lifetime of love and support means that there is simply no one else on this world to whom I am more indebted.

I would like to begin by thanking my advisor, Aaron A. Burke, for his years of mentorship in the field and classroom as well as his constant support. As co-director of Jaffa, he graciously made those materials available to me for my own research. As advisor and instructor, no one has read and critiqued my work more, constantly pushing me to improve. He supported me at every turn through research positions, teaching opportunities, and countless letters of recommendation, and I would not have reached this point without his tireless assistance. Furthermore, I must thank Aaron for every time he stepped outside of the traditional role of academic advisor, taking his students on weekend tours while in the field or setting up a barbecue so that we could blow off steam. I look forward to collaborating in the future, be it the final publications of Jaffa, Turning Points, or any other project. I would also like to extend my

thanks to the members of my committee, who read through what was initially an enormous document to help me bring out my best possible work. In both the classroom and subsequent conversations, John Papadopoulos had a central role in my understanding of the relationship between colonialism, imperialism, and cultural identity, and his close reading helped me streamline this document immensely. Greg Schachner kindly read and commented on my work long before he was a member of my committee, shaping my understanding of borderlands and playing a key role in helping me develop my methodology. Monica Smith helped me formulate my ideas regarding foodways after my prospectus defense, pushing me to read "all kinds of weird stuff" to help me wrap my mind around the relationship between foodways and identity, and her comments on this document pushed me to completely rethink how I approach writing. Stuart Tyson Smith's work in Nubia inspired my approach to Jaffa, and his comments were central to refining my ideas about foodways, practice, and the human entanglements that occur in the colonial sphere. Finally, I would like to thank the entire committee for their support throughout the final stages of this dissertation, a process marred by the COVID pandemic and my own poor health. Your support via email and numerous video calls was instrumental in seeing me through to the end. Of course, after all their efforts, any errors that remain in this work are purely of my own making.

This project draws heavily on the collective efforts of members of the Jaffa Cultural Heritage Project (JCHP) and its affiliates. I would like to thank the project's co-director, Martin Peilstöcker, for entrusting me with large body of material from the site, as well as his assistance in ceramics analysis and navigating some of Jacob Kaplan's more complex notes. In addition, a great deal of work was done at the site long before my arrival in 2013, and I am indebted to those whose tireless efforts at organizing the finds and archival materials from Kaplan's excavations made it into the research archive it is today. I am especially grateful for the efforts of George Pierce and Krystal V. Lords Pierce, whose work on the ceramics from Jaffa laid the groundwork for much of what I have done here. Also, I am grateful to the extraordinary orbit of specialists affiliated with the JCHP whose tireless work have been crucial to showcasing life at ancient Jaffa. This is especially true of Krister Kowalski (GIS), Ed Maher (zooarchaeology), Andrea Orendi (paleoethnobotany), Mary Ownby (petrography), and Brian Damiata (radiocarbon dating), whose research and collaboration dramatically influenced my ability to interpret the archaeological finds in the Lion Temple area. In addition, were it not for the hospitality and kindness of Naama Meirovich and the staff of the Jaffa Museum, my time in the storage magazines would have been far less enjoyable. Finally, I would like to thank Jacob Kaplan, as his hard work and dedication to the cultural heritage of Jaffa is the foundation upon which all my efforts are based. I can only hope that I have done his legacy justice.

The nature of an interdisciplinary institution like the Cotsen means that quite a few people outside of my committee had a hand in shaping my work. I would like to extend special thanks to Hans Barnard and Kym F. Faull. While residue analysis has factored less into the current project than I had originally anticipated, their constant mentorship, instruction, and willingness to answer my barrage of questions opened an entire specialization to me that would have otherwise remained foreign. A great deal of forthcoming research is wholly indebted to the time you invested in my education and training, and I am eternally grateful. In addition, I would like to extend special thanks to the staff and orbit of researchers affiliated with the Pasarow Mass Spectrometry Laboratory at UCLA, who always made me feel welcome and selflessly helped me any time I asked. I would also like to thank Kara Cooney and Bill Schniedewind, both for their many letters of support and for always ensuring that I had a second home in NELC during their terms as chair. Furthermore, I would like to extend my gratitude to Alan Farahani, who during his term as a postdoctoral scholar at UCLA did more than anyone else to influence my research methodologies, and kindly has continued to field a former student's questions about R and everything in between.

Many organizations at UCLA were instrumental to my completion of this degree. I would be remiss to not thank all the staff of the Cotsen Institute for their hard work in producing such an incredible scholarly environment. I would especially like to thank the incredible SAOs during my time there—Erika Santoyo, Matthew Swanson, and Sumiji Takahashi—for their friendship, and for always going above and beyond to ensure that my constant inability to handle administrative matters correctly was never more than a slight hiccup. I would also like to thank UCLA's Cluster Program—especially Raffaella D'Auria—for providing me with one of the most incredible teaching experiences of my career thus far, with the phenomenal students in my foodways seminar having a transformative effect on how I understand the relationship between foodways and cultural identity. I would also like to offer my gratitude to UCLA's Writing Programs—especially Laurel Westrup, Peggy Davis, and Nedda Mehdizadeh—for helping me deepen my love of teaching. While I have always felt a connection between research and teaching, both the Cluster Program and Writing Programs showed me how to develop that connection to the point where it has become something of a creed. You all made me a better teacher and researcher, giving me a foundation upon which I hope to keep building.

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UCLA Alan D. Leve Center for Jewish Studies via the Chaskel and Sarah Roter Summer Research Travel Grant, UCLA's International Institute, Norma Kershaw, and Charlie Steinmetz. I am eternally grateful to these organizations, individuals, and the generous donors that support these funds, as I would never have been able to complete this research without the assistance they provided. In addition, I would like to thank the UCLA College of Deans and UCLA Graduate Division for their support for periods of research and writing while at UCLA. Finally, I want to extend a special thanks to the W.F. Albright Institute of Archaeological Research (AIAR) in Jerusalem, where I was a fellow throughout the Fall of 2018. The resources of the institute, the collegiality of the other fellows, and the incredible hospitality of the staff provided me with an oasis while I did much of the research that comprises chapters 6, 7, and 8. I am especially grateful to Matt Adams, Sarah Fairman, and Aaron Greener for the excellent program they put on for fellows, to Nadia Bandak, Naual Herbawi, Mary Kammar, Ashraf Hanna, and Hanan Darieh for their incredible hospitality, and to Hisham M'farreh and Ahmad Alayan for the absolutely magnificent food that sustained me every day. Every single one of you made the Albright a home away from home through your kindness and hard work.

The line between friend and colleague becomes hazy in graduate school, but I can safely say I was surrounded by amazing people who easily embodied both roles. In addition to my incredible cohort in the Cotsen, I spent my years within a community of brilliant graduate students who not only made me a better scholar, but also made me feel like I was surrounded by family from the moment I set foot in Los Angeles. I will always feel a great debt to the intellectual environment that is UCLA, and my fellow students in both the Cotsen, NELC, and Anthropology were the keystone that held it all together. I cannot wait to see the incredible things you all accomplish. I especially want to thank the JFF—Amy Karoll, Andrew Danielson, and Nadia Ben-Marzouk. Be it the field, the classroom, or life in general, I would not have survived graduate school without you. I could not have asked to learn alongside—or from—a more incredible group of archaeologists, and you became my closest friends along the way.

To my family, you have been a bottomless well of support. Mom and Dad, I would not be here were it not for your constant sacrifice. You were always selfless, doing everything in your power so that your children could pursue their dreams. Your wisdom has been invaluable, and your love is the foundation upon which every good thing I have ever accomplished is built. I can say the same of my wonderful siblings, who have been a source of constant support despite my inability to shut up about pottery. To thank the entire Damm or Williamson clan would require a separate dissertation unto itself, but suffice it to say that I count myself blessed to have enjoyed the constant support of our ridiculously huge, absolutely wonderful family. To Maw Maw and Paw Paw, your faith in me and encouragement over the years has given me so much strength. To Grandma and Pop Pop, both of you are at the heart of my love for history and the natural world, and while your loss is keenly felt, your love and support still sustains me every day. And finally, I want to thank Dani. You are my best friend and the love of my life. An extraordinary scholar, you are my first resource and sounding board when thinking through my work. How you managed your own Ph.D. while listening to months of my muttering about legumes is beyond me, but I am forever grateful for the patience you showed throughout. You have seen me through some of the hardest times of my life, but no matter what the world threw at us your strength saw me back healthy and whole. You were the best quarantine buddy I could have asked for, and not a day goes by that I am not thankful to have met you. I would have not cleared this milestone had it not been for you, and I cannot wait to see what the future holds.

Curriculum Vitae

EDUCATION

2019	Graduate Certificate in Writing Pedagogy, University of California, Los Angeles, Writing Programs
2015	C. Phil. University of California, Los Angeles, Cotsen Institute of Archaeology
2013	A.M., Harvard University, Near Eastern Languages and Civilizations, *Emphasis*: Archeology of the Levant
2011	B.A. (*Summa Cum Laude*), University of South Carolina, Religious Studies, Classical Studies

PUBLICATIONS

Forthcoming	**Damm, Jacob C.** "Identity at the Twilight of Empire: Domestic Foodways and Cultural Practice at 12th Century BC Beth-Shean", in *No Place Like Home: Ancient Near Eastern Houses and Households*, edited by Laura Battini, Aaron Brody, and Sharon R. Steadman. Oxford: Archaeopress.
2017	**Damm, Jacob C.** "Defying the Pharaoh: Looking at Life and Rebellion under Egyptian Occupation". *Current World Archaeology* 81.7 (no. 9): 32-37.
2017	Burke, Aaron A., Martin Peilstöcker, Amy Karoll, George A. Pierce, Krister Kowalski, Nadia Ben-Marzouk, **Jacob C. Damm**, Andrew J. Danielson, Heidi Fessler, Brett Kaufman, and Krystal Pierce. 2017. "Excavations of the New Kingdom Fortress in Jaffa, 2011–2014: Traces of Resistance to Egyptian Rule in Canaan". *American Journal of Archaeology*, *121*(1): 85-133.
2010	**Damm, Jacob C.** "Digging Through Sewage and I Couldn't Have Been Happier." *Biblical Archaeology Review* 36(1).

UNPUBLISHED TECHNICAL REPORTS

2020	**Damm, Jacob C.** Report on the Gas Chromatography/Mass Spectrometry Analysis of Five Chalcolithic V-Shaped Bowls from Neve Ur (Israel).

CONFERENCE PRESENTATIONS/INVITED LECTURES

2021 *Identity at Empire's End: Foodways and Cultural Practice at 12th Century BCE Beth Shean.* American Research Center in Egypt Annual Meeting. Online. Paper.

2019 *Surveying the Field: Toward Establishing a Digital Collaboration Space for Educators of the Ancient World.* With Nadia Ben Marzouk (Primary). American Schools of Oriental Research Annual Meeting. San Diego, CA. Paper.

2019 *Conflict and Consumption: Foodways and Identity Negotiation in the New Kingdom Southern Levant.* American Schools of Oriental Research Annual Meeting. San Diego, CA. Paper.

2018 *Education as Outreach: Redefining the Role of the Undergraduate Classroom.* (Primary). Paper presented with Nadia Ben Marzouk. American Schools of Oriental Research Annual Meeting. Denver, CO.

2018 *Assignment Design/Scaffolding.* Creating Connections: UCLA's First Annual Symposium on Writing Pedagogy. Los Angeles, CA.

2017 *Pots and People: Responses to the Collapse of the New Kingdom Empire at Jaffa*. Egypt Exploration Organization of Southern California. Los Angeles, CA. Invited Lecture.

2017 *Consumption Preferences at the Collapse of Empire: The Case of New Kingdom Jaffa*. Society of American Archaeology Annual Meeting. Vancouver, British Columbia. Paper.

2015 *Judahite Burial Practices of the Latter Iron Age: Tradition, Adaptation, and Ambivalence*. The Skirball Cultural Center. Los Angeles, CA. Invited Lecture.

2015 *Egyptian Ceramic Acquisition and Use Strategies at New Kingdom Jaffa: To Import, or Not to Import?* American Schools of Oriental Research Annual Meeting. Atlanta, GA. Paper.

2015 *The Kaplan Excavation Publication Initiative, 2015*. Presented by Andrew Danielson (Primary), Nadia Ben-Marzouk, **Jacob Damm**, Amy Karoll, Krister Kowalski, Jeremy Williams, Aaron Burke, and Martin Peilstöcker. American Schools of Oriental Research Annual Meeting. Atlanta, GA. Poster.

2014 *The Kaplan Excavation Publication Initiative, 2014*. (Primary Author). Presented with Amy Karoll, Andrew Danielson, Ann-Kathrin Jeske, Martina Haase, Krister Kowalski, Nadia Ben-Marzouk, Aaron Burke, and Martin Peilstöcker. Archaeological Institute of America Annual Meeting. New Orleans, LA. Poster.

SELECT AWARDS

2019 **Fieldwork Fellowship**: UCLA International Institute ($4,000)
2019 **Charles E. and Sue K. Young Fellowship**: UCLA College of Deans ($10,000)
2018 **Educational and Cultural Affairs (ECA) Junior Research Fellowship:** W.F. Albright Institute of Archaeological Research (AIAR) in Jerusalem ($9,620)
2018 **Platt Excavation Fellowship:** American Schools of Oriental Research ($2,000)
2018 **Steinmetz Travel Grant:** Cotsen Institute for Archaeology, UCLA ($1,300)
2018 **Roter Summer Research Travel Grant:** UCLA Leve Center for Jewish Studies ($1,000)
2018 **Mini-grant.** The UCLA Office of Instructional Development (OID) ($188.22)
2017 **ASOR Student Travel Grant**: American Schools of Oriental Research ($250)
2017 **Dissertation Fieldwork Fellowship for International Studies:** UCLA International Institute ($1,800)
2017 **Appel Research Travel Grant:** UCLA Leve Center for Jewish Studies ($2,000)
2017 **Steinmetz Travel Grant:** Cotsen Institute for Archaeology ($1,200)
2016 **Research Grant:** Egypt Exploration Organization of Southern California ($500)
2015 **Roter/Bluma Appel Research Travel Grant:** UCLA Leve Center for Jewish Studies ($2,500)
2015 **Steinmetz Travel Grant**: Cotsen Institute for Archaeology, UCLA ($1,200)
2015 **Graduate Summer Research Mentorship (GSRM)**: Graduate Division, UCLA ($6,000)
2014 **Graduate Research Mentorship:** Graduate Division, UCLA ($20,000)
2014 **Graduate Summer Research Mentorship (GSRM)**: Graduate Division, UCLA ($6,000)
2014 **P.E. MacAllister Excavation Fund**: American Schools of Oriental Research ($1,000)

SELECT FIELD AND LAB EXPERIENCE

2018-Pres. **Turning Points Project (Tel Dan)**: square supervisor (2018)
2016-Pres. **Graduate Student Researcher**. Pasarow Mass Spectrometry Laboratory, UCLA.
2013-Pres. **Jaffa Cultural Heritage Project:** ceramicist, square supervisor, final publications
2012-2013 **Harvard Semitic Museum:** excavation archive/database management
2012 **The Leon Levy Expedition to Ashkelon:** Field School
2009-2010 **Khirbet Qeiyafa Archaeological Project:** Crewmember

Chapter 1 – Introduction: Jaffa, the New Kingdom Empire, and the Question Egypto-Levantine Interaction

After nearly a century of campaigns, Thutmose III's (1479-1425 BCE) victory over a coalition of Levantine kings at Megiddo in c. 1460 BCE resulted in the Egyptian New Kingdom possessing a vast territorial empire that—at its largest extent—stretched from Syria in the north to Sudan in the south.[1] The southern Levant became a strategic corridor for more than three centuries, connecting the imperial core not only with the broader Mediterranean region, but also with the contested territories of the northern Levant that were a constant source of dispute between Egypt and its imperial rivals (Murnane 1990; Redford 2003; Morris 2018).[2] Corresponding roughly with the Levantine Late Bronze Age (c. 1640/1540 – 1100 BCE), the installation of garrisons throughout the southern Levant made imperialism a daily reality for the indigenous population, and Egypto-Levantine interaction became the central discursive relationship defining cultural expression in the region.[3] While strategies of governance shifted throughout the imperial period, New Kingdom control can be broadly be understood as the implementation of imperial and colonial ideologies—though the exact manifestation varied depending on historical context. Imperial control here refers to an ideology of expansionary domination, whereas colonialism

[1] Absolute dates for the Egyptian chronology are from Ian Shaw's (2000) history.

[2] My use of the term southern Levant refers to the area of modern Israel, the West Bank, the Gaza Strip, and Jordan.

[3] This chronological range (c. 1640/1540 – 1100 BCE) and all others pertaining to Levantine chronology are adapted from Ilan Sharon (2013) unless otherwise stated. It maintains a long Late Bronze Age extending until the end of the 12th century BCE, variously referred to as the Iron Age IA, Late Bronze Age III, and the Transitional (Late) Bronze and Iron Ages (see Martin 2011b, 19–20). This is accounts for new, late dates for an Egyptian imperial presence at sites like Jaffa—now dated to c. 1125 BCE (Burke, Peilstöcker, et al. 2017). The beginning of the period is debated due to the disputed radiocarbon chronologies for the Thera/Santorini eruption and the relative chronology at Tell el-Dab'a in the Egyptian Delta (for Thera see Manning et al. 2014; 2020; Pearson et al. 2018; Friedrich et al. 2020; Martin, Finkelstein, and Piasetzky 2020; for Tell el Dab'a see Kutschera et al. 2012; Bietak 2014; Höflmayer 2017).

specifically points towards the ideologies, practices, and social interactions employed in the maintenance of asymmetrical power relations (Dietler 2010, 18). These ideologies were maintained through material and personnel investments by the central Egyptian authority, which included an extensive command and control network of fortresses and garrison cities (Morris 2005), frequent military campaigns (Murnane 1990; Hasel 1998; Redford 2003; Spalinger 2005), exploitative extraction of local resources (Naʾaman 1981; Morris 2018, 145–49, 201–4), and the deployment of troops, administrators, and craft specialists at garrisons throughout the region (Morris 2018, 204–7). Garrisons were not only places where colonial entanglements occurred between imperial personnel and the local population, they were also the epicenter from which the imperial radiated into the broader southern Levant. In this dissertation, I specifically examine one such site, the Egyptian garrison at the port city of Jaffa (modern Israel), which remained a focal point of Egyptian rule from the earliest period of formal empire until its violent collapse in the last quarter of the 12th century BCE.

By focusing attention specifically on one garrison site, my intent is to examine the human entanglements that occurred there during more than three centuries of cohabitation by imperial personnel and local Levantine individuals. To achieve this, I draw upon theories of practice to examine the manifestation of foodways at Jaffa. By foodways, I mean not just the food and drink that compose diets, but also the complete suite of practices, rules, and meanings that govern the process of food from the first collection or harvest of raw material through its processing, storage, culinary transformation, serving, display, consumption, and disposal (following J. Anderson 1971). Foodways data are ubiquitous within the archaeological record, and I draw specifically on the archaeobotanical and ceramic evidence to examine the manifestation of Egyptian and Levantine modes of doing at Jaffa. From these data, I argue that not only were foodways at Jaffa a complex, hybrid product wherein Egyptian and Levantine practices were reconfigured into a completely new formulation inseparable from its colonial origins, I also demonstrate that the ways in which these practices highlight complex social entanglements between local actors and imperial personnel. Both top-down initiatives from the colonial authorities and bottom-up consumer choice sustained the unique character of foodways at Jaffa, where ultimately the daily fare was Levantine, the beer was Egyptian, and dining was a highly charged domain closely tied to the fortunes of the empire. Using foodways, it is possible to demonstrate that the day-to-day realities of Egypto-Levantine interaction saw a complex overlay of acceptance, accommodation, indifference, and overt rejection, and yet, no one tradition every truly dominated the other. More than three centuries of cohabitation led to mutual transformation, but surprisingly, long-term impacts were minimal. Much of the transformation that occurred was only sustained in the cultural contact zone, and with the dissolution of the Egyptian empire the colonial foodways of Jaffa—and the human entanglements they generated—ceased to exist.

Apart from their ubiquity, my purpose in selecting foodways as a focal point stems from their utility in understanding the mutually transformative nature of cultural contact in daily life. While the number of Egyptian personnel in the region is disputed (see Bunimovitz 2019), their presence—especially by the 13th century BCE—can be plausibly correlated with the appearance of houses in an Egyptian style (Higginbotham 2000, 263–301; Morris 2005, 504–611; Pierce 2013, 282–453), the construction of monumental administrative contexts following an Egyptian plan (Higginbotham 2000, 263–301; Morris 2005, 504–611), increased evidence for Egyptian scribal activity (E. Levy 2017), an array of mortuary practices following an Egyptian model (DePietro 2012, 68–98), increased evidence for daily practices of an Egyptian derivation (Streit

2019a; 2019b), and an explosion in Egyptian material culture more generally (see Mumford 1998). Most importantly, however, is the sudden appearance at multiple Levantine sites of a locally based ceramic industry capable of perfectly replicating a wide array of domestic forms known from the Egyptian Nile clay ceramics tradition, hereafter referred to as Egyptian-style ceramics (see Section 6.2). Such forms often occupied the majority of the assemblage at garrison sites (Martin 2011b), as was certainly the case at Jaffa. But because early modern excavations focused especially on luxury goods and elite mortuary and ritual contexts, the disciplinary focus has predominantly been on examining how local Levantine elites adapted Egyptian material culture to respond to shifting power structures in the imperial periphery (Higginbotham 2000; Koch 2021).[4] Over the past two decades, however, the mass publication of data from Late Bronze Age sites throughout the southern Levant has produced an extraordinary quantity of information related to daily life and especially foodways.[5] Jaffa can be included in this list, as the renewed excavations of the Jaffa Cultural Heritage Project (JCHP) and the unpublished materials from Jacob Kaplan's excavations provide an important new dataset to discuss the phenomenon, much of which is presented in this dissertation for the first time. Specifically, the ability to compare Jaffa with both garrison and non-garrison sites allows for hitherto impossible resolution into how day-to-day practice unfolded within garrison communities, allowing us to expand

[4] The issue of how early data collection strategies has affected daily life studies has been especially discussed with respect to domestic archaeology (see Yasur-Landau, Ebeling, and Mazow 2011).

[5] This include preliminary and final reports from Tell el-ʿAjjul (P. Fischer et al. 2002; P. Fischer 2003), Tel Aphek (Gadot and Yadin 2009), Ashdod (M. Dothan and Ben-Shlomo 2005), the Ashdod Beach site (Nahshoni 2013), Ashkelon (Stager et al. 2008; Martin 2008; 2009a), Beth Shean (Mazar 2006b; Mazar and Mullins 2007; Panitz-Cohen and Mazar 2009), Tel Dan (Biran and Ben-Dov 2002; Martin and Ben-Dov 2007; Ben-Dov 2011), Deir el-Balaḥ (T. Dothan and Brandl 2010a; 2010b), Tel Far'ah (South) (E. Fischer 2011), Hazor (A. Ben-Tor, Ben-Ami, and Sandhaus 2012; A. Ben-Tor et al. 2017), Lachish (Ussishkin 2004), Megiddo (Finkelstein, Ussishkin, and Halpern 2006; Martin 2009b; 2011a), Tel Mor (Barako 2007b), Tel Seraʿ (Martin 2011b, 221–29), Shechem (Duff 2015), and Yarmouth (Jasmin and de Miroschedji 2020).

beyond our previous reliance on elite emulation models to incorporate a broader spectrum of social interactions.

Indeed, the recent expansion in data pertinent to daily life activities has been central to recent calls to assess cultural transformation in the Late Bronze Age southern Levant via theories of practice (Stockhammer 2012c; 2012a; 2013; Streit 2019a; 2019b), which is the intent of this dissertation. While the exact theoretical and methodological unity of practice theory is somewhat hazy (see Ortner 2006, 1–18), the approach is broadly unified by the desire "to explain the relationship(s) that obtain between human action, on the one hand, and some global entity which we may call 'the system,' on the other" (Ortner 1984, 148), with the system being an entity such as culture or structure that constrains human action (Ortner 1984, 147). In effect, practices are what mediate between objective-seeking agents and the constraining system. While theory and method are the subject of Chapter 2, a practice-based approach to foodways at Jaffa largely manifests in an iterative fashion, examining foodways from the ground-up to elucidate both social relations at Jaffa and—where possible—determine if practices became salient on the boundaries of identity groups. First, I determine if foodways at Jaffa can be differentiated as stemming from either Egyptian or Levantine modes of doing, after which I track the manifestation of these practices over time as proxy evidence for the types of socialized learning communities that would reproduce these practice systems. This line of inquiry is instrumental to understanding the types of human entanglements that occurred at the site. Finally, I historicize these practices with respect to internal developments at Jaffa and regional developments within the Levantine imperial periphery, a necessary step to contextualize their manifestation and determine whether they became salient to identities. While it is not always possible to tie practices to identity, an iterative approach maximizes what we can glean about the social significance of foodways at Jaffa over time.

The use of the phrases "Egyptian/Levantine modes of doing" or "regional foodways of Egypt/Levant" merit qualification, as in these cases my intent is not ascribe an inherently ethnic or essentialized character to the collective foodways in either region. Instead, I mean to highlight constellations of practices and objects that have a circumscribed geographic distribution within those regions, the product of proximate socialized learning networks that have ultimately resulted in cohesive aspects of foodways (see Section 2.3). The individuals who enacted these practices or utilized these objects at Jaffa were not necessarily from either region, and furthermore, while these practices and objects could certainly have been drawn upon as discursive markers for identity groups, that process was situational, fluid, and mutable (see Section 2.4). My use of the terms "Egyptian" or "Levantine" therefore indicates a certain degree of generalization equating to imperial/colonial personnel versus the indigenous/local population, respectively, and not necessarily bounded ethnic groups—something especially pertinent since both Egypt and the southern Levant possessed a great deal of internal diversity.[6] Moreover, in the southern Levant, colonial personnel were far from homogenous, potentially comprised of individuals from the Nile Valley/Delta of Egypt, Eastern Desert peoples, Nubians, mercenary groups, local Levantine collaborators, and even Levantine elites who had been raised as hostages

[6] Attempts to demonstrate whether a singular Egyptian ethnic identity existed during the pharaonic period have shown only the most fluid manifestations (Moreno García 2018; Matić 2020)—an expected result given that ethnicity is not absolute or bounded, but rather multi-scalar, situational, and subject to intersectionality (see S. T. Smith 2014b; 2018). Similarly, scholars in the Levant have debated the exact nature of the term "Canaanite" and whether it constitutes a true ethnonym in the Late Bronze Age (Rainey 1996; Naʾaman 1999; Pardee 2001; Schloen 2001, 201; Killebrew 2005a). Even those treating it as an ethnonym recognize that it signifies a multiethnic people inhabiting the geographic region historically referred to as "Canaan" (Killebrew 2005: 94). For the necessity of generalization in discussing cultural practices see Emiko Ohnuki-Tierney (1993).

in the Egyptian court.[7] This picture is further complicated by the fact that within the New Kingdom imperial system, there are well-documented instances wherein individuals presented themselves—or were presented—as Nubian or Egyptian depending on social context (see S. T. Smith 1995, 184–88; 2015). Consequently, while practices or objects at Jaffa might plausibly be linked to individuals from a particular geographic region, this relationship cannot be assumed or essentialized to be representative of bounded categories separating Egyptian from Levantine peoples. As I will show, however, modes of doing with circumscribed geographic origins point to the types of social reproductions that deliberately occurred within the garrison community, providing insight into how interaction unfolded on a day-to-day basis in the imperial periphery.

The remainder of this chapter introduces the project in greater depth. First, I introduce the site of Jaffa, the contexts available for analysis, and why I selected archaeobotanical remains and ceramics as the primary foodways datasets (Section 1.1). After this, I provide an overview of the Egyptian empire in the region, which not only contextualizes Egypto-Levantine interaction against its broader historical backdrop, but also characterizes how scholarship has treated Egypto-Levantine interaction more generally (Section 1.2). This is followed by a discussion of past treatments of cultural interaction during the Late Bronze Age, including via foodways analyses, which positions my dissertation in relation to previous scholarship (Section 1.3). Finally, I conclude with an in-depth outline of the remainder of this dissertation, discussing its constituent parts and briefly sketching the arguments presented within each chapter.

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[7] Resident Egyptian officials are known from textual records, though perhaps the most compelling archaeological evidence is the governor Ramesses-user-Khepesh of Beth Shean, who seems to have held a hereditary administrative position (D. Ben-Tor 2016, 86–87). The plausible presence of peoples from the Eastern Desert can be related to the "archers" of the Amarna archive, who have been associated with the Medjay (Redford 1992, 207), though the ethnic character of the Medjay has been questioned (Liszka 2011). Both Nubian individuals and foreign mercenary groups like the Sea Peoples are well known within the Egyptian military (see Burke 2020), likewise the administrative employment of Levantine hostages and local Levantine collaborators (Morris 2018, 153–56).

1.1 Jaffa: An Introduction to the Site and its Foodways Dataset

Figure 1: Jaffa in relation to modern cities (source: Google Earth).

Jaffa is located just south of the modern-day city of Tel Aviv, sitting on a partially natural, partially artificial bluff overlooking the sea (see Figure 1). During the Late Bronze Age, the site would have been a modest settlement of approximately 3 hectares, its size dictated by the original Middle Bronze Age fortification system that encircled the tell (Burke 2011a, 67).[8] The primary significance of the site throughout history was as a harbor (Burke, Wachsmann, et al. 2017; E. Haddad et al. 2020), with its close proximity to both the Yarkon River and a major east-west land route making the site of central importance to regional connectivity (M. Fischer, Isaac, and Roll 1996; Zwickel 2011). It was likely for this reason that the Egyptians initially placed a garrison there not long after Thutmose III's victory at Megiddo (c. 1460 BCE), where it appears

[8] Moreover, the estimated settlement size is supported by the distribution of Late Bronze Age cemeteries around the site, all of which were likely extramural (Peilstöcker 2011a; Burke, Peilstöcker, et al. 2017, 88–89).

in his toponym lists of conquered sites (Redford 2003, 12). Jaffa only makes limited appearances within the Late Bronze Age historical record in comparison to other prominent Levantine centers, though its occasional reference in the 14th century BCE Amarna archive, in the 13th century letters from Tel Aphek, and in 19th Dynasty literary texts from Egypt like the satirical Papyrus Anastasi I and the "Capture of Joppa" (Papyrus Harris 500) attest to the central role it played within the broader imperial landscape. Notably, Jaffa is referred to as an imperial granary, port, and meeting place between Levantine potentates and Egyptian colonial officials.[9] From excavations, however, we know that some form of Egyptian involvement manifested at Jaffa from the Late Bronze Age IB until the final collapse of the New Kingdom empire in the last quarter of the 12th century BCE (Burke, Peilstöcker, et al. 2017). Finds from the site, including monumental architecture following Egyptian models, monumental hieroglyphic inscriptions, and—perhaps most importantly—a consistent majority of locally manufactured Egyptian-style ceramics across all excavated Late Bronze Age contexts, all attest to the deep entanglement of Jaffa and its inhabitants with the New Kingdom imperial system.

[9] Jaffa appears throughout the Amarna letters in references to its imperial granaries (EA 294), as a location where Rib-Hadda of Byblos might flee to meet the resident Egyptian administrator Api (EA 138), and finally in EA 296 in reference to the ruler Yahtiru's claims that he guards the gates of Jaffa and Gaza on behalf of the Egyptian king (Moran 1992; Rainey 2015). The late-13th century BCE letters at Tel Aphek refer to grain shipments received at Jaffa from Ugarit (Singer 1983; W. Horowitz, Oshima, and Sanders 2006, 35–37). The "Capture of Joppa" refers to recapture of the city by Thutmose III's general Djehuty from local rebels, though the historicity of the event is unclear (Manassa 2013; Burke 2018a). Papyrus Anastasi I is a satirical discussion of the life of colonial personnel, which at one point recounts a sexual encounter between the individual and a local woman in the vicinity of Jaffa (Morris 2018, 208–9). A final source that bears mention is a reference to Jaffa in a fragmentary cuneiform letter found at Gezer, though its significance and date remain unclear (W. Horowitz, Oshima, and Sanders 2006, 53–55).

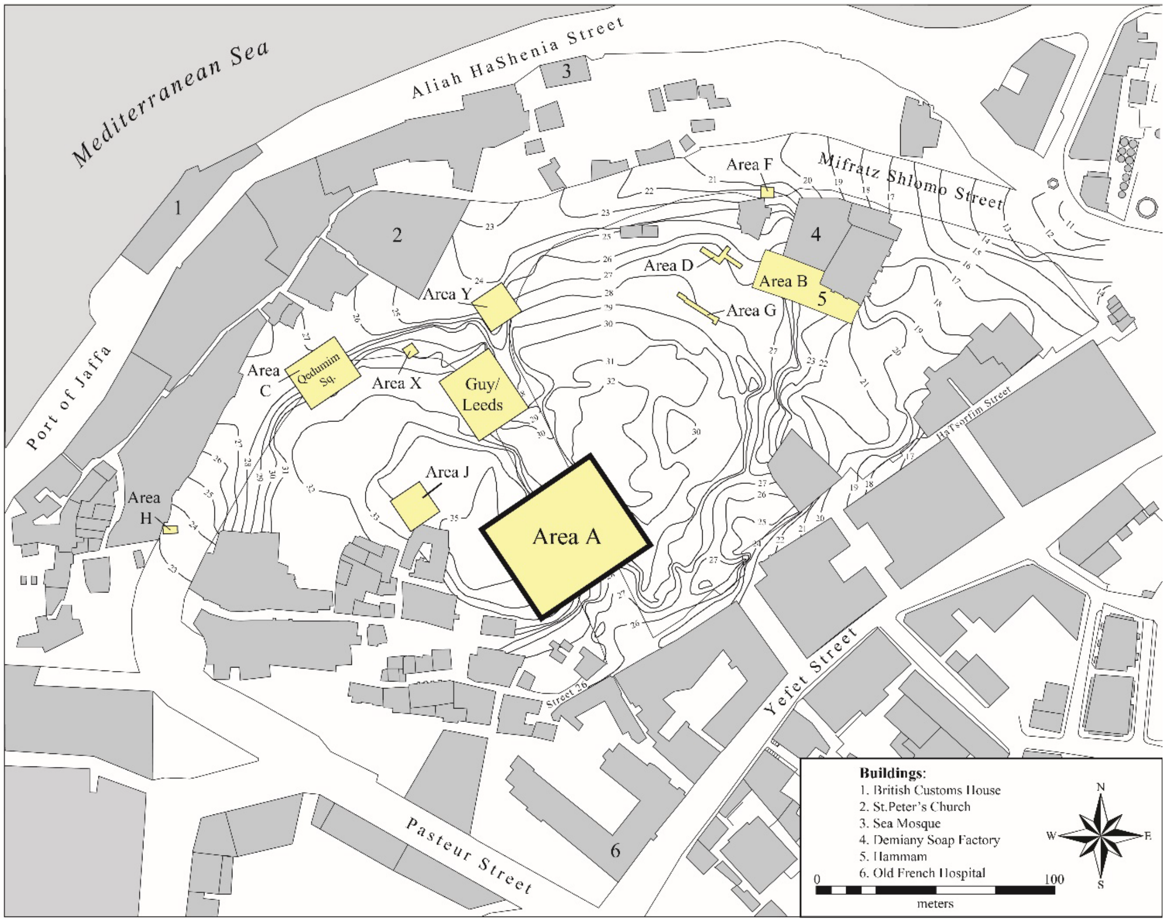

Figure 2: Modern Jaffa and the main excavations areas there (courtesy of the JCHP).

The primary data for this dissertation stems from Area A at Jaffa, which includes excavations by the Tel Aviv municipal archaeologist Jacob Kaplan (1955-1974) and the renewed excavations of the JCHP (2011-2014) under the direction of Aaron A. Burke and Martin Peilstöcker (see Figure 2).[10] While Kaplan encountered Late Bronze Age materials elsewhere at Jaffa, Area A possesses by far the most coherent exposure for understanding life at New Kingdom Jaffa.[11] Kaplan's original work was never subject to final publication prior to his untimely death, instead appearing in several preliminary publications (see chapters 6 to 8). The

[10] My thanks to the JCHP directors, who graciously made this material available to me for analysis.

[11] Other areas where Kaplan encountered Late Bronze Age materials, namely Area Y, comprised small exposures wherein little coherent architecture could be delineated (Ben-Marzouk and Karoll Forthcoming).

original finds from his excavations were stored in the local antiquities museum where they remained until the JCHP returned to Jaffa in 2007. In addition to preparing Kaplan's material for final publication, the JCHP also initiated targeted excavations within Kaplan's original excavation areas to contextualize his finds with new high-resolution data, including a new radiometric chronology to anchor Kaplan's original relative phasing.

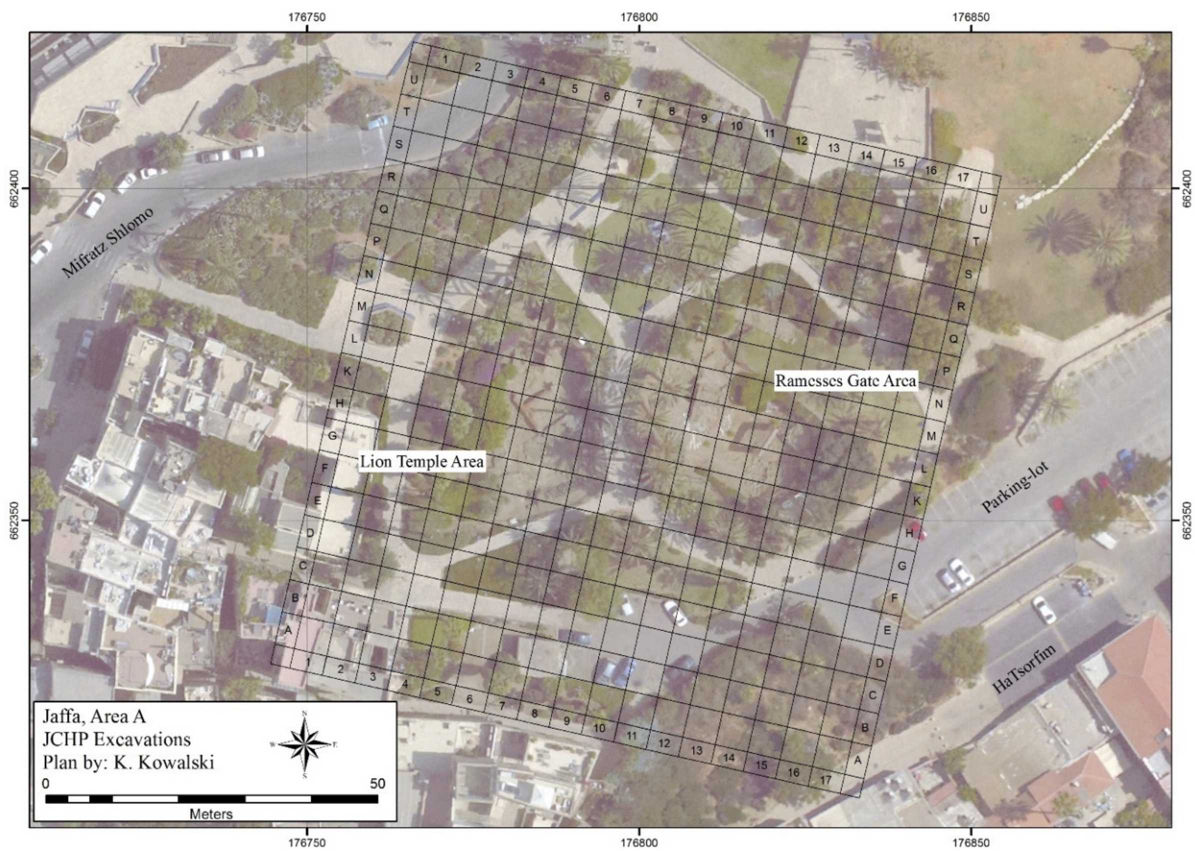

Figure 3: Aerial view of Area A at Jaffa showing the Lion Temple and Ramesses Gate areas (courtesy of the JCHP).

Area A is bifurcated between two main excavation areas, each named from the most prominent Late Bronze Age context found there (see Figure 3). The first, the Ramesses Gate area, produced two main features of interest, a Late Bronze Age IB food preparation area and a Late Bronze Age IIB/III multistory, monumental gate complex (see Chapter 7). The former was excavated in full by Kaplan and has been interpreted as the garrison kitchen during one of the earliest phases of Egyptian involvement. The kitchen, which also included a production area for the manufacture of Egyptian-style foodways ceramics, was destroyed suddenly, with the relatively small area exposed by Kaplan producing a dense collection of objects related specifically to food production (Burke and Lords 2010; Burke and Mandell 2011; Pierce 2013). The gate complex, which was excavated by both Kaplan and the JCHP, comprises three main phases of use (RG-4a, RG-3b, and RG-3a), all dating to the final decades of the Egyptian occupation. The earliest Phase RG-4a gate complex was built following a plan of Egyptian derivation and bore a stone façade with the titulary of Ramesses II (1279-1213 BCE). It was violently destroyed in c. 1135 BCE, and the dense collection of finds includes material from the collapsed administrative rooms above the passageway, material from what seems to have been a marketplace within the passageway, and rubbish that was deposited on the passageway floor during daily transit and use. After the destruction event, the gate was rebuilt (Phase RG-3b), though since this phase was not destroyed the assemblage is comprised exclusively of rubbish from the gate passageway. The gate was subsequently renovated (Phase RG-3a), with this final phase of the gate also being violently destroyed, producing a small destruction debris as well as a larger body of rubbish associated with daily transit and use. This final destruction, which likely occurred around 1125 BCE, constitutes the terminus of the Egyptian occupation at Jaffa, after which the production/consumption of Egyptian-style ceramics and other practices rooted in Egyptian traditions completely cease (Burke, Peilstöcker, et al. 2017). While a gate seems like an unusual context in which to assess foodways, the quotidian garbage, market context, and fact that the upper rooms seem to have been used to cache goods related to administration sheds light on a diverse array of activities related to food production and consumption.

The second portion of Area A, the Lion Temple area, was excavated almost exclusively by Jacob Kaplan from 1970 to 1974, though the JCHP conducted small-scale excavations of Late Bronze Age features there in 2014. The area produced contexts dating from the beginning of Egyptian involvement at Jaffa in the Late Bronze Age IB until the final collapse of the garrison in c. 1125 BCE (see Chapter 8). This includes two phases of Late Bronze Age IB architectural features bearing evidence for domestic activities in the form of ovens and silos (phases LT-10 and LT-9), a Late Bronze Age IIA ritual structure—the Lion Temple—that gave the excavation area its name (Phase LT-8), and then two phases of a Late Bronze Age IIB/III monumental administrative building built in an Egyptian fashion (Phases LT-7 and LT-6). Much like the Ramesses Gate area the Lion Temple area also exhibits evidence for destructive events, notably at the termination of phases LT-10 and LT-9, and plausibly with phases LT-7 and LT-6. While every phase produced a robust assemblage, Kaplan's use of deep probes means that his exposures and the ceramic assemblage tend to be less cohesive than the more circumscribed destruction debris from the Ramesses Gate area. The continuity of occupation in the Lion Temple area, however, means that it attests to phases that are otherwise unknown from the Ramesses Gate area—especially the earliest phase of the garrison (Phase LT-10) and the Late Bronze Age IIA (Phase LT-8).

The selection of foodways data from these two contexts was designed to maximize not just knowledge of foodways at Jaffa, but specifically to engage with datasets that might be compared across sites in both the southern Levant and Egypt. As mentioned in the introduction to this chapter, discussing the expression of Egypto-Levantine relationships through foodways at Jaffa requires first demonstrating that differences in Egyptian or Levantine modes of doing exist and/or are archaeologically detectable. Consequently, while Jaffa presents a robust zooarchaeological dataset, this material will not feature in this study due to complications in making substantive comparisons with respect to human-animal relations across the broader southern Levant and Egypt.[12] Consequently, I selected two primary datasets for which such comparisons are possible: archaeobotanical remains and ceramics. The archaeobotanical data from Jaffa—which is derived from the Phase RG-4a through RG-3a gates—presents one of the most comprehensive assemblages from a Late Bronze Age southern Levantine site.[13] The material, which is discussed in chapters 3 to 5, is derived from 119 samples that produced an NISP of 32,545 elements across 61 taxa. Importantly for foodways analyses, these data provide crucial insight into foodways at Jaffa due to their unusually high diversity of cultivated taxa. The archaeobotanical assemblage provides especially rich information regarding both cereal (Chapter 4) and legume (Chapter 5) exploitation at Jaffa, two staples that have crucial differences between regional foodways of Egypt and the southern Levant. Therefore, they present ideal case studies

[12] Analysis of faunal remains at Jaffa was conducted by Ed Maher (Maher Forthcoming). While zooarchaeological data has been put to use specifically to discuss Levantine elite emulation of Egyptian practices (Koch 2014; Spiciarich 2020), there is a primary difficulty in comparing Egyptian and Levantine practices specifically because there was so much commonality between the species exploited in either region, a product of a long history of livestock exchange (E. Arnold et al. 2016; Meiri et al. 2017; Sowada 2018). Moreover, the prevalence of hand-picking—which prioritizes large mammalian fauna (Dirrigl et al. 2020; Isaakidou 2020, 37–38)—as the primary faunal collection method in both regions has biased the data specifically towards the species common in both regions. The issues generated when data is solely collected by handpicking is visible in the disputes about pig exploitation in Egypt, which was thought to be taboo until rigorous faunal collection procedures were introduced (cf. Darby, Ghalioungui, and Grivetti 1977a, 1:173–75; Hecker 1982; 1984; R. Miller 1990; Redding 1991; S. T. Smith 2003c, 45–46). Regional analyses have been conducted, though most use zooarchaeological remains as environmental proxy data (Tchernov and Horwitz 1990; Sapir-Hen, Gadot, and Finkelstein 2014) or as economic indicators (Hesse 1986; Lev-Tov 2000; 2010; Horwitz and Milevski 2001; Gaastra, Greenfield, and Greenfield 2020). Intra-site analyses have mostly focused on extraordinary feasting deposits at Megiddo and Hazor (Lev-Tov and McGeough 2007; Zuckerman 2007b; Marom and Zuckerman 2012; Sapir-Hen, Martin, and Finkelstein 2017), the cross-regional comparison of which remains difficult. A growing body of high-NISP faunal reports at centers like Lachish (Croft 2004) and Hazor (Marom, Lev-Tov, and Kehati 2017) that focus on not just the presence of species but also butchery practices means that productive comparisons with practice-oriented studies from Egypt (e.g., Gilbert 1988; Ikram 1995; 2000; Linseele and Van Neer 2009; Bailleul-Lesuer 2016) are forthcoming.

[13] Species identification was conducted by Andrea Orendi (Orendi Forthcoming).

for examining how the manifestation of foodways at Jaffa reflect either Egyptian or Levantine modes of doing.

Ceramics related to foodways provide a similarly robust dataset, especially since they are readily differentiated between the Egyptian and Levantine traditions. The ceramics analysis is separated by area specifically to delineate the way in which distinct intra-site patterns manifest within the garrison. The collective assemblage from the Ramesses Gate area, analyzed in Chapter 7, comprises 932 diagnostic objects, whereas the material from the Lion Temple area, discussed in Chapter 8, consists of 1,300 diagnostic objects. As noted, the Ramesses Gate area is especially rich in restorable vessels from the assemblages of the garrison kitchen as well as the Phase RG-4a and Phase RG-3a destructions, whereas the greatest strength of the Lion Temple area is the breadth of superimposed strata spanning the entire history of the garrison. Ceramics are separated with respect to their primary cultural affiliation, which at Jaffa includes the locally manufactured traditions for Egyptian-style and Levantine ceramics, as well as imported vessels from Egypt, Mycenae, and Cyprus. Within chapters 7 and 8, the frequency of forms from each cultural tradition are assessed with respect to diachronic patterns across broad functional categories related to foodways: tableware, culinary wares, containers, and varia (see Section 6.4.3). Where possible, these functional associations are assisted with the preliminary results of an ongoing gas chromatography/mass spectrometry residue analysis study on forms from Jaffa.[14] Notably, while Jaffa was a cosmopolitan port site wherein people, ideas, and objects from the broader ancient world would have come into contact, the comparative rarity of imported ceramics within assemblages of Area A means that with respect to quotidian foodways, the primary choice was with respect to the production, use, and appreciation of ceramics from either

[14] The preliminary results of this study, which remains ongoing, can be found in Appendix 16.

the local Egyptian-style or Levantine traditions.[15] While Cypriot and Mycenaean ceramics are discussed where relevant, it is clear that we have not yet located their primary locus of consumption at Jaffa—which at least for Cypriot vessels seems to have been predominantly within the mortuary sphere (e.g., Peilstöcker 2011a). While Jaffa and its inhabitants certainly cannot be separated from the Mediterranean world system, the greater part of daily life occurred specifically under the umbrella of Egyptian colonialism.

Of the data used in this dissertation, only some has been made previously available. For the Ramesses Gate area, a preliminary stratigraphic report—including the new absolute chronology and a preliminary discussion of the finds—has been published by the JCHP (Burke, Peilstöcker, et al. 2017) and a previous dissertation treated the Late Bronze Age IB kitchen context (Pierce 2013). Moreover, the archaeobotanical data was recently made publicly available in an online database (Riehl and Kümmel 2005). The ceramic data from the JCHP excavations in the gate, however, are presented here for the first time as the product of my own identifications and analyses. Material from the Lion Temple has only ever been treated in Kaplan's preliminary reports (see Chapter 8); therefore, the stratigraphy and ceramics analyses are also the product of my own analyses and presented here for the first time. While stratigraphic analyses and absolute chronological data are presented in Chapter 8 as much as they contribute to the contextualization of finds, the primary studies relaying this information are to be published elsewhere.[16]

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[15] Late Bronze Age cosmopolitanism—especially as it relates to maritime interconnections—is a well-known phenomenon (see Broodbank 2013, 354–444). Its impacts are well-discussed with respect to artistic style (M. H. Feldman 2006) and ceramic trade/consumption patterns (Cline 1994; M. H. Feldman and Sauvage 2010; Demesticha and Knapp 2016; Knapp and Demesticha 2017; Stockhammer 2019). Distributional studies of Cypriot wares have been conducted with respect to both Egypt and the Levant (Bergoffen 1990; 1991; 2002), likewise Mycenaean (Stubbings 1951; Leonard 1994; 2003; Kelder 2002; van Wijngaarden 2002; Müller Celka 2004; Dabney 2007; Judas 2010; Jung 2015) and Egyptian (Eriksson 1995; Martin 2011b) ceramics. Reports on the imported ceramics at Jaffa are forthcoming (Damm and Pierce Forthcoming; Pratt Forthcoming; Yannai Forthcoming).

[16] Forthcoming publications on primary data related to this dissertation include a study of the imported Egyptian and locally manufactured Egyptian-style ceramics from Jaffa (Damm and Pierce Forthcoming), local Levantine ceramics

Collectively, the dataset for this dissertation provides information about a wide variety of practices related to foodways at Jaffa and—when historicized against the backdrop of regional history—offers new data for the analysis of Egypto-Levantine interaction in the New Kingdom imperial periphery.

1.2 The Egyptian Empire in the Levant: Setting the Stage for Interaction

To set the stage for Egypto-Levantine interaction at Jaffa, it is first necessary to sketch broader historical patterns related to New Kingdom imperial expansion. Several general historical surveys of New Kingdom imperial activities exist, but my concern here is with the collective role played by imperial governance, state-sponsored violence, local resistance, and broader entanglements more generally in structuring Egypto-Levantine interaction at Jaffa.[17] In short, I want to question the picture of steady Egyptian control and/or hegemonic domination in the southern Levant, what Monica Smith has identified as our tendency to treat ancient states as blobs on a map, within which existed a degree of "cultural cohesion, administrative effectiveness, and bureaucratic control" (M. L. Smith 2007, 28; see also 2005). Instead, I follow a pattern common to more recent histories of the New Kingdom empire (e.g., Morris 2018), highlighting that Egyptian control was variably contingent on both local resistance and competition with its imperial rivals. My intent is to envision more agency for local actors, identifying that they were less subservient to Egyptian political, economic, and—most importantly—cultural leverage than is typically assumed. Instead, my view of the southern

from Jaffa (Damm Forthcoming b), a GC/MS residue study of ceramics from the garrison (Damm Forthcoming c), as well as a complete stratigraphic report on Area A (Burke, Peilstöcker, and Damm Forthcoming). The results of a radiocarbon study on the Lion Temple, conducted by Brian Damiata, are included in Appendix 17.

[17] Numerous histories of Egyptian imperialism have been written, all integrating archaeological evidence to varying degrees. This includes broader imperial histories (Helck 1962; Weinstein 1981; Redford 1990; 1992; Morris 2005; 2018) and historical surveys of military activity (Hasel 1998; Spalinger 2005; Darnell and Manassa 2007).

Levant—or Levant more generally—is derived from treatments of borderlands, a framework that has already been applied with great effect to the New Kingdom Empire in the Levant (e.g., Morris 2010).[18] Since the southern Levant was a bridge between the imperial core and the broader Mediterranean and Near Eastern world, local actors possessed a substantial degree of power vis-à-vis the Egyptian imperial authority. Interactions between locals and the imperial authority at Jaffa could fall on a spectrum between full cooperation and outright violence, with strategies depending on what actors felt was contextually most advantageous. Imperial authorities could not unilaterally exert their will in all situations; oftentimes they were beholden to particularly aggressive vassals or liminal population groups on the periphery of imperial power.[19] Additionally, there was always a concern with how internal instability might affect relationships with imperial rivals. At no point does the ability to apply asymmetrical lethal force mean that a foreign power can ignore local power structures, a situation that has proven true in the modern world and certainly would have also held true in ancient imperial systems.[20]

[18] Borderlands traditionally have been understood as the spaces between nation-states or colonial empires, specifically when borders are cartographically definable (Weber 1986; Baud and Van Schendel 1997), and stretching applications beyond this rigid definition has been criticized (Hämäläinen and Truett 2011). The term has, however, grown to encompass a wide array of meanings that include life on the borders between geopolitical entities, cultural groupings, or even gender identities (see Anzalduá 1987). There is a common understanding that borderlands—similar to the middle ground (R. White 2011)—are an amorphous space wherein actors exist between two power structures. While interactions in this space are very much defined by the two power structures, interaction can also transcend them and produce something new. Additionally, these boundaries allow for the creative negotiation of relationships that can either reify or dramatically transform expected structures—for instance, the relationship between an central power and peripheral actors (Bacas and Kavanagh 2013).

[19] In this dissertation, the term vassal refers to a subordinate ruler, generally local Levantine officials who ruled as Egyptian clients and were subject to frequent Egyptian intrusions on their local sovereignty.

[20] For a comparative example, the US military presence in Afghanistan could be cited as a modern analog. Despite the modern command-and-control capabilities of US forces and the deployment at one point of more than 100,000 soldiers, US commanders and intelligence officials still spent copious amounts of economic and political capital to maintain goodwill with local powerbrokers. Occasionally, those same resources were turned around and put to use in ways that frustrated US military objectives (Murtazashvili 2015).

An additional element that I address is the question of how to classify the Egyptian empire in a definitional sense, a major topic of dispute (see Bryan 1996; Bunimovitz 2019, 269–73). Primarily, the question relates to my use of the terms imperialism and colonialism, for which rigid typological definitions have proven difficult to apply across all intercultural encounters (C. Lyons and Papadopoulos 2002, 9–11; Stein 2005, 7–11; Dietler 2010, 14–19). As alluded to earlier in this chapter, I understand imperialism to be "an ideology or discourse that motivates and legitimizes practices of expansionary domination by one society over another" (Dietler 2010, 18), with empire being a possible—but not necessary—physical manifestation of that ideology. In contrast, colonialism is "the projects and practices of control marshalled in interactions between societies linked in asymmetrical relations of power and the processes of social and cultural transformation resulting from those practices" (Dietler 2010, 18). As this historical survey will show, both imperialism and colonialism were intertwined with the New Kingdom imperial system, with the variable intensity of either being contextually dependent. Without overstating the typological form of the New Kingdom empire in the southern Levant, it is enough to note that it manifested via both proxy rule and direct occupation that was justified ideologically as a right to expand against and exploit neighboring peoples through policies that systematized asymmetric relations.

Egypto-Levantine interaction does not begin with the military activity of the early 18th Dynasty, but rather with the millennia of entanglements that preceded it. The complex history of these pre-imperial interactions is outside the purview of this work, but encompasses exchanges in population, ideas, and goods, violent conflicts, and even a period during the late 4th millennium

BCE in which Egyptian colonies were established throughout the southern Levant.[21] Furthermore, the century prior to New Kingdom military expansion into the southern Levant—corresponding with the Egyptian Second Intermediate Period (c. 1650-1550 BCE) and Levantine Middle Bronze Age IIB/C (c. 1750-1550 BCE)—saw the Levantine Hyksos dynasty in control of the Nile Delta region from their capital at Avaris (Bietak 1996; Mourad 2015; Candelora 2019b). The Amorite *koine* in which these rulers participated introduced key concepts and technologies of warfare into Egypt that came to define New Kingdom militarism—most notably with respect to chariot warfare (Candelora 2019a; Burke 2021). Consequently, characterizing cultural interaction during the New Kingdom imperial period requires the recognition that—unlike many other historical colonial episodes—there is no true precontact period, meaning that material culture of an Egyptian derivation need not signify an overt attempt by individuals to align themselves with Egyptian culture. There was ample time for classic Egyptian object types to

[21] Early exchanges prior to the Egyptian Predynastic period (c. 5300-3000 BCE) include not only the arrival of the broader Neolithic package into Egypt via the southern Levant, but also extensive trade connections (Brewer, Redford, and Redford 1994, 5–7; Wengrow 2006; Zohary, Hopf, and Weiss 2012, 4). Beginning with the Predynastic period and corresponding with the Levantine Early Bronze Age I (c. 3900/3700-3200/3000 BCE), trade between the two regions is attested by shells (Bar-Yosef Mayer 2002) and potentially wine (cf. McGovern 2001; Porat and Goren 2002), as well as the development of coastal sites to support maritime trade (Gophna 2002; Marcus 2002). This culminated in the installation of Egyptian colonies in the southern Levant (Miroschedji 2002), which are identified by quantities of locally manufactured Egyptian-style ceramics (see A. Ben-Tor 1991; E. Braun 2005; Mumford 2013, 71; Miroschedji 2013, 312; Martin 2011b, 269–73 and citations therein) and the recreation of Egyptian foodways locally (T. Levy et al. 1997). These colonies are best understood via the concept of "colonies without colonialism" (following Stein 2002; Osterhammel 2005), as recently argued by Ellen Morris (2018, 11–36), with the broader relationship between Egypt and the southern Levant during this period being discussed at length elsewhere (Oren 1989; van den Brink 1992; Harrison 1993; van den Brink and Levy 2002; Höflmayer and Eichmann 2014; Mączyńska 2014; Atkins 2017). By the Early Bronze Age II (c. 3200/3000-2850/2600 BCE), the interests of the Egyptian state had shifted to the northern Levant (Stager 2001; Aubet 2012, 201–65), but trade with the southern Levant persisted up and through the Egyptian Old Kingdom (c. 2686-2160 BCE) (Sowada 2009). Following the revised chronology for the Levantine Early Bronze Age IV (c. 2500/2300-2200/1900 BCE) (Regev et al. 2012), this period also corresponds with the earliest evidence for a Egyptian military campaigns into the region (de Miroschedji 2012). Later, the Egyptian Middle Kingdom (2055-1650 BCE) saw mass population movements between the two regions (Saretta 2016), with interaction between Egypt and the southern Levant including extensive trade and episodic outbursts of violence (Weinstein 1975; Cohen 2002; 2016).

become fully domesticated within Levantine symbolic discourse (e.g., the scarab[22]), hence the need to treat New Kingdom Egypto-Levantine interaction at Jaffa predominantly through the lens of more mundane, daily practices.

The Second Intermediate Period Hyksos kingdom proved the beginning of Egyptian imperial activities in the southern Levant, with the early rulers of the 18th Dynasty expelling the Hyksos from Avaris and sacking Hyksos strongholds like Sharuhen—thought to be Tell el-ʿAjjul in modern Gaza (Kempinski 1974).[23] Egyptian historical sources for this period and contemporary destructions at southern Levantine sites led to the theory that the early 18th Dynasty kings led a revenge campaign against the Hyksos and their southern Levantine allies beginning c. 1550 BCE, which has been moderated recently due to a revised absolute chronology in which the Levantine destructions are spread over a much longer period.[24] Even if campaigns by New Kingdom rulers explain most of the destructions across the southern Levant, it now seems most likely that they were spread across the near-century separating the first victories against the Hyksos by Ahmose (c. 1550-1525) and Thutmose III's victory at Megiddo in c. 1460 BCE (cf. Morris 2005, 35; Burke 2010; Panitz-Cohen 2013, 541–42). The campaigns of the early 18th Dynasty rulers have been categorized broadly as *razzias*, lightning campaigns designed for seizing booty rather than securing territory, an *ad hoc* form of imperialism that did not maintain

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[22] Diamantis Panagiotopoulos (2012) treats the deconstruction of alterity as it occurred specifically with imported objects in the Late Bronze Age, echoing previous work by Michael Dietler (2010, 59–60). For scarabs, however, they were not just imported prior to the New Kingdom imperial period, they had already been manufactured locally since at least the Middle Bronze Age IIA (2200/1900-1750 BCE) (D. Ben-Tor 2011).

[23] Our knowledge of these military campaigns is indebted to the accounts preserved in the tomb biographies of soldiers like Ahmose son of Ibana (Lichtheim 1976, 2:12–13).

[24] The revenge campaign theory was a crucial chronological anchor separating the Middle and Late Bronze ages in the southern Levant (Albright 1949, 87; Weinstein 1981, 1–10; 1992a; Dever 1985; 1990; 1992b; 1992a), but also had early opponents (Seger 1975; Redford 1979; Hoffmeier 1989; 1991). The debate eventually reached an impasse (see Burke 2008, 101), with recent radiometric dates for terminal Middle Bronze Age destructions rendering a monocausal explanation like the revenge campaign theory unlikely (Höflmayer 2019).

control except through largely symbolic oaths of fealty (Redford 1979, 274; 1992, 155; Weinstein 1981, 7–8; Morris 2018, 117–40).[25] Whether as cause or contributing factor, these campaigns occurred during the "balkanization" of the Middle Bronze Age Amorite kingdoms of the southern Levant (Burke 2021, 367), which entailed the disruption of settlement patterns and potentially contributed to severe demographic stress.[26] Regardless of how this period is understood, this early phase of the New Kingdom experiment in imperialism meant that Egypto-Levantine interaction during this phase mostly comprised transient, violent encounters, with perhaps the only recourse from open conflict being for Levantine polities to pay lip-service obeisance to Egyptian pharaohs as they campaigned through the region.

The major transition occurred during the reign of Thutmose III (1479-1425 BCE), whose victory over a coalition of Levantine rulers at the Battle of Megiddo in c. 1460 BCE signals the shift from episodic raiding to formalized territorial control (Höflmayer 2015; Morris 2018, 141–42).[27] While the Egyptians maintained the old pattern of oaths of fealty, the shift in strategy is evidenced by the first record of these oaths being secured through the use of hostages—a practice that remained in force for the remainder of the imperial period (Redford 2003, 37). Additionally, it is with Thutmose's victory that we first see more formalized taxation and the expropriation of agricultural land (Morris 2018, 144–48). While the current scholarly consensus

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[25] Recent reanalysis of the ceramics at Tell el-ʿAjjul, however, suggest that some formalized territorial occupation occurred during this early period (Kopetzky 2011).

[26] The dense, hierarchical settlement system of the Middle Bronze Age has been shown through survey and network analyses (Broshi and Gophna 1986; Burke 2010, 43–47), with similar studies demonstrating the disruption of that system by the Late Bronze Age (Gonen 1984; Savage and Falconer 2003). The hypothesis of an equivalent demographic collapse was central to Shlomo Bunimovitz's (1994) theory of a Late Bronze Age human resource crisis.

[27] Accounts of the battle are preserved in poetic and annalistic formats (Sethe 1907; Redford 2003). The account of the battle, wherein the Egyptians were responding to the threat of a coalition under the ruler of Kadesh, seems to imply that Gaza in the southern coastal plain, was already under Egyptian control (Redford 2003, 9–17; Morris 2005, 54–56).

is that local manifestations of Egyptian control mostly occurred through the cooption of infrastructure and human resources rather than the permanently stationing of a large body of Egyptian personnel (Morris 2018, 160–62), the example of Jaffa seems to suggest that some colonial personnel were installed early on. Even after Thutmose's victory, Egyptian campaigns continued, with the growing imperial rivalry between Egypt and their northern imperial counterpart Mitanni leading to near-constant direct and proxy warfare throughout the region.[28] Consequently, while more overt Egyptian involvement in regional governance increased the prospect of human entanglements, especially at sites like Jaffa, the prospect of violence continued to be a primary mode of Egypto-Levantine interaction.

While the Levant remained a dynamic borderland, the negotiation of peaceful relations between Egypt and their imperial rivals by the early 14th century BCE ushered in a period of diplomatic exchange and international trade commonly referred to as the *pax Aegyptiaca*—a largely economic designation (see Weinstein 1981). For the southern Levant, however, historical records like the Amarna archive detail extractive exploitation by the Egyptians, internecine strife among Levantine rulers, overt resistance to Egyptian rule, and the emergence of liminal social elements like the ʿApiru who variably played the role of rebel, bandit, or mercenary.[29] This includes outright rebellions, as when the vassal rulers of Amurru defected to the Hittites after years of testing the boundaries of Egyptian control (Morris 2010), or as when the ruler of

[28] Conflict with Mitanni seems to have begun as early as Thutmose I's (1504-1492 BCE) deep raid into northern Syria (Redford 1992, 134–42; Morris 2005, 31), though that campaign remains unusual. Direct conflict occurred through the reign of Amenhotep II (1427-1400 BCE), who seemingly negotiated stable relations with both Mitanni and an emergent Hittite polity. Egyptian records, however, attest to campaigns against Levantine unrest through the reign of Thutmose IV (1400-1390 BCE), including conflict with the city of Gezer (Morris 2005, 132–36).

[29] The Amarna archive dates to the reigns of Amenhotep III (1390-1352 BCE), Amenhotep IV/Akhenaten (1352-1336 BCE), Neferneferuaten/Smenkhare (1338-1336 BCE), and perhaps the first year of Tutankhamun's reign (1336-1327 BCE)(Moran 1992; Rainey 2015). Additional documentation comes from the Hittite archives of Boghazköy, which has been gradually published in both the *Keilschrifttexte aus Boghazköi* and *Keilschrifturkunden aus Boghazköi* series since 1916 and 1921, respectively. For the ʿApiru, see Niels Peter Lemche (1992).

Shechem carved out a kingdom within Egyptian territorial holdings—an effort continued by his sons after his capture and execution (Finkelstein and Naʾaman 2005, 172–80). While textual sources account for strong Egyptian responses to regional instability (see Several 1972), it is clear that the Amarna era should best be understood as one in which local Levantine actors resisted or manipulated Egyptian rule to their perceived advantage. The textual record discusses farmers escaping to the unregulated periphery, the murder of Egyptian officials and their local collaborators, the defrauding of Egyptian interests, lying to Egyptian officials, and perhaps most importantly, overt attempts to play the Egyptians against their imperial rivals (Morris 2018, 165–86).[30] Consequently, this period, which corresponds with the Levantine Late Bronze Age IIA (c. 1400-1300 BCE), cannot be understood without reference to an undercurrent of resistance and strife within the Levantine imperial periphery. While there is no archaeological evidence at contemporary Jaffa for violence, the site likely still saw the effects of a geopolitical situation that displaced local populations and created disaffected refugee communities (Burke 2012, 6–8).

The lull in imperial rivalries that characterized the Late Bronze Age IIA was eventually replaced by a period of tension and eventual open conflict between Egypt and the Hittites, much of which spilled into the Levantine periphery (Murnane 1990, 1–31).[31] This situation, which culminated in the 1274 BCE Battle of Kadesh during the reign of Ramesses II (1279-1213 BCE),

[30] The notion that the small number of troops requested in the Amarna letters testifies to the limited nature of threats against Egyptian rule (e.g., Redford 1992, 267) does not seem to accurately assess the situation. First, it neglects that any quantity of imperial troops would have served as a mark of prestige for local rulers (Pfoh 2019), and therefore such requests might have been part of symbolic discourse. Second, it fails to recognize that small quantities of military personnel provide a major deterrent to hostile action during instances of foreign occupation (Sepp 2005). Moreover, the Amarna letters were composed in a symbolic format of deferential entreaty (Morris 2006), and therefore do not provide completely accurate details regarding ruler-vassal power dynamics.

[31] Part of this development includes a rather peculiar event wherein an Egyptian queen—possibly Ankhesenamun or Nefertiti—requested that the ruler of Hittites, Shuppiluliuma, send her a husband from among his sons. The death of the Hittite prince while he was in transit to Egypt sparked suspicion and eventually open conflict between the two sides, leading to a period of cross-border conflict and proxy wars (Schulman 1978; Murnane 1990, 22–31).

seems to be intimately linked with the intensification of Egyptian activities in the southern Levant during the 13th century BCE as the Egyptians moved to consolidate maritime and terrestrial links with their northern Levantine territorial holdings.[32] Archaeological and textual evidence attest to the establishment of a sequence of command-and-control points across the Sinai Peninsula, connecting Egypt with its southernmost garrisons in the Levant and allowing for the rapid movement of troops across the inhospitable Sinai (Oren 1987; 2006; Cavillier 2001; Hoffmeier and Abd el-Maksoud 2003; Hoffmeier 2006; 2013; Hoffmeier and Moshier 2014b; 2014a). Likewise, textual sources attest to a dramatic intensification of military campaigns throughout the southern Levant.[33] Archaeologically, increased Egyptian involvement is attested in the region across a wide body of evidence. Local industries for the manufacture of Egyptian-style ceramics appear throughout the region with this type rapidly occupying the majority of ceramics at several sites.[34] Moreover, fortresses following an Egyptian model are constructed at sites throughout the region during this period (Higginbotham 2000, 263–301; Morris 2005, 504–611), likewise the so-called "governor's residencies" (Oren 1984; Singer 1986; Maeir 1988; Kochavi 1990; Higginbotham 2000, 263–301; Morris 2005, 504–611; Pierce 2013, 282–453) and the monumental Egyptian-style gate at Jaffa (Burke, Peilstöcker, et al. 2017). The period also

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[32] Kadesh was a strategic stalemate; conflict continued until later in Ramesses II's reign (Spalinger 2005, 209–27).

[33] While reliefs depicting 19th and 20th Dynasty Egyptian conflicts in the Levant might represent an artistic trope, their frequency during the period is notable (Burke 2009). Additionally, Egyptian textual reports for military activities are extensive during this period (Hasel 1998, 15–193), as are locally-erected victory stelae (Albright and Rowe 1928; Rowe 1929; Albright 1952; Černy 1958; Wimmer 2002; E. Levy 2012; 2017). The targets of these campaigns varied from cities to loosely collected social elements like the early Israelites, as depicted in sources from Merenptah's reign (1213-1203 BCE) (Yurco 1977; 1986; 1997; Hasel 2003).

[34] Rapid increases in locally-manufactured Egyptian style ceramics are attested in 13th century BCE levels at Tel Aphek (Beck and Kochavi 1985; Kochavi 1990; Gadot and Yadin 2009; Gadot 2010), Beth Shean (James 1966; James and McGovern 1993a; 1993b; Mazar 2003; 2006b; 2011; Mazar and Mullins 2007; Panitz-Cohen and Mazar 2009; 2009), Deir el-Balaḥ (cf. T. Dothan 2008; Killebrew, Goldberg, and Rosen 2006; T. Dothan and Brandl 2010a; 2010b), Tel Mor (Martin and Barako 2007), and Tel Sera (Martin 2011b, 221–28). The situation is plausible but unclear at other sites, a factor of early-modern excavation strategies (see Martin 2011b). While Jaffa exhibits a majority of Egyptian-style ceramics earlier, the pattern continues into this period (see Chapters 7 and 8).

attests to a dramatic increase in material culture of an Egyptian derivation (see especially Mumford 1998), including evidence for scribal activity, mortuary activity, ritual practices, and iconography—material culture that has variably been explained as attesting to elite emulation by local Levantine rulers or a dramatic increase in Egyptian personnel in the region (cf. Weinstein 1981; Higginbotham 1996; 2000; Killebrew 2005b; 2005b; Morris 2005; 2018; Martin 2011b; DePietro 2012; Pierce 2013; Nataf 2013; Fantalkin 2015; Streit 2019a; 2019b; Koch 2021).[35] While elite emulation likely explains a great deal of cultural production during this period, the question of whether there was also an increase in exogenous Egyptian colonial personnel is deeply intertwined with how one understands the vectors of transmission and chains of socialized learning that brought these objects and practices to the region. Given the current evidence for potentially hereditary, resident Egyptian colonial officials like the individual called Ramesses-user-Khepesh at Beth Shean (D. Ben-Tor 2016, 86–87), however, the exponential increase of material culture of Egyptian derivation, much of which comprises low-prestige, daily life objects, renders it plausible that a greater population of individuals from Egypt entered the region at this time. The greater involvement of the Egyptian administration during this period is

[35] Beginning in the 13th century BCE, there is a much greater attestation in the southern Levant of localized scribal activity in the form of hieratic and hieroglyphic inscriptions (Groll 1973; Gilula 1976; Goldwasser 1982; 1984; 1991a; 1991b; Goldwasser and Wimmer 1999; Sweeney 2004; Wimmer and Maeir 2007; Wimmer 2008a; 2008b; 2010; E. Levy 2012; 2017). Mortuary practices are especially attested via the anthropoid clay coffins, which while once thought to be a Sea Peoples phenomenon clearly attest to a manifestation of an Egyptian mortuary practice locally in the southern Levant (cf. Oren 1973; Kuchmann 1977; T. Dothan 1982, 252–88; Brug 1985, 149–52; Bloch-Smith 1992, 33–36; Gonen 1992, 29; Hallote 2001, 93–95; Stager 1995, 342; Cotelle-Michel 2004; Sabbahy 2009; Yasur-Landau 2010, 207–11; Pierce 2013, 279–81; Emanuel 2015; Pouls Wegner 2015; Arie 2016; van den Brink et al. 2017; Koch 2018; 2019a; Hoffmeier and Bertini 2019)—with this period also seeing the incorporation of Egyptian-style mortuary stelae (Ventura 1987), shabtis (Oren 1973, 123–24), and potentially funerary cones (Steel et al. 2004). The adaptation of ritual activities is especially known from the hybridization of architectural features within ritual space (Barkay 1990; 1996; 2000; Bietak 2002; Koch 2017) and the increased attestation to figurines and ritual stelae of an Egyptian derivation (Vincent 1928; Pritchard 1943; Ben-Arieh 1983; Moorey 2003; Ziffer, Bunimovitz, and Lederman 2009; Sharp, Mckinny, and Shai 2015; Budin 2015; Szpakowska 2015; D. Ben-Tor 2016, 111–13). The increase of objects iconographically linked to the Egyptian tradition are especially well attested with respect to amulets and seals (McGovern 1985, 87, 96–97; Braunstein 2011) and artistic motifs, though scholarship has especially addressed the overtly Egyptian character of motifs that have been adapted by local Levantine artisans (cf. Albright 1949, 101; Giveon 1978; Bryan 1996; Lilyquist 1998; M. H. Feldman 2006).

certainly attested at Jaffa, where the installation of monumental imperial architecture and an overwhelming frequency of Egyptian-style ceramics (see chapters 7 and 8) attest to the increased entanglement of garrison personnel with the resident local population.

The transition into the 12th century BCE—the classic period of Late Bronze Age collapse (Cline 2014)—saw rapid transformations of regional geopolitics in the southern Levant. Notably, the arrival of the Sea Peoples—a loosely affiliated, multiethnic group with Aegean affinities—seems to have constituted a direct challenge to Egyptian territorial control, though their exact nature and role with respect to the end of the Egyptian empire is heavily disputed.[36] Ultimately, both the cause and the chronology of the end of the Egyptian empire in the southern Levant is unclear and likely stems from several overlapping causes. Traditionally, it was placed in the reign of Ramesses VI (1143-1146 BCE) based on epigraphic evidence (Weinstein 1992b), however, recent radiocarbon determinations have shown that the end likely happened later, with the final destruction of the garrison at Jaffa occurring in the last quarter of the 12th century BCE (Burke, Peilstöcker, et al. 2017). Its final dissolution could have occurred as late as the reign of Ramesses IX (1126-1108 BCE), though what existed by this point was hardly comparable to what came before. Unfortunately, the historical record is sparse, though it is clear that the rulers of the mid- to late 20th Dynasty faced increasing difficulties at home that included food

[36] Regarding the character of the Sea Peoples, the primary disputes relate to their origins, their composition as an ethnic group, and their role in the collapse of the Egyptian empire and the end of the Late Bronze Age (cf. Sandars 1978; T. Dothan 1982; Noort 1994; Stager 1995; S. Sherratt 1998; Barako 2000; Oren 2000; Yasur-Landau 2010; Cline and O'Connor 2012; Cline 2014; Killebrew and Lehmann 2013; E. Stern 2013; P. Fischer and Bürge 2017). The earliest Egyptian references to the Sea Peoples date to the Amarna era, though they appear in sources after as both enemies and mercenaries employed by the Egyptian army (Emanuel 2013). The primary event for their arrival, however, is in an invasion in c. 1177 BCE during the reign of Ramesses III (1184-1153 BCE), whose temple at Medinet Habu depicts sprawling naval and land battle against a Sea People coalition, though the reality of this invasion has been disputed with respect to its veracity, chronology, route, and intensity (cf. Singer 1985; Cifola 1988; Stager 1995; Kahn 2011; Kitchen 2012, 11–18; Barako 2013; Finkelstein 2016; Evian 2016; 2017). The role of the Sea Peoples as the "boogeymen" responsible for the collapse of the New Kingdom empire remains unlikely (Millek 2017; 2018), though they certainly taxed an already overextended system.

shortages, inflation, incursions by Libyans from the west, and the breakdown of social institutions as evidenced in the robbery of royal tombs (van Dijk 2000, 301). These stresses—when combined with growing unrest in the southern Levant visible in the repeated destructions at Jaffa—overwhelmed the Egyptian ability to project power. The disintegration of the empire was a process rather than an event, resulting in the disruption of local social institutions and a number of imperial personnel being left behind (Burke 2018c; 2020). With the final destruction of the Egyptian garrisons, all markers for an Egyptian presence—such as the local manufacture of Egyptian-style ceramics—completely cease (see chapters 7 and 8). The geopolitical and cultural systems of the Egyptian empire crumbled, replaced by the new sociopolitical reality that would characterize the formation of the Iron Age nation-states (Killebrew 2013).

In sum, beginning with the first *razzias* by the first rulers of the 18th Dynasty, Egypt initiated an imperial project in the southern Levant that resulted in progressively more intense human and material investments in the region. While strategies varied depending on relations with imperial rivals and local unrest, a few elements consistently characterized Egypto-Levantine interaction. Notably, whether the primary agents were imperial forces, local Levantine rulers, or non-state actors like the ʿApiru, archaeological and textual evidence testify that the prospect of violence was never far removed from the colonial sphere. Moreover, the geopolitical position of the southern Levant made it a territorial lynchpin connecting Egypt both to its northern imperial holdings as well as maritime and terrestrial trade routes. This simultaneously spurred Egyptian efforts to maintain control, but also lent Levantine actors a greater degree of power vis-à-vis the imperial authority in that a certain degree of collaborative interaction was required to maintain stability. That the Levant was such a crucial corridor also firmly entangled the inhabitants of the region in the economic systems necessary for sustaining Egyptian power, with the products of

Levantine labor either strengthening imperial coffers or directly provisioning campaigning armies.[37] Collectively, the result was a highly dynamic imperial periphery with a diverse array of stakeholders, making extreme contingency perhaps the only consistent component of Egypto-Levantine interaction. The ability of the Egyptian imperial authority to control the periphery was far from absolute, and yet the indigenous Levantine population could not fully extricate themselves from their entanglement with the imperial system. Consequently, for garrison sites, the imperial and colonial became one of the primary elements structuring daily life, something immediately detectable within foodways at Jaffa.

1.3 Interaction, Foodways, and Identities in the southern Levant: Past Approaches

Within this section, I will position my dissertation in relation to past treatments of Egypto-Levantine interaction and identity more generally, beginning first with general trajectories and concluding with how foodways have been leveraged to assess the question. As noted in the introduction to this chapter, the relationship between Egypto-Levantine interaction and identity has only been an explicit object of inquiry for approximately two decades. Prior to that point, Egypto-Levantine interaction was mostly addressed with respect to geopolitical relations, economy, and art historical developments, with the concept of identity—or at the very least cultural production—being treated in passing. In many ways, the focus on identity was a product

[37] The relative degree of Egyptian economic extraction from the southern Levant is heavily disputed, with early scholarship linking it directly to regional impoverishment (e.g., Albright 1949, 101). This was challenged in one of two ways. The notion that the region was impoverished was challenged either on the grounds that the Late Bronze Age was a high point in cultural production (Liebowitz 1987) or that direct participation in the Egyptian system conferred wealth to Levantine elites and only impoverished those on the outside of the imperial system (cf. de Vaux 1971, 121; Gonen 1984, 69; Bienkowski 1989; Knapp 1987; 1989; 1992). The strongest challenge, however, came from Shemuel Aḥituv (1978), who argued that texts like the Amarna archive indicate only modest economic extraction by the Egyptians. This was challenged by Nadav Naʾaman, who argued that the Amarna letters only list informal extractions rather than institutionalized taxes and, moreover, that many of the things listed within informal extractions—such as the common request by the Egyptian king for "maidservants"—were far more economically valuable than Aḥituv credits (Naʾaman 1981; 2002). Regardless, period texts—especially the hieratic bowls found at southern Levantine sites like Lachish—directly attest to extraction in support of imperial projects (Wimmer 2019).

of the gradual shift away from culture history models in Levantine archaeology in the 1990s.[38] Prior to this point, Egypt and the southern Levant were treated as bounded cultural entities comprised of rigid, essential characteristics. Moreover, the tendency was to assume a stark cultural asymmetry between Egypt and the southern Levant, marking the indigenous Levantine population as culturally indebted to their imperial overlords, often as recipients of Egyptian cultural hegemony.[39] It is, however, difficult to homogenize approaches during this period of scholarship, as some works—especially art historical studies—made allowances for Levantine agency in creatively adapting and reinterpreting Egyptian material culture to suit their worldview (e.g., Giveon 1978). With the growing importance of identity in the late 1990s, however, the trajectory of scholarship changed dramatically (see Emberling 1997).

The primary turning point came with the publication of Carolyn Higginbotham's (2000) *Egyptianization and Elite Emulation in Ramesside Palestine*, which made cultural contact and identity in the New Kingdom imperial periphery an explicit object of inquiry for the first time. Using world-systems theory, she addressed the presence of Egyptian material culture in the southern Levant through a core-periphery model wherein these objects legitimized actors within

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[38] By culture history, I am referring to an approach wherein material remains are described, classified, and plotted chronologically as "units which are usually referred to as 'cultures' and often regarded as the product of discrete social entities in the past" (S. Jones 1997, 5).

[39] Several surveys of the culture history approach to Egypto-Levantine interaction have been written (Lemche 1991, 13–24; Higginbotham 2000, 1–6; Morris 2005, 1–21; DePietro 2012, 2–5; Pierce 2013, 2–12). W.F. Albright was one of the primary poles formalizing culture history and his work influenced generations of Levantine archaeologists (see G. E. Wright 1965, 85–90). He considered southern Levantine culture a filtered product of Egypt and Mesopotamia (Albright 1949, 253), an opinion followed by Roland de Vaux, who saw any Late Bronze Age sites bearing evidence for "objets précieux ou des œuvres d'art […] son ceux où la presence égyptienne est assure par d'autres témoignages" (de Vaux 1971, 121). The rigid bifurcation of Egyptian and Levantine material culture was also maintained by Yohanan Aharoni, who argued that modifications away from the Egyptian model at the Hathor shrine of Timnah could have only happened after withdrawal of the New Kingdom empire (Aharoni 1982, 136–72). Similarly, Kathleen Kenyon argued that the extramural Fosse Temple of Lachish constituted an allocation by the Egyptian colonial authority to allow the indigenous population to worship outside of the city (Kenyon 1978, 27). The approach reached its zenith in the work of Donald Redford, noted that Egypt and the southern Levant were "too fundamentally disparate in culture" to be capable of mutual transformation (Redford 1992, xxii, see also 43, 214).

the power structures of the new imperial periphery (2000, xii, 6-7).[40] Her work differentiated between two possible models for the dramatic increase in material culture of an Egyptian origin or inspiration in the 13th century BCE southern Levant. The first, the "Direct Rule model", assumed that if Egypt governed the Levant via a resident colonial force, we ought to expect architecture and material culture to manifest in ways mirroring what is known from Egypt and colonial Nubia, with especially dense clusters occurring at colonial centers (Higginbotham 2000, 14).[41] In contrast, her "Elite Emulation model" assumes a situation wherein the material culture and cultural practices from the imperial core are selectively adopted by actors in the periphery to increase their status vis-à-vis one another and diminish the status gap between themselves and representatives of the imperial core, with even hybridized cultural manifestations serving this purpose (Higginbotham 2000, 6–15). Expectations for this model include a reduced diversity of Egyptian material culture in the periphery when compared to the core, emphasis on Egyptian prestige goods and hybrid types, the contextual isolation of these types to sensitive arenas of status negotiation (e.g., mortuary contexts), and finally, a lack of "pure" Egyptian contexts, with the distribution of Egyptian material culture being relatively even throughout the region (Higginbotham 2000, 15). She concluded that both models apply partially to the Levant, with some form of occupation occurring at sites exhibiting overwhelming evidence for practices of an Egyptian origin like Beth Shan, Deir el-Balaḥ, Gaza, Jaffa, and Timnaʿ, but that the remainder of the region adhered to the Elite Emulation model (Higginbotham 2000, 129-133).

[40] Despite the obvious relationship to Immanuel Wallerstein (1974), the work drew on Irene Winter's (1977) treatment of the Assyrian iconography of power at Hasanlu, models for the Hellenization of southeast Italy (Whitehouse and Wilkins 1989), and models of the Romanization of Britain (Millett 1990).

[41] Higginbotham's notion that colonial Nubia exactly follows her "Direct Rule" paradigm has been criticized by archaeologists working in that region, who have noted that much of the region—especially the pre-imperial capital of Kerma—retained a predominantly local character after conquest (S. T. Smith 2003c, 95).

Higginbotham's work spurred a flurry of scholarly activity, much of which centered breaking down her bifurcation of possibilities and assessing the plausibility of direct rule as an explanation for Egyptian material culture in the region. Ellen Morris examined the types and distribution of Egyptian fortresses, arguing that the mutual exclusivity of the Elite Emulation and Direct Rule models constitutes a false dichotomy, with both direct rule and elite emulation often being common to imperial strategies (Morris 2005, 8-17). The greater part of the discussion focused on the local manufacture of Egyptian-style ceramics in the southern Levant, arguing that presence of such low-prestige forms—often in the majority—alongside an indigenous Levantine ceramics industry was most plausibly explained by the influx of an exogenous colonial population from Egypt (Killebrew 1998; 2005b; Martin 2004; 2011a; Fantalkin 2015). In many ways, these criticisms became possible given the dramatic increase in data related to daily life, a direct product of the massed publication of Late Bronze Age southern Levantine sites after the publication of Higginbotham's book (see n. 5). Indeed, this transformation in the state of the data has been instrumental to allowing broader engagements with daily life as the primary means by which to understand Egypto-Levantine interaction.

Despite criticism, the bifurcation within Higginbotham's model has largely structured inquiry into the present day. On the one hand are those studies that have largely understood the manifestation of Egyptian practices and material culture through the lens of elite emulation, which have predominantly focused on the ritual and the mortuary sphere (Koch 2018; 2019a; 2019b; 2021; Steel 2018). On the other side are those studies that either more readily allow for direct rule or emphasize a more amorphous, mutual hybridization of practices that affected *both* Egyptian colonial personnel and the local Levantine population (DePietro 2012; Pierce 2013). Similarly, Susan Braunstein conducted a detailed study of *aegyptiaca* in mortuary contexts in the southern Levant, concluding that they constitute the creative adaptation of foreign forms by locals in relation to a wide variety of identities, including the apotropaic protection of children and the signaling of political affiliations by adults (Braunstein 1998; 2011; see also J. Green 2006). Most recently, Katharina Streit has reassessed the criteria by which we identify individuals from Egypt in the archaeological record, specifically assessing the need to identify "embodied cultural automatisms" (Streit 2019a, 358; 2019b, 69). She specifically contrasts these practices—which are deeply rooted and socialized into the individual—with "conscious cultural choice," which refers to active decision-making (Streit 2019a, 358; 2019b, 69).[42] While her approach is explicitly concerned with the identification of the plausible origins of individuals in the archaeological record, it is theoretically aligned with my work in that it specifically seeks to assess practices that are derived from interpersonal contact and socialized learning.

While the preceding discussion indicates the broader trajectory of the field towards practice-based approaches and a general concern with the daily life implications of Egypto-Levantine interaction, it remains to be seen how foodways have factored into the question. Both Egyptology and Levantine archaeology have a robust history of foodways analyses, though their application to cultural interaction and identity is relatively a recent phenomenon.[43] To date, the

[42] Embodied cultural automatism is defined as "unconsciously acquired technical skills, work processes, and aesthetic preferences that are normally transmitted or acquired (embodied) *en passant*" (Streit 2019a, 358, emphasis original).

[43] One of the primary manifestations of foodways analysis has been in catalog treatments and daily life studies. For Egypt, this includes foodways encyclopedias (Darby, Ghalioungui, and Grivetti 1977a; 1977b; Peters-Destéract 2005), encyclopedias and indices for human-plant relations (Germer 1985; 2008; Manniche 1989; Murray 2000a; 2000c; Murray, Boulton, and Heron 2000; de Vartavan, Arakelyan, and Amorós 2010; Arakelyan et al. 2012), or encyclopedias of human-animal interaction (Boessneck 1988; Brewer and Friedman 1990; Houlihan 1996; Germond and Livet 2001; Brewer 2002; Vernus and Yoyotte 2005), birds (Houlihan 1986), mammals (Osborn and Osbornová 1998), and domesticated species (Brewer, Redford, and Redford 1994). Similar works exist for the southern Levant and Levant more generally for human-plant interaction (Zohary, Hopf, and Weiss 2012; Rivera et al. 2012a; 2012b), though synthetic treatments of foodways and daily life have focused on the biblical Iron Age (Borowski 1987; 2003; 2018; King and Stager 2001; MacDonald 2008; Shafer-Elliott 2013; Fu, Shafer-Elliott, and Meyers Forthcoming).

primary concern has been to understand practices more generally, with the application of experimental and analytical methodologies serving to explain the function of particular vessel types, explore specific technologies of food production, examine human mobility, reconstruct diet, and define trade networks—all of which delineate the components of regional foodways traditions in Egypt and the southern Levant.[44] To date, the greater body of work has assessed the role played by material culture, food elements, and practices from the Aegean region within the transformation of southern Levantine foodways, some of which have directly inspired my

[44] Functional and technological studies are largely inseparable, with various analytical methods being used to identify New Kingdom cheese manufacture (Greco et al. 2018), Egyptian wine production techniques (Guasch Jané 2005; Guasch Jané et al. 2006a; 2006b; Guasch Jané 2008; 2010; 2011; 2016; 2019; Guasch Jané, Fonseca, and Ibrahim 2012; 2017; but for a discussion of Guasch-Jané's methods cf. Drieu et al. 2020; McGovern et al. 2021), Egyptian beer production (Samuel 1994a; 1995a; 1996a; 1996b; 1997b; 1999b; 2000), alcoholic beverages across the Mediterranean (McGovern, Fleming, and Katz 1995; McGovern 2003; 2009; McGovern and Hall 2016), Egyptian bread production (Samuel 1989; 1993a; 1994a; 1994b; 1996b; 1999b; 2000; Nesbitt and Samuel 1996; Cappers 2005; Cappers et al. 2014; Lang 2017), Levantine bread production (Leibowitz 2008; Zukerman 2014a; 2014b). Cooking technologies, which are central to community identity (Graff and Rodríguez-Alegría 2012; Spataro and Villing 2015), have seen mostly technological analyses, including treatments of the so-called Egyptian "fire dog" as a cooking pot tripod (Aston 1989), recent experimental work on cooking fuels in Egypt (Budka et al. 2019), and the cooking kit in the southern Levant more generally (Daviau 1993, 8:449–52; London 2016). Human mobility has been assessed via paleodiet isotopic studies in Egypt and Nubia (Thompson et al. 2005; Buzon and Simonetti 2013; Touzeau et al. 2013; 2014), with direct dietary analyses derived predominantly from dental pathology studies (Ruffer 1920; Leek 1966; 1972; Pain 2005; J. Miller 2008; Forshaw 2009; Buzon and Bombak 2010). Due to regional issues with human remains analyses in the southern Levant, bioarchaeological approaches are only rarely applied (see Sheridan 2017), though paleodiet isotopic studies have assessed human mobility (Al-Shorman 2004; Sandias and Müldner 2015; Gregoricka and Sheridan 2017; Eshel et al. 2020), with dental pathology (van Sessen et al. 2013) and dental calculus studies (Scott et al. 2021) assessing diet. Trade network analysis has mostly focused on the distribution of container types around the broader Mediterranean, including the so-called Canaanite store jar (Åkerström 1975; Raban 1980; Gunneweg, Perlman, and Asaro 1987; Mazar 1988; Bourriau 1990; Bourriau, Smith, and Serpico 2004; Åström 1991; P. Fischer 1991b; 1991a; Bass 1991; Cline 1994; Leonard 1995; L. Smith, Bourriau, and Serpico 2000; L. Smith et al. 2004; Pulak 2001; Aston 2004; Day et al. 2011; Ownby 2012; Ownby et al. 2014; Rutter 2014; Bavay 2015; Demesticha and Knapp 2016; Knapp and Demesticha 2017), Aegean stirrup transport jars (Ben-Shlomo, Nodarou, and Rutter 2011; Haskell et al. 2011), and Egyptian transport amphorae (Eriksson 1995)—to which can be added the analytical studies associating vessels with their contents (Murray, Boulton, and Heron 2000; Serpico and White 2000; Serpico et al. 2003; B. Stern et al. 2000; 2003; 2008). Similar trade studies have been applied to the distribution of organic commodities including the association of exotic spices with Egyptian mummies (e.g., Lichtenberg and Thuilliez 1981), the Egyptian consumption of Aegean olive products during the Amarna era (Kelder 2009), the Bronze and Iron Age trade in exotic oils (Namdar et al. 2013; Linares et al. 2019), as well as general discussions of trade in botanicals (Knapp 1991; Haldane 1993). Non-residue analysis approaches have also been applied to the question, including the examination of jar dockets, sealings, and pot marks from New Kingdom Egypt (Hope 1977; Aston 2004; Budka 2015c; Fischer-Elfert and Helmbold-Doyé 2016).

methods.[45] Central are those studies that have specifically explored use patterns with respect to imported Aegean—and especially Mycenaean—tableware ceramics to explore how they functioned within local Levantine dining practices. Assaf Yasur-Landau argued from both artistic depictions of drinking practices and archaeological materials that Levantine consumers adapted Mycenaean drinking ceramics to familiar use patterns from the Levantine meal, down to the level of bodily comportment and vessel manipulation (Yasur-Landau 2005; 2008). Similarly, Philipp Stockhammer adapted use-alteration studies demonstrate the function of Mycenaean vessels in their new Levantine context (Stockhammer 2012b; 2012c; 2013). He notably showed that Levantine peoples adapted the Mycenaean kylix not as a drinking vessel but as an incense burner due to its morphological analogy with Levantine chalices (Stockhammer 2012c). When adapted as a part of the table service, it would seem that Aegean forms augmented local dining practices rather than transforming them, offering a new material variation on familiar, mealtime bodily comportment (Stockhammer 2019). By combining object materiality with bodily logics, both scholars were able to assess some of the new meanings applied foreign vessel types as they were adapted into Levantine foodways—an instrumental task for understanding the role of Egyptian-style ceramics within foodways at Jaffa.

Relatively few direct applications of foodways analyses have considered Egypto-Levantine interaction outside of ceramics analyses (see Chapter 6), with the major exceptions involving zooarchaeological evidence. These studies can be split into two primary groups, those

[45] An especially important trajectory of research has been the distribution of Mycenaean, Minoan, and Cypriot tableware within the southern Levant and in Egypt (see n. 15), which have broadly concluded that they allowed individuals to participate within Late Bronze Age cosmopolitanism (Steel 2002; van Wijngaarden 2002; Barrett 2009). Other studies examined the transition in cooking pot technologies and their plausible association with the arrival of Aegean cooking practices (Ben-Shlomo 2011; Master 2011). Finally, Aegean leguminous species at southern Levantine sites have been used to argue for local attempts by a resident Aegean population to cultivate familiar foodways (Kislev, Artzy, and Marcus 1993) or possibly royal gift exchange (Weiss et al. 2019).

that sought to use the absence of taxa to demonstrate socially significant consumption patterns and those that conducted broad-spectrum comparative analyses between sites. With respect to the former, the distribution of Nilotic fish species at southern Levantine garrison sites was cautiously used to argue for Egyptian colonial personnel maintaining familiar dining practices in the imperial periphery (van Neer et al. 2004; Lernau 2009). Subsequent analysis has, however, shown that the phenomenon exists independently of all other Egyptian practices and material culture, likely suggesting a burgeoning trade in fish during the Late Bronze Age rather than a specifically Egyptian foodways practice (Routledge 2015; Guy et al. 2018; Zohar and Artzy 2019). Similarly, it has been argued that the unusual density of goose remains at Lachish during the Late Bronze Age constituted the importation of an Egyptian feasting practice by Levantine elites (Koch 2014; Spiciarich 2020), though as was the case with fish remains, it is unclear if the pattern will be maintained in light of continued improvements in zooarchaeological field collection methods.[46] The final study of note was a faunal analysis of three New Kingdom border fortresses: Zawiyet Umm al-Adha, Kom Firin, and Tell el-Borg. The study revealed substantive differences in animal exploitation at different Egyptian fortresses, likely stemming from the inhabitants of the fortresses exploiting the specific ecological niche of their new location (Bertini and Ikram 2020). While the results are preliminary, the fortresses seem to have been subject to

[46] Similar to the issue with Nilotic fish species, zooarchaeological recovery methods in the southern Levant have only recently begun to optimize recovery of small or fragile animal remains (see n. 12). A cautionary example can be seen by comparing the results faunal studies that utilized hand-picking or wet-sieving at Iron Age Megiddo. The faunal assemblage derived from hand-picking comprises more than 30,000 elements gathered over 14 years, of which 4,554 were identifiable. In this case 94.9% (n = 4,320) of the identified elements come from large mammalian domesticates. In contrast, only 76 identified avifaunal and 71 fish bones were recovered, comprising only 1.7% and 1.6% of the assemblage NISP, respectively (Sasson 2013, 1138, Table 27.4). In contrast, a microfaunal study of the same levels across 19 soil samples (610 liters total) analyzed via wet-sieving through 1 mm mesh recovered 1,080 faunal bones, of which 34 were from avifauna and 543 were from fish (Weissbrod et al. 2013, Inline Supplemental Table S1). Consequently, 19 soil samples produced an avifaunal assemblage 44% the size of one derived from 14 years of hand-picking, and a fish assemblage 768.8% larger, rendering any interpretation based on the absence of small/fragile faunal remains from a given assemblage subject to caution.

differential levels of support from the central authority (Bertini and Ikram 2020, 46), resulting in profoundly different foodways as people sought to best exploit the local environment. Consequently, this study demonstrates that we should expect a certain degree of flexibility in colonial expressions of foodways at sites like Jaffa without recourse to an essentialized model of Egyptian diet. As will be shown over the course of this dissertation, this pattern seems to be apposite for the southern Levant as well.

Another pertinent collection of foodways studies is from outside the Levantine imperial periphery, comprising work conducted at well-published colonial sites in New Kingdom Nubia.[47] Especially relevant has been the work of Stuart Tyson Smith, who has applied foodways to assess Egypto-Nubian interaction in the colonial periphery. Using ceramics analyses he has demonstrated that low proportions of Nubian ceramics at colonial sites like Askut and Tombos often belie an overwhelming domination of the Nubian cookpot within the overall cookpot assemblage (S. T. Smith 2003c, 113–24; 2003a; 2013c, 92–94; 2013a; S. T. Smith and Buzon 2017). Smith has argued that this pattern suggests that cooking was likely conducted by local Nubian women, and therefore the consistent presence of Nubian cooking pots within contexts that otherwise mostly comprised Egyptian ceramics is strongly indicative of the types of interpersonal entanglements common to colonial settings. Furthermore, comparative residue analysis indicates that Nubian and Egyptian cooking pots were used to produce different cuisines, demonstrating that the utilization of tableware from the Egyptian tradition was predominantly to consume foods cooked in Nubian fashion (S. T. Smith 2003c, 119–24). Recent bioarchaeological evidence has further shown the complex hybridization and reconfiguration of

[47] This especially includes the Egyptian fortresses at Askut and Tombos (S. T. Smith 1997; 2003c), the town of Amara West (P. Spencer 1997; 2002; N. Spencer 2009), and the town at Sai Island (Budka and Doyen 2012; Budka 2017; 2018; 2020).

foodways that occurred specifically in the Nubian cultural contact zone, all suggestive of deep human entanglements within the fortress communities (Schrader, Buzon, and Smith 2018; Schrader 2019, 135–48, 180–84). While equivalent bioarchaeological data is not yet available from the southern Levant (see n. 44), the practice-based approaches to foodways in colonial Nubia directly indicate the utility of the method for understanding cultural contact in the New Kingdom imperial period. Moreover, they preface the same sort of human entanglements detectable within the garrison community at Jaffa.

1.4 Outline of the Dissertation

As this chapter has indicated, foodways offer a unique dataset for assessing Egypto-Levantine interaction at Jaffa. While Egypto-Levantine interaction is especially well understood as it relates to Levantine elites negotiating their new place within the imperial system, the study of foodways allow more direct access into a broader spectrum of society. Moreover, the recent publication of new archaeological data from Late Bronze Age southern Levantine sites and general groundwork that has been conducted on the regional foodways of Egypt and the southern Levant have laid the foundations for a practice-based approach to foodways at a garrison site like Jaffa. Following the example of those studies that have explored the Levantine adaptation of Aegean foodways, as well as the model set by foodways analyses of cultural interaction in New Kingdom Nubia, it is possible to assess the mutually transformative nature of cultural contact at Jaffa as individuals from a variety of identity groups creatively adapted familiar practices to deal with their new colonial context.

The remainder of this work is structured as follows. Chapter 2 describes the theoretical and methodological underpinnings of the project, describing my iterative approach of first examining the archaeological manifestation of practices to assess social relations within the garrison community, then moving—if possible—to larger questions regarding the articulation of identities at Jaffa. Chapters 3 to 5 comprise a paleoethnobotanical analysis of foodways at Jaffa. In Chapter 3, I review the methodological difficulties for assigning substantive differences in the regional plant-based foodways of Egypt and the southern Levant. As a solution, I propose a novel semiquantitative method for assessing whether the absence of a taxon within an archaeobotanical assemblage can be assumed to indicate its genuine absence in antiquity. Demonstrating that the absence of a taxon within regional foodways is indicative of their genuine distribution in antiquity is central to arguing that differences existed within the regional systems of Egyptian and Levantine foodways, and therefore, to mapping those differences on to the situation at Jaffa. In Chapter 4, I apply this method specifically to staple cereals from both Egyptian and Levantine foodways, which in turn is used to argue that bread baking at Jaffa was purely derived from Levantine modes of doing. For Chapter 5, my focus is on legume exploitation, specifically highlighting the centrality of bitter vetch (*Vicia ervilia*) to regional Levantine foodways—and its plausible rejection in Egypt—to discuss the significance of its absence from Jaffa, which may represent an accommodation of Egyptian tastes within the new hybrid foodways system.

Within Chapters 6 to 8, I address ceramics at Jaffa, tracking diachronic patterns in the cultural affiliations of broad functional categories of foodways: tableware, culinary wares, containers, and varia (see Section 6.4.3). For Chapter 6 I treat the typology and methodology of the ceramics study, whereas within chapters 7 and 8 I address patterns as they manifest in two distinct excavation areas at Jaffa. Chapter 7 includes a contextual summary of the Ramesses Gate excavation area, which is followed by a frequency analysis of forms as they manifested over the final decades of the Egyptian occupation. While the material from the Level VI Late kitchen is also discussed, its stratigraphic separation means that its incorporation into diachronic analysis is deferred to the holistic discussion of patterns in Chapter 9. Chapter 8 contains the first-ever contextual discussion of the Lion Temple excavation area, which is followed by a diachronic analysis of ceramics in that area. Finally, in the concluding Chapter 9 I historicize foodways patterns at Jaffa, delineating the diverse communities of practice that manifested at the site and tracking their expression over the course of intra-site and regional historical developments. As will be shown, foodways at Jaffa were a complex, hybrid product of both Egyptian and Levantine modes of doing that entangled actors from both the local and colonial population. While not all practices can be directly associated with the active articulation of identities or boundaries, foodways played an important role in the day-to-day navigation of life as it manifested in the shadow of the Egyptian empire.

Chapter 2 – A Practice-Based Approach to Foodways

Whether by Jean Anthelme Brillat-Savarin's aphorism "Dis-moi ce que tu manges, je te dirai ce que tu es" (Brillat-Savarin 1862, 1) or Claude Lévi-Strauss' oft-cited notion that food is "good to think" (Lévi-Strauss 1963, 89), the social analysis of foodways begins with the straightforward notion that food and drink are much more than nutrition derived from consumption. And yet, the relationship between foodways, practice, and identities is complex since—much like any other domain of practice—foodways do not exist in a one-to-one correlation with identity. Identity, or rather, identities, are multivalent, scalar, fluid, negotiable, and manipulable, drawing upon a wide variety of actions and objects for their expression and modification (S. T. Smith 2014b). This would have been especially true at a garrison site like Jaffa, where objects and practices could move between discursive and non-discursive functions depending on context. Moreover, the saliency of various subtypes of identity—be it ethnic, cultural, gender, age, status, or any other such categorization—was also context dependent, and therefore any hypothetical encounter between Egyptian colonial authorities and a local resident from Jaffa was not necessarily governed by a single identity type. Differences in material culture or practice need not have fed into strategies of signification; these differences could just as easily have been elided, harmonized, ignored, or used to create new, hybrid identities in the imperial periphery. Consequently, my focus is on delineating the practices and material culture that manifested at Jaffa over the course of the imperial occupation, with identities such as ethnicity only being a secondary consideration when it is possible to demonstrate their saliency. Effectively, the approach is iterative, with concepts from practice theory such as the habitus or communities of practice serving as the intermediaries between the material record and how meaning might have been structured at Jaffa. The remainder of this chapter describes the theoretical and methodological framework for my approach, moving through progressively more complex manifestations of practice to how these practices might relate to interaction at Jaffa.

Given the complexity of delineating any form of identity expression in the past, as well as the loose internal unity of practice theory as a methodological and theoretical system, the iterative approach that I have adopted is—by necessity—a product of theoretical pluralism (Ortner 2006, 1–18; Voss 2008, 17). In this chapter, I address each component part, bringing them together into a single interpretive framework that first delineates the constellations of practices that manifested at New Kingdom Jaffa, and subsequently addresses how these practices might—or might not—relate to cultural interaction. The chapter is, therefore, structured as follows. First, I provide a brief overview of the relationship between foodways and individual or communal identities (Section 2.1), placing the articulation of foodways primarily at the locus of individual agency. This is followed by a discussion of the concept of signature foods (Section 2.2), which provides one of the least complex methods for differentiating between different systems of practice related to foodways. Then I treat several bodies of theory central to my iterative approach, beginning first with key concepts derived directly from theories of practice (Section 2.3), then materiality studies (Section 2.4), and finally, transitioning to how practices might come to inform identities in the cultural interaction zone (Section 2.5). As will be shown, when considered as a system of practice, foodways provide an ideal archaeological lens into the cultural contact zone, with practice-based approaches specifically detailing the types of human entanglements that occurred at a site like New Kingdom Jaffa.

2.1 The Social Significance of Food

As noted in the introduction of this chapter, while we might define food as “plants or animals that are biologically sustaining” (Peres 2017, 422), dietary composition is never as simple as the sum of all biologically edible foodstuffs to which an individual has access. As Sidney Mintz evocatively put it, "no other fundamental aspect of our behavior as a species except sexuality is so encumbered with *ideas* as eating" (Mintz 1997, 8, emphasis original). Certainly, some food selection behaviors are explainable through materialistic causes like ecology, though my fundamental concern—and that of socially oriented foodways archaeology more generally—is with "how, within the bounds of feasibility, culture (mediated by individual taste) is the arbiter of what and how people eat" (Twiss 2019, 13).[48] In this section, I provide a brief overview of how this relationship between foodways and culture manifests. Rather than providing a sweeping overview of foodways in social scientific and humanistic inquiry, which has been done elsewhere (see especially Farb and Armelagos 1980; Scholliers 2001; Mintz and Du Bois 2002; A. Logan 2012; Hastorf 2017; Peres 2017; Twiss 2019), I focus more narrowly on the connection between foodways as a locus of individual choice and foodways as a relational component in the constitution of communities. The latter serves as a natural transition into my use of practice theory.

Conceptually, the notion that food choice provides insight into individual or group values begins with Paul Rozin's (1976) "omnivore's paradox," wherein humans require and therefore seek diverse foods but are also plagued by anxiety over new foods being potentially dangerous.[49] While evolutionary predispositions play an important role in encounters with unknown

[48] A hierarchical series of constraints has been proposed to explain the final form of a diet, wherein foodways are derived first from the environmental possibilities and technological capabilities of a society, then social structure, and then ideology (Farb and Armelagos 1980, 14)—in many ways reflecting Hawkes' (1954) ladder of inference. As will be seen in chapters 3 to 5, I address environmental constraints is only in cases where they offer the primary explanation for substantive regional differences in foodways in Egypt and the southern Levant. This contrasts with materialist approaches that see ecology as the prime mover behind food selection (e.g., Harris 1985). In my case, I am less concerned with the origins of foodways, being interested instead in their meaning over time.

[49] The term is also known as the "omnivore's anxiety" (Fischler 1980) and recently has been popularized as the "omnivore's dilemma" (Pollan 2016).

foodstuffs, day-to-day selection behaviors are largely informed by "highly sophisticated cultural competences and culturally constructed practices and representations" (Fischler 1988, 279; see also Scholliers 2001, 4). Neither completely dictates individual action, as evolutionary predispositions can be overridden (e.g., P. Rozin 1987, 182) and large-scale transformation of culturally specific foodways begins at the locus of individual choice (Twiss 2019, 126). But the importance of individual choice cannot be overstated, as consumption literally incorporates or embodies the foodstuff in question, transforming it from an external, independent entity to part of the substance or being of the consumer (Fischler 1988, 279; see also Twiss 2007).[50] Whatever is put into the individual either sustains or transforms their being, with self-descriptive aspiration and external ascription each playing a role in the social significance of the act.

While individual choice played a central role in the manifestation of foodways at a site like Jaffa, such choices did not occur in a vacuum. Self-definition is inherently relational and communicative (see Mintz 1997, 13), and foodways form one of the foundational components for initiating and maintaining human relationships (Farb and Armelagos 1980, 4; see also Appadurai 1981). This manifests in both intragroup and intergroup interaction. In the case of the former, foodways can address variable scales of individual identity such as gender, family, age, rank, and occupation (Hastorf 2017, 224–25 and citations there). For the latter, foodways can form the basis of comparison between larger social groups, often becoming a metaphor for a community that can be flexibly adapted depending on the other against which comparisons are made (e.g., Ohnuki-Tierney 1993). Moreover, the close relationship between foodways and

[50] This plays a role in both individual self-definition and the ascription of properties on the other. For example, both are visible in the case of kosher law wherein foods render the individual clean or unclean (Douglas 2001). Ascription can be negative, as is the case in modern uses of plant-based protein diets to emasculate the other (Gambert and Linné 2018). It can have positive connotations, such was the association throughout US history of white foods—especially white bread—with health and purity (Bobrow-Strain 2008).

cultural memory means that meals and their components can play a major role in the creation of collective memories that reinforce group cohesion (Sutton 2001; Hamilakis 2013, 111–28). This has a generative effect, wherein group preferences for foodways or group identities tied to foodways can become entangled with more tangible economic and political systems of production or distribution (M. L. Smith 2006), meaning that foodways can encode the means for their reproduction and create relatively stable, recursive systems. The means by which such systems become tied to meaning making dictates how foodways might become salient during intercultural encounters, as the role of foodways in delineating communal boundaries also makes them flexible tools for navigating any social transformation that community might encounter (Lalonde 1992). This has especially been noted in colonial instances characterized by asymmetrical access to power (Lightfoot and Martinez 1995; Lightfoot, Martinez, and Schiff 1998; Reddy 2015; Sunseri 2015), with foodways variably playing a role in the maintenance, redefinition, or subversion of boundaries between various identity groups. But the question remains, how do we assess the role of foodways during intercultural encounters at Jaffa, drawing only on material remains from the archaeological record?

2.2 Signature Foods: The Question of Substantive Difference in Foodways

The first element in applying a practice-based foodways approach to the New Kingdom garrison at Jaffa is a seemingly simple question: Are Egyptian and southern Levantine material culture and practices sufficiently distinctive to distinguish elements that might have become salient markers of difference in the cultural contact zone? As noted previously, my primary objective is the delineation of objects and practices as they manifested at Jaffa, and it is only after this process that it is possible to identify those which became part of strategies of signification in the cultural contact zone (following S. T. Smith 2003c, 33). For some classes of object related to foodways—notably ceramics (see chapters 6 to 8)—this is a relatively simple prospect given the Egyptian and Levantine ceramics tradition during the Late Bronze Age comprise fully distinct corpora with limited morphological, technological, or decorative overlaps.[51] Moreover, the shapes of certain vessel types are sufficiently distinct as to require different use patterns—even if they fulfilled the same function within the assemblage. In contrast, demonstrating differences in diet or food processing technology is more complex, as this requires determining whether the collective data from either region is sufficiently exhaustive as to demonstrate substantive differences in diet. For instance, demonstrating substantive differences in plant-based foodways in Egypt and the southern Levant occupies chapters 3 to 5 and requires a new method altogether to demonstrate that the absence of a plant taxon in either region constitutes meaningful differences in foodways. It is only when such substantive differences are demonstrated that the situation at Jaffa can be properly contextualized. Effectively, the question must progress from whether there are discernible differences in foodways in Egypt and the southern Levant, to whether—or how—these differences manifest at Jaffa, and finally, if possible, the social meaning of these practices in the cultural contact zone.

At the heart of the question regarding substantive differences between foodways in Egypt and the southern Levant is whether certain features can be regarded as characteristic of either tradition. This is inherently related to Robert Gasser and Scott Kwiatkowski's (1991) concept of "signature plants," which refers to taxa of singular importance within a cultural system that lend foodways a specific character. This has been adapted by Christine Hastorf (2017, 232) more broadly into the notion of "signature foods," which is heavily informed by Elizabeth Rozin's

[51] In those areas where the two traditions overlap, the overlapping portions (e.g., the simple bowl with plain rim) still bear characteristics that allow them to be differentiated.

articulation of "core flavors" or "flavor principles" that characterize sensory profiles central to shared understandings of communal foodways (E. Rozin 1973; see also E. Rozin and Rozin 1981; Falk 1991). Should such signature elements exist, they have a stronger potential to become salient markers of distinction during intercultural encounters—either in an emic or an etic, ascriptive sense.[52] Signature foods only offer one dimension of exploring foodways, however, as the practices that accompany production and consumption are equally if not more important to understanding interaction at a site like Jaffa.

2.3 Theories of Practice

As discussed in Chapter 1, theories of practice—while diverse—are united by the desire to understand the relationship between human agents and some sort of entity—e.g., structure—that constrains human action, with the action that negotiates between the two constituting "practice" (Ortner 1984, 147–48). The various theories of practice that I utilize within this study offer subtle differences in their understanding the constraining entity, human agency, or the relationship between the two. Their collective application, however, serves two functions. First, from a theoretical standpoint, it more readily allows for practice and structure to be transformed in instances of inter-group encounters. The second consideration is methodological, in that certain bodies of practice theory are more readily applied to the material manifestation of practices accessible to archaeologists. In this section I begin with the more theoretical elements, after which I will progress towards those with more direct methodological implications. Notably, for my purposes, it is not necessary to fully delineate the exact nature of the system that constrains human action, in that I do not endeavor to propose the types of syntagmatic and

[52] For an emic sense, see Ohnuki-Tierney (1993) discussion of short-grained rice in the case of Japanese self-definition. For etic ascription, one might cite the Israelite/Judean disparagement of first the Philistines and then the Greeks and Romans as unclean pig-eaters (Hesse and Wapnish 1998; Faust 2006, 35–48; MacDonald 2008).

paradigmatic rules common to structuralist approaches (e.g., Douglas 1972). While I do think such rules existed in ancient Egypt and the southern Levant with respect to foodways, the question of their knowability is directly related to whether data is sufficiently exhaustive for their articulation (see Peres 2017, 444).[53] Instead, I assume the existence—and mutability—of such structures, drawing heavily on the work of Pierre Bourdieu for my understanding of how they might have impacted practice at Jaffa.

My primary understanding of the structures constraining human action is derived from Bourdieu's concept of the habitus, which has become ubiquitous within archaeological treatments of practice (Dornan 2002). Bourdieu defines the habitus as

> systems of durable, transposable dispositions, structured structures predisposed to function as structuring structures, that is, as principles of the generation and structuring of practices and representations which can be objectively "regulated" and "regular" without in any way being the product of obedience to rules, objectively adapted to their goals without presupposing a conscious aiming at ends or an express mastery of the operations necessary to attain them and, being all this, collectively orchestrated without being the product of the orchestrating action of a conductor. (Bourdieu 1977, 72)

Critical elements from the original definition are the unconscious role of the habitus in structuring both action and meaning making, as well as its capacity to be both generative and generated based on the experiences of the individual. Importantly, however, the habitus constrains practice without dictating it mechanistically (Bourdieu 1977, 73).[54] Additionally, the habitus does not provide a one-to-one correlation with social expressions like culture or identity groupings such as ethnicity. Rather, these types of social expression develop from the constant

[53] Douglas' models have been put to use in foodways analyses of archaeological contexts in northwestern Honduras (Morell-Hart 2011; 2014) and west-central Ghana (A. Logan 2012). In both cases, the authors controlled all data collection, tailoring field methods to achieve their stated goals. Hopefully, my dissertation might be an early step towards the reconstruction of the "grammar" of meals in both Egyptian and Levantine foodways.

[54] Ruben Reina and Robert Hill's discussion of *costumbre* in in Guatemala offers a useful analogue, with the term broadly definable as a mental template for what makes an object appropriate to accomplish a given task. It is not necessarily a rigid definition, but rather there are degrees to which an object can adhere to *costumbre* and still be deemed sufficient to achieve an objective in the correct way (Reina and Hill 1978; see also Wood 1990, 88–89).

dialectic between the habitus, practice, and the social contexts of the agent (S. Jones 1997; J. Thomas 2002; S. T. Smith 2003c, 18; 2014b, 5). Given its relationship to experience, the habitus is, at its heart, an individual phenomenon, and yet, the social proximity of individual agents—and thereby their similar experiences—contributes to shared elements of the habitus between them and results in mutually comprehensible and shared manifestations of practice (Bourdieu 1977, 79–83; see also S. T. Smith 2014b, 4). At a site like Jaffa, the underlying assumption is that the practices which manifest are in some capacity related to the—sometimes overlapping and sometimes diverging—habiti of various members of either the local indigenous or exogenous colonial population. Social signification and the construction of boundaries is not the immediate product of these differences in habitus, but the habitus certainly plays a role in their creation (S. T. Smith 2003c, 18).

I diverge from Bourdieu's understanding of practice with respect to how he envisioned the relationship between the habitus—or any other constraining structure—and agent. Within Bourdieu's work, the individual has a degree of freedom to act in accordance with exigent objectives despite the constraining influence of the habitus. Shifts in the manifestation of practice, however, are the products of changing objectives or changing contexts—not conscious engagement with or transformation of the habitus (Bourdieu 1977, 76; 1990, 56). There is no agentive decision making wherein the individual knowledgably engages with and actively modifies their own constraining predispositions (Dornan 2002, 305–6). Given the creative deviations and reinterpretations of structure that characterize intercultural encounters, some form of more conscious, active engagement between agent and structure seems necessary, with Anthony Giddens' concept of structuration providing an appealing addition to Bourdieu's habitus for such a solution. Especially relevant is Giddens' notion of the duality of structure, wherein "structure is both medium and outcome of the reproduction of practices" (Giddens 2000, 5). These practices are recursive, not being "brought into being by social actors but continually recreated by them via the very means whereby they express themselves *as* actors" (Giddens 1984, 2, emphasis original). Moreover, by these actions, knowledgeable agents "reproduce the conditions that make these activities possible" (Giddens 1984, 2). The main element to this formulation that I use to modify Bourdieu's habitus lies in Giddens' conception of agency, wherein "all social agents are knowledgeable about the social systems which they constitute and reproduce in their action" (Giddens 2000, 5). In effect, the modification of Bourdieu's habitus with Giddens' structuration makes the manifestation of practice more active and conscious, something especially useful in understanding how individuals might experience or encounter entirely new modes of doing (see also S. T. Smith 2014b, 5)—especially during periods of uncertainty like colonial encounters.

While the habitus and structuration provide a higher-order theory for understanding the constraining factors that might have structured practice at Jaffa, these concepts do not necessarily map directly onto the archaeological record. Instead, archaeological applications of practice theory must work in the opposite direction, highlighting the importance of repetitive action in both meaning making and the constitution of communities. Paul Connerton's notion of incorporating practices is especially useful for understanding this relationship, in that they specifically encompass the types of daily practices that continuously create social meaning provided that "bodies are present to sustain that particular activity" (Connerton 1989, 72). While Connerton specifically envisioned these practices as ephemeral and therefore "largely traceless" (Connerton 1989, 102), their quotidian, habitual character has been cited as precisely the reason for their archaeological knowability (González Ruibal 2014, 38)—especially in the case of foodways (Roddick and Hastorf 2010, 157). Connerton's description of incorporating practices provides a clear indication of how they might become perpetuated:

> Any bodily practice, swimming, typing or dancing, requires for its proper execution a whole chain of interconnected acts, and in the early performances of the action the conscious will have to choose each of the successive events that make up the action from a number of possible alternatives; but habit eventually brings it about that each even precipitates an appropriate successor without an alternative appearing to offer itself and without reference to the conscious will. (Connerton 1989, 101)

The sequential nature of incorporating practices lends to their replication as packages, which in turn makes them relatively stable as either mnemonic devices or for meaning making within a social unit.[55] This stability led Connerton to conclude that "every group, then, will entrust to body automatisms the values and categories which they are most anxious to preserve" (Connerton 1989, 102). Foodways activities such as cooking or dining—which are by their very nature quotidian, habitual, and sequential—therefore have a strong potential to become central incorporating practices by which communities are defined or perpetuated. Indeed, it was for this very reason that foodways have been argued to be the "ultimate *habitus* practice" for understanding past societies (Atalay and Hastorf 2006, 283, emphasis original).

Methodologically, articulating plausible incorporating practices requires the reconstruction of those activity sequences and their material correlates that have become fixed as part of the habitus of foodways. In effect, we are seeking to reconstruct the *chaîne opératoire* as it was articulated by André Leroi-Gourhan (1993). While the term *chaîne opératoire* is often adapted in archaeological writing as a more rigid, heuristic, or methodological tool simply referring to the stages necessary to accomplish a given task (e.g., Hastorf 2017, 123), I adapt it in light of Leroi-Gourhan's original formulation as an encompassing social theory. Like

[55] The term sequential is to identify series of tasks predicated on producing a known outcome, following Connerton's notion of a "the proper execution of a whole chain of interconnected acts" (Connerton 1989, 101).

Connerton's notion of the sequential nature of practice, Leroi-Gourhan adds a more explicit component related to how the individual learns to conduct said practice. He splits the formation of the *chaîne opératoire* into three key stages:

> The first takes place at a deep level and is an automatic form of behavior directly connected with our biological nature. This stage provides the basis upon which education eventually imprints the data of tradition. Physical attitudes, eating habits, and sexual behavior rest upon this genetic base, their modalities being strongly marked by ethnic nuances. The second stage is that of mechanical behavior and includes operational sequences[56] acquired through experience and education, recorded in both gestural behavior and language but taking place in a state of dimmed consciousness which, however, does not amount to automatism because any accidental interruption of the sequence will set off a process of comparison involving language symbols. This process leads on to the third stage, that of lucid behavior, in which language plays a preponderant role, either by helping to repair an accidental interruption of the sequence or by creating a new one. (Leroi-Gourhan 1993, 230)

The second and third stage are of the greatest import given their explicitly social nature. When discussing the *chaîne opératoire*, we are referring to the product of socialized learning that has become embodied in the individual. Deviation is subject to critical evaluation by the individual and/or surrounding individuals, being either corrected or accepted as a useful innovation. Within this dissertation, *chaîne opératoire* is especially relevant in determining if there are substantively different modes of doing related to foodways present at Jaffa that can be assigned specifically to either Levantine or Egyptian origins—something achievable only through diachronic analysis of practice over the long term (see A. Logan 2012, 6–9). The selection of a particular mode of doing in foodways can be likened to the anthropological usage of the term style (Hastorf 2017, 67), especially as it has been applied in the literature on isochrestism (Sackett 1982; 1985; 1986). Identification of these modes of doing does not translate into the direct identification of individuals who originated from these regions. Instead, the ways in which a specific *chaîne*

[56] "Operational sequence" is the common English translation for the original French "*chaîne opératoire*."

opératoire manifests in the cultural contact zone sheds important light on the types of social relations prevailing there.

It is possible to discuss the relationship between *chaîne opératoire* and social relations specifically because it constitutes more than just a sequence of operations for accomplishing a given objective. Specifically, any given *chaîne opératoire* possesses features that makes it highly individual as well as deeply relational. At the individual level, it is useful to recall Marcel Mauss' techniques of the body, which he defined as being both "effective" and "traditional" (Mauss 1973, 75), though Amanda Logan's updated definition of "a bodily logic that is socially transmitted" is useful (A. Logan 2012, 7). The idea that any *chaîne opératoire* also possesses a bodily logic at the individual level means that it is not just the sequence that matters, but also the bodily comportment that accompanies the stages within the sequence. These bodily logics must be learned either through training or by imitation of other members within a social unit. Once established at an individual level, however, any modification through the introduction of foreign bodily logics produces deep, visceral incongruities (Mauss 1973, 78). At the level of individual practice, therefore, *chaîne opératoire* would plausibly remain resistant to substantial modification except in in deeply entangled social situations as might occur over long-term interpersonal encounters.

At a relational level, the *chaîne opératoire* for accomplishing a given task does not exist within a vacuum, but rather exists within a broader constellation of practices related to a wider variety of objectives. Fundamentally, any *chaîne opératoire* exists within what Tim Ingold has referred to as the taskscape, wherein the task is identified as "any practical operation, carried out by a skilled agent in an environment, as part of his or her normal business of life" (Ingold 2000, 195), with tasks being "the constitutive acts of dwelling" (Ingold 2000, 195). Much like

Connerton, Ingold relates the meaning of tasks to their position within a sequence of tasks, with "the entire ensemble of tasks, in their mutual interlocking" comprising the taskscape (Ingold 2000, 195). Consequently, transformation at the level of individual practice has the potential to radiate through other arenas of practice and the social relations that they characterize. For something like foodways, this can have far-reaching effects given the complex relationship between taskscapes and expected roles of age or gender groups within a social unit (see A. L. Logan and Cruz 2014). Collectively, the delineation of practices—either as *chaîne opératoire*, bodily logics, or broader taskscapes—at Jaffa based on their plausible origin within Egyptian or Levantine modes of doing allows for the examination of a specific kind of social group within the archaeological record—the community of practice.

The concept of a community of practice is, at its heart, a theory of socialized learning. It centers on learners as active participants in the practices of social communities whose identities are constructed in relation to those communities (Wenger 1998, 4). The key emphasis is learning, which is placed at the intersection of social structure, situated experience, social practice, and identity (Wenger 1998, 12–13). The creation and sustenance of a community of practice relates to enterprises shared between individuals, with their collective learning resulting in practices "that reflect both the pursuit of […] enterprises and the attendant social relations" (Wenger 1998, 45). In turn, these practices eventually become "the property of a kind of community created over time by the sustained pursuit of a shared enterprise" (Wenger 1998, 45). Individuals can participate in numerous communities of practice at any given point, and membership need not be formalized, vocalized, or even conscious (Wenger 1998, 6–7). The heart of the matter is the social and participatory nature of learning, with potential members of a community of practice participating in what Jean Lave and Etienne Wenger have called legitimate peripheral participation—the gradual acquisition of knowledge that moves a newcomer into "full participation in the sociocultural practices of a community" (Lave and Wenger 1991, 29).

Communities of practice are tied together by their shared objectives, their shared practices to achieve those objectives, and finally, as a learning community. Their learning is classified as situated learning, which Lave and Wenger broadly define as the notion that "agent, activity and the world mutually constitute one another" (Lave and Wenger 1991, 33), and—perhaps most importantly—is part of "generative social practice in the lived-in world" (Lave and Wenger 1991, 35), with learning and shared practice contributing to meaning making and group identity through three dimensions. First, mutual engagement between actors interweaves participation in and reification of the community. Second, joint enterprise creates mutual accountability without any need for explicit acknowledgement that the enterprise is shared—meaning that the whole affair can be unconscious or unspoken. Finally, and perhaps most importantly, "shared histories of engagement can become resources for negotiating meaning without the constant need to 'compare notes'" (Wenger 1998, 84). Communities of practice will not always be at the forefront of communal identity, with foodways or foodways-based communities of practice vacillating back and forth along a continuum of non-discursive and discursive depending on context (Roddick and Hastorf 2010). However, even if such communities of practice are contextually less significant in the construction of salient identities, they still offer an important archaeological tool understanding cultural interaction zones. For example, if a complex *chaîne opératoire* with roots in Egyptian modes of doing were to appear at Jaffa, regardless of whether it forms a salient feature of social distinction it specifically demonstrates a chain of socialized learning connecting individuals back to Egypt in some capacity. The material residue of that action does not necessarily identify narrower identities like ethnicity, but instead signifies the types of face-to-face learning explainable only via human entanglements. In effect, I endeavor to identify communities of practice at Jaffa first, and only after which is it possible to assess whether such communities became salient over the course of long-term cultural interaction.

While the first and most obvious application of communities of practice are to complex, technological procedures related to foodways, I assign them also to less obvious practice spheres. Moving beyond the co-production of food or the transformation of foodstuffs into a meal, I also assess communities of practice in reference to the act of the meal itself. This entails moving from the meal-as-object to the meal-as-event, or even further, the meal-as-discourse (Lalonde 1992). In short, I mean moving from what constitutes the meal to how the meal constitutes the individuals partaking in it. While the accomplishment of a meal might be slightly beyond what Lave and Wenger meant by a group enterprise, it is not too much of a stretch to view its participants as seeking to achieve a common goal of satiety—something which extends far beyond the simple fulfillment of nutritional goals and includes cultural valuations of sufficiency (Hastorf 2017, 59; see also M. L. Smith 1999). Therefore, much like any other community of practice, the meal requires its own specialist knowledge that must be learned—be it the elements composing a meal, what can and cannot be consumed together, the order in which elements are served, apportionment, the appropriate gestural elements to the act of eating or drinking, and many other such considerations. Only when these are achieved in the appropriate fashion are participants sufficiently sated, and therefore these rules are critical to the—quite literal—constitution of the community.

2.4 Materiality

Thus far, I have discussed the material culture associated with practices merely as the accoutrement appropriate for the accomplishment of a given task. When we consider the various facets of practice discussed in Section 2.3, however, the material and sensory components of practice are only partially captured. The material and sensory facets of practice can be more readily accounted for through the inclusion of another body of theory—materiality. Much like how practice theory allows us to move from day-to-day activities to meaning making, examining the materiality of foodways demonstrates how objects are both subject to and generative of cultural relationships (Meskell 2005, 6). Materiality articulates the role of objects in creating and mediating social relations, linking things to repetitive action as playing a key role in constituting the habitus (Steel 2013, 8; see also D. Miller 2005). The application of materiality to foodways is far from new, with early anthropological discussions of the social dimensions of foodways arguing for an explicit understanding of food as agent (e.g., Fajans 1988, 143). Rather than granting agency to objects, I maintain Giddens' previously cited definition of agency that requires social agents to be knowledgeable actors within their social systems (Giddens 2000, 5). Agency implies more than just the capacity to affect or create social relations, it also includes responding to change in a purposeful and/or planned way.

This stance is not antithetical to the application of materiality to foodways, if anything, it points towards a specific kind of materiality that is especially recoverable from the archaeological record. In addressing the archaeological study of things, Bjørnar Olsen noted that "we should pay far more attention to the material components that constitute the very condition of possibility for those features we associate with social order, structural durability, and power" (Olsen 2010, 5). The physical form of an object or the sensory experience that it offers have a dramatic impact on the beholder, in many ways structuring how the object can be used. Consequently, when we think in terms of the role played by material culture in creating and mediating social relations, we must identify those conditions of possibility inherent to the object and outline how they might affect social actors. This does not imply that the object is in a fixed, passive state to which actors must respond. There is a certain level of active contribution to social interaction by the object, as can be seen in Linda Hulin's use of the concept of ambience, wherein objects can "converse" or "gang up on one another" to produce a collective, experiential reality for the individuals that cohabit their space (Hulin 2013, 354). The objects themselves are not agentive decision-makers, but rather have dynamic, contextual properties that must be engaged by social agents who attempt to use, respond to, or otherwise negotiate the existence of those objects.[57] Lynn Meskell has usefully discussed this as a material habitus, a material world that is both constructed by us and yet also constructs us (Meskell 2005, 3). This approach can be seen directly within chapters 3 to 5, wherein I examine the materiality of plant-based foodstuffs, and additionally in ceramics analysis of chapters 6 to 8, where I examine the "stuff of food"—borrowing Louise Steel and Katharina Zinn's turn of phrase for the "the objects used to prepare, wrap, serve and consume food and the tactile experiences involved in its production and consumption" (Steel and Zinn 2017, 1). Both provide key insights into the enabling and constraining factors that structure human interaction with the material elements of foodways and, therefore, how those interactions might have affected either isolated practices or the constitution of communities of practice.

[57] Hulin's active language should not imply conflict with my stance taken against object agency. If anything, it is similar to Dawkins' anthropomorphizing language in his work where he describes genes as "selfish"; as a metaphorical expression it offers greater conceptual clarity to the points being made (Dawkins 2006, x–xii).

Part of the materiality of foodways is their participation in what Yannis Hamilakis has referred to as the environment of sensoriality, referring to their capacity via sensory experience to elicit bodily and affective responses in the beholder (Hamilakis 2013, 194). Every stage in the foodways process engages multiple senses, with the collective sensory profile of the *chaîne opératoire* and its objective being deeply entwined with both the bodily logic of its execution and the habitual character of the collective experience. Therefore, when we conceptualize the link between foodways, practice, and identities, we cannot neglect the role played by the sensorial modalities of foodways in contributing to stable configurations that unite communities of practice (Twiss 2019, 2). Sensory experience is not, however, an objective reality, but rather is contextual, historical, and culturally constructed (Lalonde 1992; Hamilakis 2013, 118). Consequently, despite the centrality of the senses in linking foodways to identity, archaeological analyses seeking to access the importance of the environment of sensoriality within ancient foodways must do so with the knowledge that our sensory experience is situated within our own modern contexts.

Our perceptions cannot be retrodicted as an absolute empirical reality that is fully representative of how ancient individuals experienced their world. Instead, we can be more productive when we focus on the range and diversity of ancient sensory experiences (Twiss 2019, 15). In the case of this dissertation, the question is more specifically whether there are differences in the environment of sensoriality between the regional foodways of Egypt and the southern Levant, and furthermore, how these differences manifested at Jaffa. In this, I depart slightly from Hamilakis' approach, where he explicitly challenges the notion that there is a biological universalist means by which to understand sensory experience (Hamilakis 2013, 9–10). While I agree with this understanding given the historically situated nature of sensory experience, I also see a utility for modern empirical studies of food experience to better understand past sensescapes. However, the point is not to use modern studies to explain how individuals in the past experienced the world, but rather to shed light on some of the possibilities of their experience. For instance, in chapters 4 and 5, I use modern flavor science panels to discuss sensory differences between regional Egyptian and Levantine foodways. In this case, it is more significant to demonstrate that differences were perceivable than to assess how those differences were perceived. Much like the situation with communities of practice, differences must be shown first before it is possible to discuss whether such differences became salient markers for identities.

At the heart of a communal sensorial conception of foodways is the concept of cuisine, which Sidney Mintz defined by arguing that

> what makes a cuisine is not a set of recipes aggregated in a book, or a series of particular foods associate with a particular setting, but something more. I think a cuisine requires a population that eats that cuisine with sufficient frequency to consider themselves experts on it. They all believe, and care that they believe, that they know what it consists of, how it is made, and how it should taste. In short, a genuine cuisine has common social roots; it is the food of a community albeit often a very large community. (Mintz 1997, 96)

Again, though cuisine cannot be separated from rules, values, and practices (Fischler 1988, 285; Hastorf 2017, 67–71), Mintz's definition places sensory experience at the heart of the matter by making cuisine the agreed-upon knowledge of how the sensory experience of food should unfold. Violation of common principles produces difference that must be negotiated in some fashion. Returning to Hulin's concept of ambience, such differences—or dissonance, as she refers to it—can be allowed to exist, however their retention likely stemmed from "a conscious act of will" (Hulin 2013, 354). While I do not seek to fully reconstruct the cuisines of Egypt or the southern Levant, an enormous task which may not be entirely possible, I do seek to isolate the possible differences that might have been introduced into foodways after more than three centuries of cohabitation at Jaffa. Such differences offer several interpretive possibilities useful for understanding social relations at the site. They might signal negotiable elements of foodways, possibly indicating the development of hybrid colonial cuisines specific to the garrison community. Moreover, they might indicate human entanglements wherein aspects of food production were specifically controlled by one community of practice, and therefore the final product came to reflect a specific communal aesthetic. While the mechanism that introduced differences can potentially be demonstrated through contextual evidence, responses to the shift cannot be assumed and presumably were diverse. Hulin's use of dissonance is perhaps too strong of a term, as changes might just as easily be met with indifference.[58] As with every aspect of practice addressed thus far, however, the key is to demonstrate such difference first, after which social interpretations will be supplied if possible.

2.5 Connecting Practices to Identities

As has been noted several times throughout this chapter, the final step in my analysis, if possible, is to move from the direct evidence for practice in the archaeological record to the articulation of identities at Jaffa. The usage of the generic term "identities" at this stage is intentional, as the complete sequence of foodways, from the production of raw ingredients through their consumption, could possibly relate to a variety of different kinds of identities, or none (see Sergi 2019). While communities of practices can readily be delineated within the archaeological record, their saliency with respect to particular identities such as ethnicity—as implied by the study of Egypto-Levantine interaction—is only demonstrable with the overlap of additional pieces of evidence. Identities like ethnicity should not be expected to map onto the material

[58] In this case, the unconscious acceptance of incongruities could be related to indifference, with the power of the incongruity being insufficient as to merit explicit action. Regardless, the difference is not regarded as being a danger to satisfying daily life needs in an appropriate way. In a sense, the situation is like Dietler's (2010, 66-74) differentiation of active rejection and indifference.

record as neatly bounded, essential categories. An Egyptian pot at Jaffa does not indicate the presence of an Egyptian, nor necessarily does the articulation of more complex foodways technologies with roots in Egyptian modes of doing. While identities like ethnicity are derived in part from deeper-seated structures like the habitus, they remain mutable and socially contingent based on the context of the actors (S. Jones 1997; S. T. Smith 2014b, 7–8). In effect, associating the material record with ancient identities indicates that we, the modern researcher, possess sufficient evidence to understand ancient emic social categories.

Fundamentally, what practices reveal are human actions under the constraining influence of the habitus to achieve a specific goal. We might similarly relate them to culture, defined by Michael Dietler as

> a creative project of structured improvisation grounded in sets of embodied categorical perceptions, analogical understandings, aesthetic dispositions, and values that structure ways of reasoning, solving problems, and acting on opportunities. (Dietler 2010, 187)

In this case, culture is as much the mental templates offering a framework for action as it is the actions themselves. What sets ethnicity—and all identities in general—apart is their fundamentally taxonomic nature. They are how social subjects construct themselves into relationships of similarity and difference with other subjects (Voss 2008, 13–14),[59] which is why Fredrik Barth and other instrumentalist thinkers specifically conceptualized ethnicity as occurring at boundaries (see Barth 1969 and essays within). Following Siân Jones, the role of constraining structures like the habitus in the process is that “such subliminal dispositions provide the basis for the recognition of commonalities of sentiment and interest, and the perception and communication of cultural affinities and differences” (S. Jones 1997, 128). The communication of affinity and difference opens the door for all of the complex—and flexible—

[59] This is similar to the notion of ethnicity being a form of cognition, as a means of viewing the world rather than an entity in the world (Brubaker, Loveman, and Stamatov 2004).

formulations through which individuals align themselves into ethnic unities, be it through criteria such as actual or fictive kinship, cosmology, or shared practices (McGuire 1982; Emberling 1997; Lucy 2005).

Consequently, when articulating ethnic identities via archaeological remains we are not just talking about delineating groups with visibly distinct practices, we are also implying an emic distinction that those past groups would have held themselves. As noted by Jack Hitt, ethnicity is a negotiation "between what you call yourself and what other people are willing to call you back" (Hitt 2005, 40), with the complex movement of ethnicity between self-description and external ascription adding a further layer of complexity (Voss 2008, 26). At its heart, ethnicity is a "consciousness of difference" (Vermeulen and Govers 1994, 4). While different modes of doing might serve as criteria through which such consciousness develops, it is equally possible that they might not. This is especially crucial in lieu of historical sources, though these cannot be taken uncritically either (see S. T. Smith 2007). A useful cautionary note comes from Barbara Voss' (2008) concept of overdetermination. She uses the term to signify that identities—and social phenomena in general—are "too complex to be explained with mechanistic, cause-and-effect models" (Voss 2008, 5). Therefore, rather than associating patterns in the material record as a singular, one-to-one correspondence with identities like ethnicity, it is necessary instead to recognize that "a given phenomenon is conceptualized as an effect produced by a potentially infinite number of other contributing and interacting phenomena" (Voss 2008, 5). Consequently, in examining the record we are not attempting to reconstruct the material correlates of identities directly, but rather using all available evidence "to trace the webs of social discourse and material practices that participated in the emergence and consolidation" of identities (Voss 2008, 5). While it seems somewhat problematic to study Egypto-Levantine contact without the explicit desire to delineate ethnic groups, assuming identities to be overdetermined offers a liberatory potential in examining practices at Jaffa as reflecting social relations rather than static boundaries.

Instead of bounded identities, my intent is to shift the discussion to the process of identification. This means moving beyond identity in a stative sense—i.e., focusing on the common characteristics of groups as an ideal type—and instead examining the "never-ending process of construction" (Scholliers 2001, 5). If identity is stative, then identification is discursive, contextual, and very much in flux, "a constant dialectical process between the self and other" (Scholliers 2001, 7). Furthermore, as noted by Voss, the act of identification

> is to establish a relationship of similarity between one thing or person and another, and self-reflexively to position oneself in such an affinity with others. In this sense, practices of identification call attention to perceived similarities and, in doing so, achieve an erasure or elision of other kinds of variability. These erasures of variations pose an internal threat to the stability of identities, requiring continual "work" (in the sense of the multifaceted deployment of social power) to maintain the coherence of relations of similarity. (Voss 2008, 14)

Within Voss' definition, certain kinds of practices or their material correlates are episodically drawn upon and politicized to perform the type of work necessary to mark alterity or similarity. Moreover, the emphasized elements might symbolically override other types of diversity within the given group. In effect, the array of practices and material correlates available to the garrison community at New Kingdom Jaffa comprised a constellation of possibilities, ones that in turn could be variably drawn upon in the cultural contact zone as the needs of identification presented themselves. These needs were contextually dependent and therefore fluid, dictated both by the environment in which identification occurred (e.g., a period of local collaboration versus one of local rebellion) as well as the social status of the individual in question, with age, gender, and occupation being among the myriad aspects that might affect their needs. Following Aaron A.

Burke's treatment of the Middle Bronze Age Amorite *koine*, these aspects could then be "mediated by local circumstances, social necessities, tastes, and tradition" (Burke 2021, 16) to satisfy the immediate requirements. Once the constellation is understood, it is possible to historicize and map the selection of practices, potentially highlighting the emic taxonomies enacted at a site like Jaffa.

2.6 Conclusions

As noted by Christine Hastorf, "there is a long way between the plant remains, animal bones, ceramic vessels, fire installations, middens, and past meals" (Hastorf 2017, 56). And yet, there is an even greater distance between the archaeological correlates for past meals and the ability of modern researchers to tease out their social significance for past societies. As I have outlined in this chapter, my approach to bridging this gap lies in working from the ground up, detailing practices and their material correlates as they manifested at the New Kingdom garrison at Jaffa. But the purpose is not just rote description, as it is necessary to move beyond what Michael Dietler (2010, 183) referred to as "banal generalization" and progress to useful interpretations of ancient social dynamics. To accomplish this, I adapt theories of practice, first determining if it is possible to classify foodways as to whether they adhere to an Egyptian or southern Levantine mode of doing, and then subsequently examining how these aspects of practice manifest at Jaffa. At the first level of analysis, the intent is not to reconstruct identity groupings like ethnicity on the ground, but rather to address the extent to which stereotypical "foodways were followed and the reasons for deviation from modeled patterns" (Twiss 2012, 371). These patterns allow us to materialize human experience (Hastorf 2017, 5) and furthermore, any transformation of practices that occurs is a strong indicator of changing priorities in the making of culture or shifting social relations (A. Logan 2012, 14–15). Theories of practice allow us to envision these constellations of practices and their material correlates as representative of more complex, socially learned elements of the individual—be it the habitus, *chaîne opératoire*, bodily logics, taskscapes, or the environment of sensoriality. Collectively, these elements are central to the development of communities of practice, which in turn offer some of the building blocks for the formation or maintenance of identity groups.

For foodways, tracking signature foods, a complex *chaîne opératoire* or taskscape, or a particular material/sensorial logic provides direct insight into the types of social relations that prevailed between various communities of practice at Jaffa—a site where multiple modes of doing manifested simultaneously. Tracking these communities of practice, however, is not the same as tracking identities like ethnicity. In many ways, we should expect that the sudden appearance of a complex, foreign suite of practices—and thereby a specific community of practice—likely identifies the appearance of an exogenous population. This is akin to Assaf Yasur-Landau's concept of "deep change," where he argues that migration can only be defined archaeologically when a substantial body of practices are transformed simultaneously (Yasur-Landau 2010, 13–14). For instance, the sudden appearance after Thutmose III's conquest at Megiddo of a fully-fledged ceramics industry that produced exact, local replications of Egyptian domestic ceramics at multiple sites throughout the southern Levant (Martin 2011b) is most parsimoniously explained by the influx of an exogenous community of practice—potters from Egypt. And yet, the continued persistence of this industry over the next three centuries of the occupation makes it plausible that individuals of Levantine origin were eventually initiated into this community of practice. Moreover, just because the most plausible explanation for a community of practice is its exogenous origin does not necessarily mean it was a salient feature for the creation of social boundaries. Demonstrating the latter requires a greater degree of contextualization. Initially, at least, a practice-based approach first provides insight into human entanglements and socialized learning, assessing social relations rather than social boundaries.

For instance, the domination of a particular *chaîne opératoire* within a specific domain of foodways might provide insight into its domination by a particular community of practice. Moreover, the modification or hybridization of a *chaîne opératoire*, or even its stability after centuries of cultural contact, might signify the types of social reproductions occurring at Jaffa. Modification or hybridization of practices might signal the formation of a new, creolized foodways in the imperial periphery, and long-term stability in competing practices might in turn signify crucial boundaries that were articulated specifically within the cultural contact zone. Effectively, either dynamism or stasis in foodways are potentially significant. But the approach articulated here not only tracks material objects, but also compares modes of doing at Jaffa with their broader manifestations in both Egypt and the southern Levant. In many ways, my concern is for "things-in-motion" (Appadurai 1986, 5), or rather, how these things and their concomitant practices came to be encoded with significance in the oftentimes unstable imperial periphery.

Chapter 3 – Data and Methods for Assessing Regional Patterns in Plant-Based Foodways of Egypt and the Southern Levant

Whether by the common assertion that meat played a limited role in ancient foodways, or the primacy given to the so-called "Mediterranean triad," any discussion of the intersection of practice, foodways and identity at New Kingdom Jaffa cannot neglect the central position of plant-based foodstuffs in the Egyptian and Levantine habitus.[60] Deriving meaningful social interpretations about Egypto-Levantine interaction from the archaeobotanical record, however, lies at the intersection of several complex methodological problems. First, to assign practices at Jaffa to either an Egyptian or Levantine mode of doing, it is necessary to demonstrate whether such a division existed, necessitating a regional comparison of Egyptian and Levantine plant-based foodways. Such a comparison entails the collation of all published archaeobotanical data from both regions, not just during the period of the Egyptian occupation but also those periods before and after, providing the *longue durée* perspective necessary to demonstrating stability or dynamism in the practices of either region (see Riehl and Nesbitt 2003). Given the variable field collection strategies and contexts that produced this dataset, however, it cannot be assumed that these data represent a full characterization of human-plant relations in either region. Simply put, the total absence of a taxon from Egyptian or Levantine archaeobotanical assemblages cannot be uncritically assumed to indicate its absence from regional foodways—such absence must be demonstrated by other means. In this chapter, I propose a novel method to resolve these issues, adapting several paleoethnobotanical indices that are then used in subsequent chapters to argue

[60] The common assumption that meat played a minimal role in ancient Near Eastern diets has been critiqued at length, especially for the Iron Age (MacDonald 2008, 73–76; Sasson 2010). For the Mediterranean triad, arguments now favor adding in leguminous species as a fourth pillar (Sarpaki 1992; Horden and Purcell 2000).

for distinctly Egyptian and Levantine plant-based foodways as they relate to cereal (Chapter 4) and legume (Chapter 5) exploitation.

My work therefore falls under the umbrella of paleoethnobotany, broadly defined as interpreting the interrelationship of humans and plants as manifested in the archaeological record.[61] Taxa are not of interest just as dietary components. Instead, I am interested in their role within broader practice systems, both with respect to the *chaîne opératoire* that moves them from field to embodied foodstuff and the sensory perception that accompanies their production and consumption. Requisite specialized knowledge might indicate specific communities of practice, just as sensory characteristics might mark core features of a cuisine. The social significance of these elements at Jaffa, however, can only be arrived at if meaningful comparisons can be made between Egyptian and Levantine foodways. Consequently, the rest of this chapter proceeds as follows. First, by reviewing paleoethnobotany applications in both regions I outline the state of the available data and position my methods in relation to past work (Section 3.1). Subsequently, I describe my dataset (Section 3.2) and some of the theoretical and methodological issues related to its use (Section 3.3)—especially as it pertains to depositional and collection biases (Section 3.4). Finally, within Section 3.5 I propose a novel, semiquantitative method for overcoming these biases, with this method informing all successive analyses. Collectively, the method allows for the harmonization of disparate data, providing a new means by which to examine the consequences of Egypto-Levantine interaction at Jaffa.

[61] Subtle definitional differences depend on the author's theoretical leanings. Early definitions make reference to adaptation, such as Hans Helbaek's desire to delineate "man's victories and defeats in his battle against nature" (Helbaek 1959, 372) or Richard Ford's "elucidation of cultural adaptation to the plant world" (Ford 1979, 286). More recent definitions focus on how human-plant interactions reflect and are shaped by "cultural models of the world" (Morehart and Morell-Hart 2015, 487). Regardless, all contrast with archaeobotany, which is defined as "recovery and identification of plants by specialists regardless of discipline" (Ford 1979, 299).

3.1 Past Applications of Archaeobotany and Paleoethnobotany in the Levant and Egypt

The long history of both archaeobotany and paleoethnobotany in Egypt and the southern Levant is integral to understanding the state of the available data. Evolving disciplinary objectives transformed not only the questions asked, but also the types of data collected by field projects. For Egyptian archaeology, the abundance of textual and iconographic resources—in combination with excellent organic preservation—meant that much of inquiry was split between two main objectives: taxonomic description of well-preserved botanical remains from elite tombs and the provision of archaeological material to clarify ancient Egyptian textual and iconographic depictions of human-plant interactions, especially with respect to lexicography.[62] Collectively, these undertakings were adapted into larger syntheses that provided a sweeping interpretation of the place held by plants within the Egyptian worldview (Reichardt 1859; Loret 1886; 1892;

[62] For tomb assemblages, this includes early major studies based on—sometimes unprovenanced—museum collections in in Berlin (A. Braun 1877), Leiden (Pleyte 1882), Boulaq (Schweinfurth 1884b), Florence (Bonnet 1901), Grenoble (Beauverie 1930), and Paris (Beauverie 1935). This list is far from exhaustive, as the nature of many of these studies as botanical miscellanies meant that they faded into obscurity relatively soon after publication, though the genre is more formalized in the modern day (e.g., Germer 1988). Direct examination of tomb deposits at the time of excavation became more common with the excavations of the late 1800s, including the extensive repertoire of Georg Schweinfurth (1882; 1884c; 1884a; 1885; 1887), Percy Newberry's work in tandem with Flinders Petrie's cemetery excavation at Hawara, Kahun, and Gurob (1889; 1890) and with Howard Carter in Thebes (Newberry 1912), the material from the tomb of Kha and Merit (Mattirolo 1926), general work on material from the Deir el-Medina tombs (Schiemann 1941b), and the archaeobotanical material from Tutankhamun's tomb (Barton-Wright, Booth, and Pringle 1944). Early studies are typified by selective publication of finds, though tomb studies have since fully embraced formalized archaeobotanical cataloging (Barakat and Baum 1992; Granger, Smith, and Elder Smith 1996). As for works engaging textual and iconographic resources, the genre ranges between large-scale attempts to reconstruct ancient daily life that include discussions of human-plant relations (Wilkinson and Birch 1878; Erman 1885) as well as more general catalogues of plants in text and art (Woenig 1886; L. Keimer 1967; 1984). In contrast to tomb studies, this field is largely independent of modern paleoethnobotany, with the artistic depiction of human-plant relations becoming an object of inquiry its own right (Moens 1984; Hugonot 1989). To this later period of scholarship we can add the publication of the models from the Middle Kingdom tomb of Meketre (Winlock 1955), which dramatically influenced the discussion of plant-based subsistence patterns and processing technologies in ancient Egypt. Additionally, it is necessary to mention the genre of ethnographic—or perhaps more appropriately pseudo-ethnographic—study of early modern Egyptian farmers, colloquially known as *fellahin*, with Edward William Lane's (1860) perhaps being the most influential for interpreting ancient Egyptian text and relief (e.g., Wilkinson and Birch 1878, III: 442-443) despite its tendency to sensationalize and exoticize Egyptian farmers for his European audience (see Said 1979). Collectively, much of the work discussed in this note contributed to early attempts to associate taxa with iconographic and lexicographic referents, with the work of Ludwig Keimer (1924; 1928; 1929b; 1929a; 1931; 1943) being especially influential (e.g., Chace 1927, I:46–47; Gardiner 1941, 28).

1893; 1894; Loret and Poisson 1894; Darby, Ghalioungui, and Grivetti 1977b; Manniche 1989; Aufrère 1999a; 1999b; Aufrère, Asensi, and de Vartavan 2005), though it was not until much later that such syntheses began to engage with the growing body of archaeobotanical data excavated from settlement contexts (see McDowell 1992, 203). Data from settlements has been a relative latecomer to the discussion of human-plant relations in ancient Egypt, though several catalogues now exist and paleoethnobotanical syntheses have become progressively more common.[63] Since these developments are much more recent, the greater part of our understanding of human-plant relations in ancient Egypt is based not on archaeological evidence for daily life, but rather on idealized depictions of daily life filtered through an elite lens, be it in the mortuary, iconographic, or textual sphere. Consequently, any comparative study of plant-based foodways in Egypt and the southern Levant must begin with the archaeobotanical data from settlements, after which other categories of data may be utilized cautiously.

The southern Levant presents a similar situation, in that the greater part disciplinary inquiry has been directed at human-plant relations in textual resources, with special emphasis falling on clarifying the *Sitz im Leben* of biblical composition.[64] Modern paleoethnobotany made

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[63] General catalogues have mostly focused indexing every provenanced find of plant taxa at Egyptian sites (Germer 1985; de Vartavan, Arakelyan, and Amorós 2010; Arakelyan et al. 2012), though they also address themes such as domestication (Brewer, Redford, and Redford 1994). Paleoethnobotanical studies tend to focus on specific technologies related to plant processing (Murray 2000a; 2000c; Murray, Boulton, and Heron 2000; Serpico and White 2000; Samuel 2000; Germer 2008), with Delwen Samuel's work on baking and brewing in ancient Egypt being especially critical (1989; 1993b; 1993a; 1994a; 1994b; 1995a; 1996a; 1996a; 1997b; 1997a; 1999b; 1999a; Kemp, Samuel, and Luff 1994; Nesbitt and Samuel 1996)—work that has since been expanded by Mary Anne Murray (Murray 2000b) and René Cappers (Cappers 2005; Cappers et al. 2014; Cappers 2016).

[64] This was a popular genre in 19th century Protestant circles (e.g., Cook 1846; Balfour 1857), and it continues into the present day (see Borowski 1987; MacDonald 2008 and citations therein). It also characterizes intertextuality studies comparing the biblical text to other ancient texts, as seen in attempts to interpret the Gezer Calendar—a 10th century BCE text—as an agronomic guide via the much later bucolic imagery of the Hebrew Bible (see G. E. Wright 1955; Talmon 1963), and approach that has been subjected to substantial criticism (Schniedewind 2004, 58–59; 2019). The pinnacle of this early approach was Gustaf Dalman's eight-volume *Arbeit und Sitte in Palästina*, which examined daily life as portrayed in biblical and extrabiblical texts through the ethnographic lens of Ottoman-era peasant farmers (Dalman 1928a; 1928b; 1932; 1933; 1933; 1935; 1937; 1939; 1942; 2001). As was the case with

an early impact in the region, however, becoming a regular fixture beginning in the mid-20th century (see Warnock 1998). Given the association between the Levant and the so-called Neolithic revolution, much of early inquiry was focused not on historical periods like the Late Bronze Age, but rather on the earliest periods of domestication (e.g., Stager 1985b).[65] Beginning especially in the 1970s and 1980s, the field embraced later period sites with greater frequency, with studies falling largely between two categories. The first type, which does not appear within this dissertation, focused on archaeobotanical remains that were hand-collected over the course of normal excavations, producing low-NISP datasets of common, large-seeded taxa (see Section 3.4.2).[66] The second type, however, comprises high-NISP datasets representing extraordinary depositional events, usually storage contexts that were suddenly destroyed (e.g., Kislev 1980), with these data featuring heavily in this dissertation. This type of analysis was gradually supplemented by studies utilizing more systematic collection procedures that engaged a broader array of context types, and as more data became available, textual and paleoethnobotanical syntheses—especially of the biblical Iron Age—became more common.[67] As can be seen, the complex history of paleoethnobotany in the southern Levant means that work on the periods

Lane (see n. 62), the assumption of an ahistorical, bucolic lifestyle persisting from antiquity into the early modern period is problematic, though Dalman's philological conclusions were highly influential in the field.

[65] This can especially be seen in the first monograph-length discussion of paleoethnobotany in the ancient Near East (J. Renfrew 1973), and continues today in one of the few examples of synthetic, cross-regional applications of paleoethnobotany in the region—now in its fourth edition (Zohary, Hopf, and Weiss 2012).

[66] This is largely characterized by the work of Nili Liphschitz, whose charcoal and dendrochronological analyses at sites throughout the southern Levant also included the identification of hand-collected charred seeds (e.g., Liphschitz 1996). For a comprehensive bibliography of these studies see Liphschitz (2007, 174–80).

[67] New data includes the use of ethnography to assist use-alteration studies of archaeobotanical remains (C. Palmer 1994; Warnock 2004). The first fully probabilistic botanical sampling strategies were applied at the Iron Age sites of Ashkelon (Weiss and Kislev 2001; 2004; 2007; Weiss, Kislev, and Mahler-Slasky 2011), Dhiban (Farahani 2014), and Khirbet al-Mudayna al-Aliya (Farahani et al. 2016), though Miriam Chernoff's paleoethnobotanical work on the Middle Bronze Age at Tel Ifshar should also be included (M. Chernoff 1988; 1992; M. Chernoff and Paley 1998). Major Iron Age syntheses can be found specifically in treatments of agriculture (Borowski 1987), daily life studies (Stager 1985a; King and Stager 2001; Borowski 2003), and diet (MacDonald 2008).

before, during and after the Egyptian occupation has been of a diverse character. Consequently, a cross-regional analysis of plant-based foodways requires a great deal of interpretive caution prior to making categorical statements about a Levantine mode of doing. Over the past two decades, however, several such studies have been conducted, each informing the methodological approaches taken within this dissertation.

Regional syntheses have fallen between two methodological categories: quantitative and semiquantitative. Thus far, quantitative regional studies have engaged with the collective archaeobotanical dataset as a cohesive sample of human-plant interactions, either attempting to maximize reliable data through excluding problematic reports or adapting statistical tests to homogenize problematic elements within the regional dataset. In the case of the former, Alexia Smith (2005) eliminated data from reports wherein non-ideal archaeobotanical sampling procedures were used (e.g., hand-picking), allowing for a degree of data loss to enable the application of multivariate statistical methods (see also Alexia Smith and Munro 2009). As for the latter approach, a multi-author study used a rarefaction test to argue that even if problematic datasets are included, sample size can be sufficiently robust as to eliminate the effect sampling issues might have on interpreting the absence of taxa from a given site (Frumin et al. 2015). Of the two, Smith's approach is preferable, since rarefaction requires several assumptions that are untenable in the case of the collective archaeobotanical data from the southern Levant—namely that all samples are collected in the same fashion using random sampling procedures (Sanders 1968; Gotelli and Colwell 2011, 47–48). Ideally, however, it should be possible to engage a regional archaeobotanical dataset holistically, including data derived from non-ideal collection procedures, a process which requires semiquantitative rather than quantitative methods.

For both Egyptian and Levantine archaeology, only a single regional paleoethnobotanical study has applied semiquantitative methods to engage with data from non-ideal sampling procedures (Riehl and Nesbitt 2003). Acknowledging the disparate quality of the published data, the authors translated these numbers into semiquantitative ranges rather than treating the published NISP of taxa as self-representative. This softened the data disparities between published catalogues, allowing for broad conclusions about diachronic shifts in agricultural practices to be drawn. The authors willfully acknowledge that there was no attempt to reanalyze the published data, but their work demonstrates the promise of working with irregular data rather than eliminating it from consideration altogether. Their method inspired my own, showing that semiquantitative characterization can harmonize large datasets that resist homogenization due to the presence of multiple overlapping biases. In contrast to their approach, my method fully reanalyzes the published data through both qualitative and quantitative characterizations, allowing for an analytical means to assess how accurately archaeobotanical data might reflect the presence and absence of taxa at a site in antiquity. This process must begin from the ground up, first by describing the available data and then through direct engagement with its biases.

3.2 The Archaeobotanical Dataset

This section introduces the archaeobotanical dataset used within this dissertation, which comprises nearly every published archaeobotanical report pertaining to settlement contexts from Egypt and the southern Levant dating between the early second through early first millennium BCE.[68] The broad chronological span is necessary to address cultural practices over the long term, demonstrating first whether it is possible to delineate Egyptian or Levantine modes of

[68] This corresponds roughly with the Levantine Middle Bronze Age IIA through late Iron Age I, as well as the Egyptian Middle Kingdom through early Third Intermediate Period.

doing, and then how these practices manifested during the imperial period at Jaffa. Moreover, examining the period after contact demonstrates the degree to which changes became engrained in either region after the cultural contact episode. The qualifying statement "nearly every published report" is necessary, as some botanical reports were excluded from the dataset. These fall across two groups: those excluded for contextual reasons and those excluded for reasons of data quality. Datasets excluded for contextual reasons include materials derived from mortuary contexts and ritual contexts, as these were unlikely to represent quotidian foodways.[69] Datasets that that were excluded for data quality fall across two categories: those that utilized hand-picking to produce small-NISP datasets (see Section 3.1) and preliminary reports without NISP figures.[70] Of these, preliminary studies are still applied qualitatively as they indicate the presence of taxa at a site.

After these exclusionary principles were applied, the dataset includes reports on a total of 30 sites in both regions across 100 chronological phases. A complete list of sites is provided in

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[69] The list of published tomb contexts from Egypt is vast (see de Vartavan, Arakelyan, and Amorós 2010; Arakelyan et al. 2012), however the main datasets excluded here include the embalming cache in the Valley of the Kings tomb KV63 (Hamdy and Fahmy 2018), the Deir el-Medina tombs (Schiemann 1941b), the Middle Kingdom Tomb of Khesu (Sakr 2005), New Kingdom tomb TT294 in Thebes (Granger, Smith, and Elder Smith 1996), the Tomb of Tutankhamun (Barton-Wright, Booth, and Pringle 1944; Germer 1989; Hepper 1990; de Vartavan 1990; 2012), and the New Kingdom tombs in the Douch Necropolis at Kharga (Barakat and Baum 1992). From the southern Levant, the only major mortuary dataset excluded are the Middle Bronze Age remains from Jericho (Hopf 1983). Excluded archaeobotanical datasets from Egyptian ritual sites includes New Kingdom Semna in Sudan (van Zeist 1983) and Middle Kingdom deposits at Saqqara in Egypt (Fahmy, Kawai, and Yoshimura 2014). Only one site from the southern Levant was excluded—the Hathor shrine at Timnah (Kislev 1988).

[70] Only one dataset from Egypt was excluded for data quality reasons, the analysis of plant remains from the workmen's huts outside of Deir el-Medina (Newton 2011), as it was confined to a few vessels the excavators thought might have been used for growing plants. From the southern Levant, a large body of studies based on hand picking were excluded (see n. 66), since these only produced a low-NISP dataset of common taxa. Preliminary reports from Egypt includes Deir el Ballas (Wetterstrom 1990), the qualitative preliminary studies from the Amarna Workmen's Village (J. Renfrew 1985; Samuel 1995b; Stevens and Clapham 2014), and the preliminary publications from Tell el-Retaba wherein quantitative data is represented proportionally without absolute values (Malleson 2015; 2016a). From the southern Levant, this includes dissertations treating the archaeobotanical remains from Tell Miqne/Ekron, Ashkelon, and Tell es-Ṣafi/Gath (Mahler-Slasky 2004; Frumin 2017), the data for which have been made available as proportions lacking absolute values (Frumin, Melamed, and Weiss 2019).

Appendix 1, though a brief description of their contribution is provided here. From Egypt, data comes from 13 sites across 47 chronological phases, with most published samples being from single period sites. Two major studies, however, provide long-term exposures from superimposed strata. This includes 54 samples from ancient Memphis (modern Kom Rabi'a), all of which were collected from a 20 x 25 m exposure containing New Kingdom domestic dwellings associated with priests and/or artisans and a Middle Kingdom food storage and preparation facility (Murray 2000b). Another study published Middle Kingdom through Third Intermediate Period (TIP) contexts from a trio of Western Desert road sites opposite the Qena Bend of the Nile River: Gebel Romaʿ, Wadi el-Hôl, and Gebel Qarn el-Gir (Cappers et al. 2007). The sites were subjected to systematic sampling of all loci, resulting in extraordinary data control, though the publication format lumped all samples together by chronological period (e.g., a single list of taxa for the entire Middle Kingdom) and therefore these data cannot be subjected to the complete methodology of this study (see Section 3.5).

Single period sites are more common within the Egyptian dataset, though many still present superimposed strata within single chronological periods (e.g., Tell el-Maskhuta). From the Middle Kingdom, the site of Umm Mawagir in the Kharga Oasis provides an extensive array of context types related to foodways, including storage contexts, food preparation areas, and middens, though the samples are lumped into a single list of taxa (Cappers et al. 2014). For the Second Intermediate Period (SIP), all sites are from the Nile Delta region. Tell el-Maskhuta provides 31 samples from secondary rubbish deposits across multiple subphases of the period (P. Crawford 2003), Tell el-Dabʿa provides an additional 14 samples from primary and secondary rubbish deposits (Thanheiser 2004), and Abu Ghâlib—the only Western Delta site—provides 6 samples collected from occupational debris (Schiemann 1941a). Single period sites from the

New Kingdom provide much narrower chronological exposures, with the dataset also including several sites on or outside of the geographic boundaries of traditional pharaonic Egypt. The first, the fortress site of Tell el-Borg in the Sinai Peninsula, produced 28 samples treating a wide variety of domestic contexts (Malleson 2019). The second is the fortified Egyptian town of Amara West in modern Sudan, a colonial capital founded during 19th Dynasty as a seat for the Deputies of Kush. While the town exhibits clear evidence for cultural entanglement between Egyptians and local Nubians, it comprised a colonial installation of Egyptians in Nubian territory and therefore is of immediate relevance to this dissertation (N. Spencer, Stevens, and Binder 2014). Qualitative archaeobotanical studies have been published for New Kingdom Amara West (e.g., Ryan 2017), but full quantitative data is available from Villa E12.10, an elite domestic context that produced 14 fully published samples (Ryan, Cartwright, and Spencer 2016).[71] The final New Kingdom site is Tell Amarna, which dates narrowly to the 14th century BCE when it served as the capital of the pharaoh Akhenaten. Separate archaeobotanical reports are available for different districts and domestic units within the city. One study of the main city examined multiple medium-sized domestic contexts in Grid 12 (20 samples) as well as the house of a lower official by the name of Ranefer (5 samples), with both datasets engaging a variety of domestic and rubbish contexts (Stevens and Clapham 2010). Another report comes from the so-called Stone Village, a residential quarter for lower socioeconomic strata individuals, which produced an additional 15 samples across an array of domestic contexts (Clapham and Stevens 2012). While Amarna cannot be taken as fully representative of daily practice in New Kingdom Egypt due to its extraordinary nature as a royal capital (Meskell 2002, 33), its collective

[71] The association of this house with an Egyptian mode of doing is based on a confluence of elements, notably the house plan, a traditional Egyptian tripartite house, in tandem with its associated assemblage—which included 90% Egyptian-style ceramics alongside 10% Nubian cooking jars (N. Spencer 2009).

archaeobotanical assemblage provides unprecedented insight into a variety of socioeconomic and functional contexts, making it the backbone of the New Kingdom archaeobotanical dataset.

In contrast to Egypt, the vast majority of archaeobotanical data from southern Levantine sites used within this dissertation are derived from the chance discovery of extraordinarily preserved caches of charred seed. Consequently, even if sites provide data for the entire target period, it is usually across a small number of high-NISP samples. Collectively, the southern Levantine dataset is derived from 17 sites across 53 chronological phases. Continuous, multi-period datasets come from three sites: Tel Ifshar, Megiddo, and Beth Shean. Tel Ifshar, located on the central Sharon Coastal Plain of modern Israel, produced 88 fully published samples from a wide variety of contexts between the Middle Bronze Age IIA and the Late Bronze Age IIB, though a notable limitation of these data is that taxa are rarely identified below the level of genus (M. Chernoff 1988; 1992; M. Chernoff and Paley 1998). Megiddo, located in the Jezreel Valley of modern Israel, produced 25 samples from a wide variety of contexts dating from the Middle Bronze Age IIB through the Iron Age IB, though selective publication of samples and the exclusion of heavy fraction from analysis means that the published data are not fully representative (Borojevic 2006). Finally, Beth Shean, an important New Kingdom garrison at the junction of the Jordan and Jezreel Valleys in modern Israel, produced a series of caches of charred archaeobotanical remains dating between the Middle Bronze Age IIB and Iron Age IB, with some samples having an NISP in the hundreds of thousands (Simchoni and Kislev 2006; Simchoni, Kislev, and Melamed 2007; Kislev et al. 2009; 2011). Consequently, rather than revealing insight into a broad-spectrum of human-plant relations, a great deal can be said about a narrow range of practices (e.g., cereal cultivation).

The pattern of large caches prevails for most of the southern Levantine data, which mostly consists of snapshots into extraordinary preservation events. The Middle Bronze Age IIB site of Manaḥat on the outskirts of modern-day Jerusalem produced nine samples from domestic contexts (Kislev 1998). Tel Shiloh in the hill country of the modern-day West Bank also produced a series of samples from the Middle Bronze Age IIB/C and Iron Age I, albeit the report lumps the collective samples from the Middle Bronze Age as a single dataset (Kislev 1993).[72] The North Slope of Ashkelon, on the southern coast of modern Israel, produced the largest overall dataset for the Middle Bronze Age, with 75 samples collected from levels dating between the Middle Bronze Age IIA through IIC (Kislev, Simchoni, and Kidron 2018). However, this report lumped all samples into assemblages by chronological period, meaning that the distribution of recovered taxa among the wide variety of context types is unclear.

Several sites produced archaeobotanical datasets dating throughout the New Kingdom imperial period. Tel Aphek, interpreted as an Egyptian agricultural estate on the southern Coastal Plain of modern Israel (Gadot 2010), produced 14 samples dating between the Late Bronze Age IIB through Iron Age IB from a wide variety of domestic and industrial contexts—including materials associated with the Late Bronze Age palatial estate (Kislev and Mahler-Slasky 2009). That much of the material is derived from seed caches means that a great deal can be said about a relatively narrow range of practices. A preliminary publication from Tell es-Ṣafi/Gath along the southern Coastal Plain of modern Israel fully published seven samples from various domestic contexts dating from Late Bronze Age III through Iron Age IB (Mahler-Slasky and Kislev 2012;

[72] In the original report from Tel Shiloh, the Middle Bronze Age IIB/C is rendered Middle Bronze II-III.

Maeir 2013), though more complete data are forthcoming.[73] Another major assemblage comes from Tel Batash in the Soreq Valley of modern Israel, with 23 samples coming from a variety of contexts dating from the Late Bronze Age IA through the Late Bronze IIB (Kislev, Melamed, and Langsam 2006). From modern Jordan, Deir ʿAlla in the Jordan Valley produced 18 samples dating from the Late Bronze Age IIB through the Iron Age IB (van Zeist and Bakker-Heeres 1973), though there is a disconnect between this study and the earlier stratigraphic publication (Franken 1969) that makes it difficult to tie samples to context. Farther south in the highlands of modern-day Jordan, the site of Tall al-ʿUmayri produced six samples from the Late Bronze Age II through Iron Age I, all derived from a wide variety of domestic and industrial contexts (Ramsay and Mueller 2016).

The final major group of southern Levantine sites are those that examine relatively few high-NISP contexts within a single chronological period. These include the destruction debris of a food preparation area within a Canaanite palace at Late Bronze Age IIA Beth Shemesh, which produced 8 samples from discrete seed caches within the building (Weiss et al. 2019). Along the southern coast, a Late Bronze Age IIB site discovered in a salvage dig near modern-day Ashdod—hereafter the Ashdod Beach Site—produced 10 samples related to industrial viticulture installations (Melamed 2013). Several Late Bronze Age IIB storage pits from the Egyptian garrison town of Deir el-Balaḥ in the modern Gaza Strip produced another 4 samples, all related to cereal storage (Kislev 2010). And finally, two early Iron Age I sites produced published archaeobotanical reports. The first is Tel Hadar, which comprises two samples taken from an

[73] Two dissertations examined the site (Mahler-Slasky 2004; Frumin 2017) and the authors have kindly allowed me to review some sections. Broad qualitative patterns have also been published (Frumin, Melamed, and Weiss 2019).

Iron Age IB granary (Kislev 2015) and second consists of a single assemblage from a large grain storage pit excavated at Tel Keisan (Kislev 1980).

The final dataset for this study is the archaeobotanical assemblage from New Kingdom Jaffa, against which the collective regional data is compared. Jaffa provides the largest body of samples from any site dating to the period of the New Kingdom empire, totaling 129 samples collected from the final three phases of the Late Bronze Age III gate complex (see Chapter 7). Since the gate was destroyed twice in this period, the sample is unusually rich and diverse, especially since the Phase RG-4a destruction produced caches of several species of cultivated crop within the gate passageway—suggestive of its role as a marketplace (Burke, Peilstöcker, et al. 2017, 110). The archaeobotanical assemblage was identified by Andrea Orendi and will be subject to final publication (Orendi Forthcoming), though a catalog is also available online via the ADEMNES database (Riehl and Kümmel 2005). Since it is the product of rigorous collection procedures combining hand collection of bulk samples with comprehensive flotation protocols, the material provides broad-spectrum insight into foodways at ancient Jaffa during the final era of Egyptian rule.[74] While chronologically narrow in comparison to other sites in the dataset, the material from Jaffa constitutes an important window into life at an Egyptian garrison, comparable perhaps only to the rich archaeobotanical assemblage from Tel Aphek.

Collectively, the total dataset of this dissertation comprises 611 individually reported samples that produced an NISP of 1,667,595 identified macrobotanical elements. In both regions, the sites come from an array of diverse ecological zones and levels of sociopolitical complexity, ranging from state capitals (e.g., Amarna) to small fishing and agricultural villages (e.g., the

[74] The JCHP excavations utilized a hand-pump flotation system (following Shelton and White 2010) and every locus was sampled at least once.

Ashdod Beach Site). Therefore, while sampling procedures, publication quality, and other issues disallow the claim that it is possible to provide a complete understanding of human-plant interactions in Egypt and the southern Levant during the period of interest, a robust image can still be provided if the data is used cautiously. This caution is built into the proposed methodology for analyzing this massive collection of data, with the remainder of this chapter devoted to articulating both the biases inherent in such data as well as the semiquantitative methodology necessary to address them. As will be shown, these data are ideally positioned to shed light on the consequences of long-term, intense cultural contact between Egypt and the southern Levant during the period of the New Kingdom.

3.3 Plant-Based Foods and Identity Negotiation: Moving from Species to Practices

The theoretical framework for the paleoethnobotanical component of this dissertation follows that which was outlined in Chapter 2, in that patterning in the archaeobotanical record is used to understand the relationship between foodways, practice, and identity during the period of the New Kingdom imperial occupation of the southern Levant. There are, however, some theoretical and methodological particularities to doing this with botanical remains. While large archaeobotanical datasets allow for the exploration of broad patterns over time (Johannessen 1988), the types of social analyses conducted within this dissertation cannot be achieved through simple quantification (see Begler and Keatinge 1979, 208; Popper 1988, 53). Instead, there are intervening variables that must be addressed before the dataset outlined in Section 3.2 can be addressed as a coherent representation of past foodways. In this section, I address the theoretical place of the archaeobotanical data vis-à-vis the desire to delineate ancient plant-based foodways.

First, I give primacy to the archaeobotanical record over all other forms of evidence. As discussed in Section 3.1, while a great deal of literature has considered the textual and iconographic evidence for plant-based foodways in both Egypt and the Levant, limitations of that data include lexicographical ambiguity and unclear stylistic conventions for ancient depictions of plant taxa.[75] This body of evidence will not be ignored, but rather employed cautiously in a qualitative sense throughout the case studies of chapters 4 and 5. Following convention, I understand the domain of paleoethnobotany as encompassing archaeological plant remains: macrobotanical remains, starch, phytoliths, and pollen (Pearsall 2015, 27). Due to the state of the data from both Egypt and the southern Levant, I confine analyses specifically to macrobotanical remains, defined as “all plant remains that are large enough to be seen with the naked eye and that can usually be identified with a low-power microscope” (Gallagher 2014, 19). This body of data is by far the most comprehensive of what has been collected from either region thus far, and therefore it is of the greatest comparative utility.[76] Macrobotanical remains are further divided at

[75] A simple example regarding the question of Bronze Age cultivation of sesame in Egypt and the broader ancient Near East will suffice to demonstrate the complexity involved. The early hypothesis of sesame exploitation was lexicographical in origin, with the Sumerian terms ŠE-GIŠ-Ì and the Egyptian *n*-oil being interpreted as signifying sesame and its products. The identification was purely on internal textual justification, despite all secure archaeological finds for sesame being significantly later (Bedigian and Harlan 1986; Fuller 2003). Early finds of sesame are now known from Mesopotamia and northern Syria in the Early Bronze Age, and also from New Kingdom Egypt, and debate now centers on whether these represent imports (Zohary, Hopf, and Weiss 2012, 112–13)—the question being especially relevant since the plant represented by the Sumerian ŠE-GIŠ-Ì was locally cultivated (Bedigian and Harlan 1986). Regardless, the recovery of early archaeobotanical evidence for sesame does not necessarily secure the lexicographical association with either ŠE-GIŠ-Ì or *n*-oil in lieu of more direct evidence, and the whole argument risks a certain degree of circularity if the lexicographical evidence is given first priority to dictate the interpretation of the archaeobotanical evidence.

[76] Starch analyses have not yet been applied to the target period in either Egypt or Israel with the exception of Delwen Samuel’s analysis of starch granules in reference to ancient Egyptian brewing practices (see summary in Samuel 2000). Instead, they have mostly been applied to prehistoric contexts. Phytolith analysis are more common, though the focus has been mostly on early Iron Age levels at sites in Israel such as Tel Miqne/Ekron (Ollendorf 1987), Tel Dor (Albert et al. 2008), and Tel es-Ṣafi/Gath (O. Katz et al. 2010). Palynological analysis has seen a major resurgence in the past decade, with offsite applications being adapted specifically to paleoclimate reconstruction (Litt et al. 2012; Bernhardt, Horton, and Stanley 2012; Langgut, Finkelstein, and Litt 2013; Langgut et al. 2014; Mercuri 2014; Schiebel and Litt 2018). On-site palynological analyses are still relatively rare, though they have been adapted for paleoenvironmental reconstruction (e.g., Drori and Horowitz 1989) and functional analyses of activity spaces (e.g., Langgut et al. 2016). Another obliquely related field is archaeoentomology, which uses insect remains to explore crop storage and processing practices. Work on Middle through New Kingdom Egypt is almost exclusively due to the efforts of Eva Panagiotakopulu (1998; 2001; 2003; Panagiotakopulu, Buckland, and Kemp 2010; but see also Borojevic et al. 2010). In the southern Levant, the only major applications of the method have been by Mordechai Kislev, either in devoted studies (Kislev 1991; Kislev and Melamed 2000) or in passing within archaeobotanical reports (Simchoni, Kislev, and Melamed 2007).

the level of charcoal and all other plant tissues, though in this dissertation I only focus on the latter category. Apart from the difficulty in quantitatively standardizing charcoal for analytical purposes (Begler and Keatinge 1979, 213; Hubbard and Clapham 1992, 118), the anthropogenic and depositional forces that lead to the creation and preservation of charcoal and/or wood in the archaeological record are sufficiently complex that charcoal evidence for fruiting trees should not be taken as direct evidence for local horticulture (contra Liphschitz 2007, 103).[77] Other macrobotanical remains have the added issue that their pathways to preservation are erratic. While tubers, fibrous elements, and even leaves can be preserved under certain conditions, the fact that these conditions are unevenly present across the southern Levant and Egypt means that these elements can also only be used to note the presence of a specific taxon. Consequently, for the purposes of comparative analysis I focus only on categories of macrobotanical remains that have similar probabilities for preservation across both Egypt and the Levant.

The final theoretical issue that must be addressed is that macrobotanical remains need not always relate to diet, or even human foodways more generally. Many taxa have functions outside of foodways, and many were exploited for both food value and other technological uses.[78]

[77] For example, Arbuckle has shown the long life of Christ's thorn (*Ziziphus spina-christi*) in Egypt. Christ's thorn has long been dismissed as a useful crafting material. Instead, its importance was thought to be derived from its edible fruit. The identification of wood from Christ's thorn as both planks and constructional elements (e.g., tenons) in coffins (2018, 69–71), however, demonstrates the possibility of more complex life histories for this species beyond local horticulture. Another example can be seen with the non-fruit bearing cedar of Lebanon (*Cedrus libani*) in Egypt. Cedar, an expensive, imported commodity throughout pharaonic history, was known for its use in high-prestige projects including boats, temple architecture, and coffins (Gale et al. 2000, 349). And yet, small objects made of cedar such as a spindle whorl and cedar charcoal have been identified in the Amarna Stone Village—a village of a low socioeconomic stratum isolated from the main city (Gerisch 2012, 50, 52). When considered alongside the attested secondary use of cedar beams from ships in coffin construction and other crafted objects throughout Egyptian history (Vinson 1987, 39–80; Creasman 2013), wood fragments clearly had a complex life history prior to their entry into the archaeological record. Final deposition could occur substantial distances from the point of harvest, and after several major functional, social, and contextual transformations.

[78] Studies on non-food botanical remains in both Egypt and the Levant abound, including fiber crops (e.g., Borojevic and Mountain 2013), fodder crops (e.g., Charles 1998), and temper (e.g., Goldberg 2004). For a taxon that falls in both categories, the tiger nut/*chufa* (*Cyperus esculentus*) is a perennial sedge grass that was exploited throughout

Moreover, modern Western functional divisions, such as between food and medicine (Adelman and Haushofer 2018), need not have held in the past.[79] Consequently, the relative abundance of certain taxa within the dataset of this study is not meant to stand for their relative importance within ancient Egyptian or Levantine diets (Popper 1988, 58–59), and as a result, my comparison of Egyptian and Levantine foodways is confined to specific classes of cultivated plant (e.g., cereals in Chapter 4) rather than a comparison of diets writ large. Diets, as a collective whole, are difficult to reconstruct from archaeobotanical remains, not least of which because not all elements of ancient diets are preserved in the archaeobotanical record (Hastorf 1988)—what Deborah Pearsall referred to as "nonrandom data loss for which there is no correction" (Pearsall 2015, 40). A notable limitation of paleoethnobotany is that the evidence for diet is circumstantial rather than direct (Dennell 1979; Begler and Keatinge 1979; Hastorf 1988, 120; 1999, 76), and more often than not the macrobotanical record provides more evidence for crop processing than food consumption (Hastorf 1988, 122). Consequently, in using macrobotanical remains it must be recognized up front that I cannot make claims to exhaustively represent foodways from either Egypt and the southern Levant, but rather, it is necessary to confine arguments solely to the types of evidence that can be reasonably compared between the two regions and then to Jaffa. Having addressed the theoretical position of the macrobotanical data within this study, it is now possible to address physical limitations of these data and the methods proposed to address them.

Egyptian history as food, fodder, and as an oil crop for the perfume industry (M. Negbi 1992; Murray 2000c, 636–37). Consequently, archaeobotanical evidence for *chufa* need not indicate its role in the local diet.

[79] For example, the dietary of staples wheat and barley functioned in a variety of ancient Egyptian medical recipes (Germer 2008), including in preparations where they were not consumed (Ghalioungui, Khalil, and Ammar 1963).

3.4 Grappling with Disparate Data: Some Methodological Points

The primary methodological concern in analyzing the data outlined in Section 3.2 is that a regional, quantitative synthesis implies the direct comparability of the various constituent archaeobotanical assemblages—something which is rarely attainable in practice (see Wagner 1988, 29; Lee 2014; C. White and Shelton 2014, 110). Every archaeobotanical sample is subject to variables that inflict biases on the resulting assemblage, and therefore these biases must be characterized and addressed. This is especially true if the intent is to make meaningful social interpretations regarding the presence and/or absence of a given taxon from regional foodways. Within this section, I explore the various biases introduced into macrobotanical assemblages during pre-depositional (Section 3.4.1) and post-depositional (Section 3.4.2) stages of assemblage development, with the latter group being further subdivided to include changes in assemblage resulting from taphonomy, excavation/collection strategies, as well as quantification and identification methods.[80] These biases are outlined specifically with respect to how they affect the regional datasets from both Egypt and the southern Levant, with Appendix 1 providing a tabular summary of these data characterizations for each site/stratum analyzed within this dissertation. This characterization sets up the methods devised to circumvent the issue of comparing disparate archaeobotanical data (see Section 3.5).

[80] Following Virginia Popper, plants move through the stages of selection (in antiquity), discard (in antiquity), preservation, collection (by the archaeologist), processing (by the archaeologist), and then the recording types/numbers of taxa (Popper 1988, 55, Fig. 4.1). Her concept is slightly modified here using Gyoung-Ah Lee's notion of a life assemblage (living population of plants prior to harvest), death assemblage (totality of plant remains brought to a site in the past), deposited assemblage (fraction of the death assemblage deposited at a site), fossil assemblage (what survives after deposition to be potentially recoverable by archaeologists), and finally, the sampled assemblage (what is actually recovered by archaeologists) (Lee 2012, 651–52).

3.4.1 Pre-Depositional Biases

The first biases that require attention are introduced already during the ancient period and relate to how the plants arrived at a site and how they were processed and/or consumed once there. There are three generic pathways by which macrobotanical remains arrive at a site, though only two are of immediate interest here: anthropogenic and indirect anthropogenic.[81] Anthropogenic pathways encompass all intentional human selection and transport of plants to a site, whereas indirect anthropogenic pathways involve those species/parts brought either unintentionally or as a secondary consequence of another activity (Gallagher 2014, 28–29). The assumption that the bulk of macrobotanical remains analyzed within this dissertation stem from anthropogenic and indirect anthropogenic pathways is not made uncritically. Nearly every study from which the dataset is composed consciously selected functionally specific contexts related to either crop-processing or storage. As a result, most recovered material consists of cultivated crops and segetal/synanthropic weeds, the latter group either incidentally stored with their associated crop or removed during crop processing and deposited as waste.

Because of these collection strategies, the presence and absence of any taxa from a given assemblage must first be considered from a contextual standpoint, with special reference to whether the anthropogenic or indirect anthropogenic pathways were exclusionary to the taxon of interest. The narrow functional range of surveyed contexts within the dataset—especially from the southern Levantine sites (see Appendix 1.2)—means that the absence of a taxon in an assemblage cannot be uncritically assumed to stem from its absence in antiquity. In addition to

[81] The third is non-anthropogenic, covering all other routes by which plants enter sites (Gallagher 2014, 28–29), including forces such as seed rain (Pearsall 2015, 36–37). Non-anthropogenic pathways are rarely discussed in Egyptian and southern Levantine reports outside of prehistoric periods (e.g., Madella et al. 2002), often only being used to explain wild species (e.g., Clapham and Stevens 2012, 19) or anomalous C14 results (e.g., Borojevic 2011).

pathway biases, however, the next crucial pre-depositional concern is any anthropogenic modification of plants that might reduce or eliminate their chances of survival in the archaeological record. Plant processing can be viewed in a reductive sense wherein components of the initial botanical assemblage are removed, destroyed, or broken down to their constituent parts through various human activities (Hillman 1984a; Gallagher 2014, 29–30).[82] As with the pathways that bring plants to a site, the primary basis for understanding the reductive anthropogenic forces that further structure the deposited assemblage is context (Minnis 1981; Pearsall 1988). A full contextualization of the samples used in this study is provided in Appendix 1.2 under the heading **Context Type**, with this characterization forming the first principle prior to any interpretation of substantive difference between Egyptian and Levantine foodways. Assemblage composition, however, also provides crucial clues about anthropogenic modification (Fuller, Stevens, and McClatchie 2014, 175), and therefore in addition to context I examine the cooccurrence of intentionally cultivated taxa with crop waste and undesirable species.[83] A high frequency of unwanted taxa/botanical components alongside a diversity of cultivars is suggestive of an assemblage less subject to exclusionary anthropogenic factors and therefore more reflective of human-plant interactions at a site. Conversely, if an assemblage only contains a small group of cultivars, it was likely subject to exclusionary factors that render it less representative of ancient

[82] Experimental projects have delineated the botanical debitage of activities such as foraging (Abbo et al. 2008; 2013), olive processing (Margaritis and Jones 2008), and cereal processing (Nesbitt and Samuel 1996). Ethnoarchaeological analogy has produced quantitative models for crop husbandry practices (G. Jones 1987), with modern weed ecologies used to reconstruct ancient agronomic principles (G. Jones and Halstead 1995; G. Jones et al. 2005), allowing the reconstruction of agriculture and processing behaviors (Hillman 1984a; 1984b; 1985; C. Palmer 1994; Cappers 2005). Tandem projects utilizing both experimentation and ethnographic observation have been conducted on viticulture and wine production (Margaritis and Jones 2008) and olive oil production (Warnock 2004), albeit typically for areas outside the target regions of Egypt and the southern Levant. Most experimental and ethnographic study of culinary practices has been on brewing and baking, highlighting the macrobotanical waste they generate and proposing methods to identify these activities archaeologically (Kemp, Samuel, and Luff 1994; Nesbitt and Samuel 1996; Samuel 2000; D. Lyons and D'Andrea 2003; Cappers et al. 2014).

[83] The assessment of what is undesirable/inedible is subjective (Dennell 1979, 128), but in this study the assumption is applied to plausible categories such as segetal weeds.

activities. When combined with sample context, these taxa make it possible to detect the types of anthropogenic forces that may have biased the macrobotanical record.

The final pre-depositional element that is of methodological concern is the mode of preservation. For the data analyzed within this study, all Levantine assemblages were preserved by charring, whereas assemblages from Egypt are variable preserved by desiccation, charring, or both. Each mode of preservation exerts dramatically different influences on the character of the assemblage (van der Veen 2007; Pearsall 2015, 38–39). Desiccation—either in arid environments or under specific burning conditions—typically preserves a greater diversity of taxa and/or botanical elements (Sievers and Wadley 2008).[84] In contrast, charring is more traumatic, with a number of variables (e.g., oxygen level) contributing to the probability of macrobotanical preservation (Boardman and Jones 1990, 1–2; Guarino and Sciarrillo 2004) and further effects coming from taxa-specific variables (e.g., seed oil content).[85] Carbonized macrobotanical assemblages are not directly comparable to desiccated assemblages, since the latter will almost always exhibit a greater diversity of species and/or botanical elements independently of what was present at a site in antiquity. Consequently, within this study, charred and desiccated assemblages are considered separately in all analyses to avoid homogenizing incommensurate data and thereby overestimating the representativeness of a given sample. This

[84] Given the difficulty in differentiating ancient from modern desiccated remains, a great deal of caution is required for only studying secure contexts (Lennstrom and Hastorf 1995, 705). All of the reports utilized within this dissertation have already accounted for this issue (e.g., Clapham and Stevens 2012).

[85] Experimental charring of grain has shown that both straw and free-threshing rachis were lost first, followed by glume wheat chaff, and then finally grain (Boardman and Jones 1990, 9–10). Moreover, the preservation of seeds from different family groups is dramatically different (Guarino and Sciarrillo 2004). For example, the relatively dry wheat grain behaves differently under high heat than the oil-rich flax seed. The former expands, becoming misshapen (Hillman 2001, 31), whereas the latter typically ruptures (Kislev et al. 2011, 581, Fig. 2). Additionally, the position of botanical elements in relation to the fire is crucial, with elements in the oxidizing zone being consumed completely and those outside being preserved via charring (Gustafsson 2000; Sievers and Wadley 2008).

is visible in Appendix 1.1 in the separate columns for the NISP of charred (**CNISP**), desiccated (**DNISP**), and undifferentiated (**LNISP**) remains at a given site. The two datasets are treated as separate but complimentary, with the adequate characterization of the different depositional pathways being a necessary step towards synthetic analysis (Guedes and Spengler 2014, 82). Unsurprisingly, the prevalence of desiccation in Egypt results in more biodiverse macrobotanical assemblages, highlighting the need to demonstrate that differences between Egyptian and southern Levantine foodways are genuine rather than the product of pre-depositional variables.

3.4.2 Post-Depositional Biases

While pre-depositional biases dictate the maximum possible macrobotanical assemblage that can be recovered by archaeologists, an even more powerful force affecting the composition of the data are the archaeological methods used to recover each assemblage. Technically, post-depositional biases include all forces acting on macrobotanical remains once they enter the soil matrix, however, in this section I address how two dimensions of modern field collection—sampling strategy and recovery method—have affected the regional datasets from the southern Levant and Egypt.[86] Sampling strategy is concerned with the logic behind how, when, and why samples are taken, whereas recovery method relates to how macrobotanical remains are separated from the surrounding soil matrix. Methods design is specifically related to research goals, project limitations, site specifics, soil type, and other factors (Wagner 1988, 26; Guedes and Spengler 2014, 77), and consequently there is no single, correct technique. I am, therefore, not concerned with critiquing individual studies for their choice in methods. Instead, I evaluate the effect each method has had on the on the comparability of each assemblage within a larger

[86] For a summary of post-depositional forces that affect macrobotanical preservation, see Daphne Gallagher (2014). For the target period and region, however, the data necessary for assessing these forces is rarely published, leaving their discussion outside the purview of this dissertation.

regional framework of a comparative foodways analysis. Importantly, the question is whether differences in macrobotanical remains between the two regions represent different plant-based foodways or if it is simply a product of data bias introduced by field collection.

7.4.2.1 Issues of Sample Selection

The assemblages discussed in Section 3.2 stem from two broad categories of macrobotanical sampling strategies: non-probabilistic and probabilistic approaches. Fundamentally the difference between the two is whether sample collection strategies are based on intuitive, non-statistical selection or probability theory.[87] Of the two, non-probabilistic sampling methods are by far the most common within the dataset of this dissertation. Generally, the selection of contexts for macrobotanical sampling within non-probabilistic studies is opportunistic, with sample collection occurring only where preserved plant remains are seen or expected (Lennstrom and Hastorf 1995, 702). In practice, this embraces everything from the hand-collection of seeds during daily excavation to the retention of an assemblage of thousands of charred seeds from a single, extraordinary context. In contrast, probabilistic sampling—broadly speaking—applies consistent sampling criteria to every context encountered during excavations (Lennstrom and Hastorf 1992, 205).[88] Given that non-probabilistic surveys are more subject to chance than their probabilistic counterparts, the unification of data derived from both within a comparative foodways study merits requires care.

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[87] Within general archaeological sampling procedures, non-probabilistic sampling is defined as a "non-statistical sampling strategy (in contrast to *probabilistic sampling*) which concentrates on sampling areas on the basis of intuition, historical documentation, or long field experience in the area" (C. Renfrew and Bahn 2016, 601, emphasis original). For macrobotanical remains, this includes sampling only visibly dense deposits of botanical elements or specific context types (see Guedes and Spengler 2014). In contrast, probabilistic sampling is a "sampling method, using probability theory, designed to draw reliable general conclusions about a site or region, based on small sample areas" (C. Renfrew and Bahn 2016, 602).

[88] Sample consistency unifies all probabilistic sampling methods, which have been subject to several surveys (Toll 1988; Wagner 1988; Lennstrom and Hastorf 1992; 1995; Guedes and Spengler 2014; Pearsall 2015).

The main methodological concern with the data derived from non-probabilistic surveys relates to the representativeness of each sample with respect to broader activities at a site. The matter is related to the notion of "feature bias," which entails sampling procedures that emphasize a limited range of context types (e.g., storage contexts), rendering it impossible to demonstrate the overall significance of the resulting macrobotanical assemblage (Lennstrom and Hastorf 1995, 702, 716).[89] While the issue is pronounced at the level of intra-site analysis, it is more problematic for inter-site comparisons where the objective is to demonstrate differences in practice or diet. Fundamentally, assemblages derived from non-probabilistic methods—even if they bear a high NISP—are not sufficiently exhaustive as to allow for direct interpretations of the presence or absence of a given taxon.[90] While probabilistic sampling does not ensure exhaustive collection of all taxa related to plant-base foodways, systematic sampling procedures render a greater degree of comparability across samples by narrowing the range of possible variables that might bias each sample. Systemization falls across two key elements. First, each context type receives equal priority in sampling, which satisfies the issues associated with feature bias.[91] Second, each sample is standardized with respect to soil volume, treatment, and collection method, eliminating variables across these categories.[92] While the methodological distinction between probabilistic and non-probabilistic sampling procedures are firm, it is possible for

[89] It has been argued that the overall bias of non-probabilistic collection is less pronounced because ancient activities largely homogenized the archaeobotanical record regardless of context (see Fuller and Stevens 2009, 40 and bibliography there). This homogeneity, however, must be demonstrated (Guedes and Spengler 2014, 82).

[90] Because of this, early scholars argued for systematic sampling procedures that would place paleoethnobotany on firm statistical footing (Limp 1974; van der Veen and Fieller 1982; Lennstrom and Hastorf 1992).

[91] There are several different methods for achieving this (see Guedes and Spengler 2014, 78), though all are unified by a pre-planned sampling method that treats all contexts the same.

[92] True volumetric standardization is difficult to achieve, as soil composition and moisture levels ensure that different soil samples within identically-sized containers will not necessarily be of similar weight or volume (P. Wright 2005, 20). Within this dissertation, however, reported standardized volumes will be taken at face value.

excavations to implement elements of probabilistic sampling procedures, thereby producing data derived from quasi-systematic means. It is therefore necessary to characterize the assemblages from Section 3.2 across several criteria to demonstrate possible biases within the data.

Appendix 1.2 provides a full characterization of the sampling procedures used within each report from which the data of this dissertation is derived. The first level of distinction is under the **Method** column, which differentiates between studies that employed probabilistic, non-probabilistic, and quasi-systematic sampling procedures. This is followed by further characterization of individual samples, notably whether standardized sample volumes were taken (column **Sta.**) or whether individual contexts were sampled multiple times (column **Du.**). Fundamentally, this assists in determining if each context was treated equally, and therefore whether the contents of a given assemblage can be treated as representative or if they are more likely artifacts of the sampling procedure. As can be seen from Appendix 1.2, the archaeobotanical dataset for the study area is subject to a wide variety of biases at the level of sampling strategy, complicating any attempt at synthetic study. Notably, almost all data derived from the southern Levant stems from non-probabilistic sampling methods, though in Egypt more recent work has tended towards probabilistic methods. The reasons behind this are manifold, relating to the date of excavations, resource availability, and most importantly, overall project goals. As a result, the data from the southern Levant is predominantly derived from opportunistic encounters with large deposits of extraordinarily preserved macrobotanical remains from a limited functional range of contexts, providing a great deal of data about a limited array of human-plant interactions. It is therefore necessary to address the feasibility of comparing plant-based foodways in Egypt and the southern Levant, especially since an additional layer of bias is introduced depending on the method for retrieving macrobotanical remains from the soil matrix.

7.4.2.2 Issues of Recovery Technique

Where sampling procedures might dictate the breadth of evidence for plant-based foodways that archaeologists encounter, recovery methods directly influence the types of taxa that can be recovered. Recovery techniques for macrobotanical remains can be divided into the broad categories of hand-selection, dry sieving, and water-assisted methods, with each imparting its own selection biases.[93] The degree of bias within each method can result in dramatically different recovery rates for macrobotanical remains, with an experimental study showing a 6% to 98% recovery rate for poppy seeds depending on the method employed (Wagner 1982). Consequently, the fact that all three methods are represented within the dataset of this dissertation means that regional comparison of results requires extreme caution. This is instrumental to the comparison of Egyptian and southern Levantine foodways, since certain recovery methods impart taxa-specific biases that might offer better explanation for differences in the macrobotanical assemblages from either region.

Of the three methods for recovery, hand-selection produces the most erratic biases by far, in that collection is confined to macrobotanical remains as they are spotted by excavators. Even when combined with large-screen dry sieving (1/4 – 1/8 inch mesh), the completely random nature of recovery means that coverage is subjective and uneven throughout the site and the resulting data is resistant to statistical analyses (Struever 1968; D. H. Thomas 1969; French 1971; Payne 1972; P. J. Watson 1976; C. White and Shelton 2014, 96; Pearsall 2015, 44).[94] In

[93] Several surveys of the character of each method have been written that address their specific biases (Wagner 1988; P. Wright 2005; Pearsall 2015), as have more narrow treatments discussing the effect of soil type on each method (Chiou, Cook, and Hastorf 2013) and how methods can produce an over- or under-representation of charcoal in relation to other macrobotanical remains (Hageman and Goldstein 2009).

[94] With hand-selection, excepting dense deposits of macrobotanical remains, finds mostly comprise large, highly visible elements like olive pits, with smaller seeded taxa being almost totally absent save for the occasional find (e.g., Liphschitz and Waisel 1980).

the case of this dissertation, the only studies included within the dataset that utilized hand-collection are those that treat dense, high-NISP deposits from extraordinary preservation events, which provide the highest potential recovery rate for the method—both with respect to quantity and biodiversity. Dry sieving and water-assisted methods are much more comprehensive, though each has its own advantages and disadvantages. Dry sieving refers to the use of—often graded—meshes to filter macrobotanical remains directly from the soil matrix with no intervening processing, though within this dissertation the method specifically refers to those studies that conducted the process with small aperture meshes (less than 1 mm).[95] While water-assisted methods are more diverse, of the studies that I consider all utilized some mode of flotation where soil samples are agitated in water and the suspended light fraction is then collected.[96] The rationale behind using one method or the other relates to the conditions of macrobotanical preservation, with dry-sieving being more suited for the recovery of desiccated remains from low-moisture soils and flotation more ideal for the recovery of remains from high-moisture soil.[97] Given the dramatically different conditions of preservation between both Egypt and the southern Levant (see Section 3.4.1), it is unsurprising that dry sieving is the preferred method of

[95] Large aperture meshes are insufficient for adequate macrobotanical collection (D. H. Thomas 1969), and from a conceptual standpoint are lumped with hand-collection due to their similar resolution.

[96] Wet-sieving, the other main method of water-assisted recovery, is rarely applied for macrobotanical recovery in either Egypt or the southern Levant. In the rare cases where it has been used, archaeobotanical reports rarely incorporate the finds. For example, at Tell es-Ṣafi/Gath, Israel, while wet-sieving was extensively used within the project to study metallurgical waste (Eliyahu-Behar et al. 2012), the archaeobotanical report only provides information about material collected via flotation (Mahler-Slasky and Kislev 2012).

[97] The relationship between soil moisture content and method selection is mostly related to the degree of force required to separate macrobotanical remains from the soil matrix, with dense, wet soils requiring force such that there is a high probability of destroying macrobotanical elements (Pearsall 2015, 44–46). Moreover, desiccated remains—which are typically only preserved in low-moisture soils—tend to degrade rapidly when exposed to water (C. White and Shelton 2014, 96–97), an issue not shared with carbonized remains.

recovery at arid sites in Egypt, whereas flotation is more commonly implemented at southern Levantine sites.

The largely regional division between recovery methods means that there is a general bias between macrobotanical assemblages in Egypt and the southern Levant. Experimental applications have shown that while dry sifting tends to recover a greater diversity of taxa, flotation generally recovers a greater overall quantity of seeds (Hageman and Goldstein 2009; C. White and Shelton 2014), therefore making data derived from either method complimentary rather than directly comparable (Wagner 1988, 29). Consequently, it is not unreasonable to expect a greater degree of biodiversity within macrobotanical assemblages from Egypt than in the southern Levant independently of regional foodways. To highlight potential biases, Appendix 1.2 summarizes the collection methods utilized within the study area under the column **Recov.** in addition to providing a field for the smallest reported mesh size (column **Mesh**). While the taxon-specific biases relevant to the former are discussed independently in chapters 4 and 5, the latter is immediately relevant since regardless of the recovery method, mesh size immediately dictates the types of remains that can be recovered (Wagner 1988, 20; P. Wright 2005, 21). These two variables provide the final necessary characterization to the dataset outlined in Section 3.2. Characterization is, however, not a solution unto itself. The pre- and post-depositional variables outlined over the course of this section only demonstrate that the collective data resists homogenization via simple, direct comparisons or unifying statistical methods. Consequently, it is necessary to propose an altogether new, hybrid method to delineate substantive differences in plant-based foodways in Egypt and the southern Levant.

3.5 Demonstrating Practice: Synthesizing Disparate Archaeobotanical Data

A meaningful comparison of plant-based foodways in Egypt and the southern Levant requires addressing the array of variables indicated in Appendix 1, which requires a novel methodology that treats these data as non-exhaustive—and at times quantitatively ambiguous—reflections of human-plant interaction. While this can in part be accomplished via the qualitative characterization of each assemblage, in this section I propose a semiquantitative method that addresses and emphasizes ambiguities within the data where they occur. In short, the method addresses the presence and absence of taxa through time and space, albeit by envisioning presence and absence as being demonstrable on a scalar level of certainty rather than as an absolute state within the data. Effectively, the intent is to demonstrate whether the absence of a taxon stems from a meaningful pattern rather than from one of the biases outlined in Appendix 1. By qualifying absence, it is possible to address the common imperative to avoid interpreting absence (Pearsall 2015, 389). This brings us closer to delineating plant-based foodways in Egypt and the Levant, thereby characterizing the expression of foodways at imperial Jaffa. Since the method is iterative, beginning with the base unit of analysis and progressing through several indices designed to weigh presence and absence, the first methodological issue centers on ensuring the comparability of raw counts across all assemblages.

The main issue is that the direct quantitative comparison of macrobotanical assemblages within and across Egypt and the southern Levant as an index for regional foodways implies that each assemblage constitutes and accurate reflection of human-plant interactions (see Popper 1988, 60; Hubbard and Clapham 1992, 117–18). As the diversity shown in Appendix 1 indicates, this assumption is untenable. Central to resolving this issue is defining what is perceived to be the target population about which we would like to draw conclusions based on our samples.[98] Direct comparison across regional datasets implies that our sites were sampled to reconstruct a hypothetical population of all plants at a site, and therefore our data constitutes the remnants of that plant population. In actuality, what has actually been sampled is a volume of space within that site, of which the preserved macrobotanical remains are parameters of a sample element rather than the sample itself (Banning 2000, 80).[99] While the distinction may seem pedantic, it is significant to the application of quantitative methods because our population can only be specified "relative to a space with a given volume of sediment, not relative to a (as yet unknown) population of artifacts or ecofacts" (Lee 2012, 650). If our target population is in fact all species characterizing the human-plant interaction sphere—as is implicit in the desire to reconstruct plant-based foodways in Egypt and the southern Levant—then the sample must first be addressed as a volumetric fraction of a constrained spatial population. While the sample characterization present in the summary Appendix 1 has already begun this process, it can be assisted further with several quantitative methods.

3.5.1 Data Structure

To compare macrobotanical assemblages across sites, it is necessary to restrict analysis to unitary macrobotanical elements of which no further divisibility is possible without reducing that unit to a fragmentary state. This includes elements such as caryopses, achenes, nuts, or seeds—all of

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[98] The term population is defined as "a set of all units (usually people, objects, transactions, or events) that we are interested in studying" (McClave and Sincich 2018, 33), following its traditional usage in statistics.

[99] When archaeologists sample a space for the recovery of artifacts and/or ecofacts they are conducting what is known as cluster sampling, wherein the objects found constitute observations about that sample. All excavations of sites comprise this sort of sampling in that by excavating a site, we concentrate on spatially or temporally restricted subsets of that site. Ideally, those subsets function as microcosms of the whole population of soil at the site with respect to the observations made available to the archaeologist. In other words, they ideally encompass almost all the variation we would see if we were to excavate the site in its entirety (Banning 2000, 80).

which can be used to calculate sample NISP without need of additional weighting.[100] Within this study, I use non-unitary fragments only for indicating presence-absence. I do, however, discuss all instances where high densities of fragments were recorded if their exclusion might otherwise skew interpretation. The NISP data for each site was transcribed into two tables (see Appendix 2) that form the basis for all succeeding calculations discussed in Section 3.5.2. In addition to NISP, these tables include several related variables that serve as parameters characterizing the NISP per sample. Some of the variables are adaptable from Appendix 1, whereas others are discussed here for the first time.

Within the downloadable file in Appendix 2, the table labeled "Samples" addresses individual samples, which are identified by several distinct criteria, with the column headers described here marked in bold—**Sample ID**, **Site**, geographic region (**Region**), excavation area within the site (**Area**), the locus number (**Locus**), stratum number (**Stratum**), chronological period (**Periodization**), sample volume in liters (**VolumeL**), and whether the sample in question is comprised of charred, desiccated, or is lumped between the two (**Char_Des**). The first quantitative variable is the total NISP of all taxa within the sample (**stNISP**). This is followed by the total NISP of all taxa recovered from that phase/stratum (**ptNISP**), which demonstrates the proportional skew exerted by specific samples within a total assemblage. The next variable is the number of individual taxa identified within the sample (**sNTaxa**), with different plant components of the same species equating with one taxon (e.g., barley grain and rachis).[101] This is

[100] A number of quantitative units have been proposed within archaeobotany (see Begler and Keatinge 1979, 213–14; Pozorski 1983; Pearsall 2015, 154–57), however, the use of non-fragmentary elements to calculate NISP is especially well suited for avoiding inflated proportions (see Marshall and Pilgram 1993).

[101] This figure includes all taxonomic identifications that were presented as separate entities in the original archaeobotanical report. While this might weight identifications to the species level the same as identifications to the family or genus level, there is a certain degree of suspension of doubt. If the archaeobotanist saw fit to separate the identification it is replicated within this study.

followed by the total number of taxa found in that phase/stratum (**pNTaxa**). The downloadable table "Phases" from Appendix 2, in contrast, addresses the macrobotanical assemblage at the phase level by showing the NISP for each recovered taxon. Most of the variables from "Samples" are replicated, albeit as aggregations of their corresponding samples. For "Phases," however, the **NISP** column of each taxon/botanical element is weighed against the total NISP for that phase/stratum (**tNISP**), thus providing its proportional value within the broader phase assemblage (**PropNISP**). This is then followed by the number of samples in which this taxon is present (**pNSamp**), which can then be directly compared with the total number of samples collected from this phase (**NSamp**). The final data table that bears mention is the master archaeobotanical catalog for all sites ("Master_Data", downloadable from Appendix 2), from which the NISP of individual taxa can be derived on a sample-by-sample basis. While this data is not directly used for calculations, it forms the basis for all data aggregation. With these three data tables in mind, it is now possible to transition to the methods by which they will be evaluated.[102]

3.5.2 Methods of Data Analysis

As previously noted, the method applied within this dissertation is iterative, beginning with relatively simple tabulations and progressing to more complex techniques (following Pearsall 2015, 148). At the simplest level are ratios, which in this study are confined to ratios where the numerator is included within the material represented by the denominator (see N. Miller 1988, 72). Their primary usage will be to indicate proportional values of the NISP of a single taxon within a total assemblage. Any instance where such proportions are compared across assemblages is always accompanied by qualifying information regarding the utility and possible

[102] These data were manipulated and analyzed using RStudio (RStudio Team 2015). In addition to the R computing language, data-cleaning and manipulation were assisted with the *plyr* and *dplyr* packages (Wickham 2011; Wickham et al. 2020). The full R-Markdown file is provided in Appendix 2 to enable readers to review all coding decisions.

pitfalls of the ratio in question.[103] Overall, ratios are used to discuss the composition of individual samples as well as indicate the degrees of presence for taxa within a site. To stretch this analysis to include the qualification of absence, it is necessary to shift to another type of metric—the measurement of taxa diversity.

While paleoethnobotany has developed several measurements to address sample biodiversity, their application has not been without dispute (see Lennstrom and Hastorf 1992, 210–23; Marston 2014, 168–69; Pearsall 2015, 159). Broadly speaking, however, the primary dispute has centered on whether diversity scores can assist functional interpretations of contexts (Lennstrom and Hastorf 1992, 223). This issue is of less concern here, as I do not apply diversity indices to interpret contexts, instead using them as a quantitative tool to characterize variable sample quality at both the site and regional level. Specifically, I apply two indices, each of which is ideally suited to address different facets of the dataset.

The first is known as the Index of Heterogeneity (IH), wherein the number of taxa in a sample are set as a proportion against the number of taxa in the overall site assemblage (Hubbard and Clapham 1992, 125).[104] The advantage of the method is its simplicity and bulk treatment of diversity in relation to the total site assemblage, quickly highlighting outlier samples. It does, however, fail to engage with NISP, meaning that sample size is a nonentity and rare taxa can skew the resulting index. To correct the issue of NISP, I adapt a second diversity index—the

[103] A single example shows the necessity of qualifying information. In the Late Bronze Age IIB levels of Area N at Beth Shean, free-threshing tetraploid wheat grains comprise 98.6% of the overall NISP. Behind this number are several quantitative and qualitative parameters of relevance. Quantitatively, both the taxon NISP (n = 139,341) and the overall NISP for Area N (n = 141,375) come from Appendix 2. The data can be further qualified with Appendix 1, as the phase-level assemblage stems almost exclusively from a single context—charred grain from a storage bin. While the NISP ratio is useful for discussing a single functional context within Area N, it is not representative of human-plant relations at the site and the ratio is not commensurate with one from another site unless the contextual considerations are identical.

[104] The IH for each sample can be seen in the "Samples" table of Appendix 2 under the **IH** column.

Shannon-Weaver Index (SW). The utility of SW is that it treats sample evenness by addressing the NISP of each taxon within a sample as it relates to the total NISP of the sample (Shannon and Weaver 1964; Marston 2014, 168–168).[105] The resulting formula is as follows:

$$H = -\Sigma(n_i/N) \cdot \log(n_i/N)$$

H represents the diversity score, which is equal to the negated summation of n_i (the NISP of each individual taxon) divided by N (the total NISP for the sample), multiplied by the logarithm of n_i divided by N (Lennstrom and Hastorf 1992, 210).[106] Much like IH, the maximum diversity score is related to the number of taxa present within the sample, however, the incorporation of individualized NISP counts per taxon means that the Shannon-Weaver index is especially sensitive to the presence of rare taxa—an aspect that in the past has been used to characterize its shortcomings (Marston 2014, 168–69) but in this study provides a useful counterpoint to IH.

In tandem, both methods address a major issue in the dataset—the comparison of studies that only analyzed a few high-density accumulations of macrobotanical remains with those that adopted more systematic collection procedures. For the former, sample NISP is often exorbitantly high due to the physical size of the collected sample, yet diversity is relatively low since collection strategies only addressed contexts of singular function (e.g., silos). Such samples require a diversity measure that is less sensitive to NISP. In contrast, in more systematic studies, the diversity of context types generally entails variable NISP values in each sample, and

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[105] The strength of SW in relation to NISP is the reason why other indices are not applied. Taxa richness, as advocated by E.P. Odum (1971), only accounts for total NISP alongside the number of taxa present in a sample and thus ignores individual species richness (Lennstrom and Hastorf 1992, 210). In contrast, Simpson's diversity index (Simpson 1949) utilizes the same variables as the Shannon-Weaver index and thereby accounts for evenness, but it calculates a diversity score against a theoretical range of zero diversity to infinite diversity instead of on the basis of diversity within the total assemblage (Marston 2014, 168–69). Given the variable qualities of the dataset used within this dissertation, this makes Simpson's diversity index inappropriate.

[106] The SW for each sample is calculated in the "Samples" table of Appendix 2 under the column **SW**.

therefore a method more sensitive to NISP is required. Collectively, the comparison of diversity measures is done with central tendency measures (e.g., mean) from which the overall standard deviation and coefficient of variation are calculated. Below, Table 1 offers a summary of these values across the complete dataset from both Egypt and the southern Levant. In practice, both diversity indices are highly contextual and therefore these regional numbers are of limited utility. They can, however, server a didactic purpose to explain the application of the method.

Region	Preservation	Samples	μ IH	SD IH	CV IH	μ SW	SD SW	CV SW
Levant	Charred	375	0.26	0.27	1.05	0.80	0.70	0.88
Egypt	Charred	114	0.49	0.31	0.63	1.59	0.60	0.38
	Desiccated	55	0.44	0.24	0.86	1.49	0.67	0.17
	Lumped	67	0.48	0.38	0.49	1.97	0.33	0.45

Table 1: Regional summary for both Egypt and the Levant of the mean (μ) IH and SW across all samples, including the standard deviation (SD) and coefficient of variation (CV) for each value.

In the case of IH, which occurs within a possible range of 0-1, if the mean (μ) value for a population is low then on average each sample accesses a limited proportion of the overall biodiversity expressed at a site.[107] Unlike IH, SW does not occur within a fixed range but rather as a value wherein $SW \geq 0$, with a higher SW indicating greater taxic diversity in a sample. SD and CV offer further characterization, with the former showing the extent of deviation from the mean and the latter the overall range of variation present. Simply put, the lower these two values are, the lower the overall variation among samples. Table 1 broadly shows that regardless of the mode of preservation or diversity measurement employed, samples from Egypt tend to have access to a greater overall proportion of site-level biodiversity in comparison to Levantine samples. Furthermore, the higher SD and CV values for Levantine samples indicate a

[107] This can happen for several reasons, like if one sample from a site is unusually diverse in comparison to others or if the sampling strategy examined a few contexts from different functional categories. For the latter, an example would be if only three samples were taken from a site: one from a grain-processing area, one from a storage jar containing desiccated fruit, and another from a store jar containing charred legumes. In this case, it is unlikely that the taxa from each context would overlap and therefore each sample would express a lower IH.

substantially greater degree of variation in sample diversity scores. This highlights that the bulk of detected biodiversity expressed in Levantine samples is heavily skewed by erratic samples with unusually high or low diversity in comparison to their fellows. Low mean diversity scores combined with high SD and CV values are strongly indicative that the sample population cannot be considered an adequate reflection of the overall human-plant relations that occurred at a site in the past—something which seems to be especially true of the Levant in comparison to Egypt. This is relatively unsurprising given the degree of biases shown in Appendix 1, which provides the explanatory qualifications that assist us in interpreting why such skewed diversity indices might occur.

Since it is impossible to know with certainty whether an excavation recovered a high proportion of the potentially recoverable taxa at a site, the use of diversity indices makes it possible to move inductively from their methods and results to infer the potential degree of exhaustiveness that was achieved. When combined with the qualitative information in Appendix 1, it is then possible to assess the degree to which absence from an assemblage can be regarded as a definite condition of antiquity rather than the product of sample bias. IH and SW can, however, be superfluous in the case of staple taxa that are only absent from a few contexts within a region. This is apparent in the discission of cereals in Chapter 4, where the total absence of any wheat species from a sample does not require the application of diversity indices to explain.[108] Instead, this method is at its greatest utility for examining rarer taxa, as will be seen in the discussion of bitter vetch in Chapter 5. Regardless, diversity indices perform best when applied

[108] For the sake of demonstrating the efficacy of the method, it is applied to the case of free-threshing tetraploid wheats at Levantine sites in Chapter 4 despite their absence being easily explained via Appendix 1.

to high-NISP samples, and therefore they require further assistance for rarer taxa that are only ever found as low-NISP components. For this, it is necessary to address spatial distribution.

The main means to integrate spatial distribution with quantitative archaeobotanical data is the measurement of ubiquity, which is the percentage of samples in which an individual taxon appears (Popper 1988, 60–61; Marston 2014, 206). Moreover, ubiquity standardizes samples with a weighting scheme that ignores NISP and sample size (Pearsall 2015, 160–61), and therefore can highlight taxa with low preservation probability that were used/encountered frequently in antiquity. In such cases, the attestation of a small quantity of examples across multiple contexts implies a higher frequency that would otherwise be missed. Conversely, when a high proportion of a taxon is found within a sample despite an overall lower ubiquity score, this indicates an extraordinary instance of preservation that merits further examination. The comparison of ubiquity values requires certain cautions, namely since ubiquity is inherently related to preservation biases and the soil volume sampled within an excavation (Kadane 1988). Additionally, splitting contexts into multiple samples or low sample numbers can dramatically inflate ubiquity scores. For the latter, an additional issue is that a small quantity of samples across functionally disparate contexts means that ubiquity measures of the use of space rather than offering insight into the relative importance of individual taxa (Popper 1988, 61–63). Consequently, in this study ubiquity will always be reported in conjunction with the total number of samples collected, and furthermore, regional comparisons using ubiquity are confined to phases in which five or more samples were collected.[109]

[109] Ubiquity is calculated in the “Phases” table of Appendix 2.

When applied individually, ratios, diversity indices, and ubiquity are limited. In tandem, however, they enable inter-site comparisons across quantitatively and qualitatively disparate datasets. The use of methods sensitive to NISP both locally and across the sitewide assemblages alongside methods that ignore NISP and homogenize counts using spatially based frequencies greatly enhances the selection of outlier samples and/or values. Taxa with high ubiquity but low density can be equally important within human-plant interaction as those that show up in high density deposits. In practice, presence can be discussed in terms of degrees of intensity, and absence can be characterized with respect to the probability that absence in an archaeobotanical table equates to true absence in antiquity. Even still, the values generated via these indices still require contextualization. This reflects a key point about this methodology—it is an exercise in inductive reasoning with the assistance of quantitative characterization, not a quantitative proof for explaining past human behavior.

As the qualitative data characterization and inductive application of quantitative methods shows, this dissertation is not a work in the deductive tradition of null hypothesis significance testing (NHST). Nor will such hypothesis testing be attempted, since disparity within the regional macrobotanical data from Egypt and the southern Levant renders any method that assumes inter-site statistical comparability unsuitable.[110] While the archaeobotanical dataset from this study is inherently quantitative in that it is derived from raw counts, it is necessary to

[110] Methods have been proposed to conduct large scale statistical comparison between archaeobotanical assemblages from different sites (e.g., Lee 2012; 2014), but these require both systematic collection procedures and the full reporting of certain parameters (e.g., soil sample volume) that are lacking in most reports (see Alexia Smith 2014). In many archaeological cases, statistical tools are often of limited utility given that their underlying assumptions are often at odds with archaeological data (W. Green 2009, 2; see also Quine 1961; Lakatos 1978).

treat it as semiquantitative data due to the unquantifiable biases present within it.[111] Instead, this work is better understood as exploratory data analysis (EDA), in that the goal is not to just simplify or summarize data, but to represent it in such a way as to allow for the appreciation of possible patterns (Green 2009, 5; after Tukey 1977). The notion of pattern searching is especially appropriate here, as EDA allows for the highlighting and examination of spatio-temporal trends (Marston 2014, 169) without proclaiming their definitive character. Consequently, this study follows a longstanding trend within general statistics—and more recently the social sciences—to avoid the rigidity of NHST-style methods in favor of conceptually simpler EDA techniques to engage complex datasets.[112] Overall, the primary effect is to characterize possible differences in the regional foodways of Egypt and the southern Levant, patterns which could be subject to NHST-type testing in the future as the data improves. Regardless, the semiquantitative methods currently stand as offering the most plausible means of supplying these types of social interpretations, which can then be tested against the imperial garrison at Jaffa.

3.6 Conclusions

This chapter has delineated the inherent difficulties of comparing large, regional archaeobotanical datasets, especially when such comparisons are meant to supply social interpretations regarding the presence or absence of a taxon from a given assemblage. After discussing the biases inherent to macrobotanical data, I proposed a semi-quantitative method to circumvent these issues and provide more meaningful comparisons of regional foodways without

[111] The term semiquantitative is adapted from its use in analytical chemistry, where it indicates numbers derived from uncalibrated instrument runs (Green 2009, 2). Fundamentally, the numbers associated with such data—while analytically useful—do not serve as standalone reflections of empirical truth.

[112] There has been a general movement in statistics towards the use of data visualization rather than complex multivariate statistical methods for the intuitive exploration of data (Anscombe 1973; H. Chernoff 1973; Tukey 1977; Wang 1978; Kleiner and Hartigan 1981; Cleveland 1989; Tufte 2001), which has been recently echoed in the social sciences and archaeology (W. Green 2009; Cowgill 2015).

overinterpreting the quantitative data. Taking the discussion outside of the realm of proof is not to detract from the utility of the current study.[113] With appropriate methods, the patterns visible within the data can be defended as reasonable indicators for past behaviors. Currently, this approach represents the most robust possible re-evaluation of the collective archaeobotanical data available from both the southern Levant and Egypt during the periods immediately before, during and after New Kingdom control. At the very least, it is the most robust re-evaluation possible without confining inquiry to the limited datasets generated through probabilistic sampling procedures. Instead, the following two chapters adapt the disparate data to articulate several propositions regarding regional plant-based foodways in Egypt and the southern Levant, and in turn offer insight into how extended cultural contact under the auspices of the New Kingdom empire might have impacted the expression of these behaviors at a site like Jaffa. Should we reach a point of sufficiently systematic data collection, the patterns proposed within this study could serve as initial hypotheses to be tested against the new dataset within an NHST-type framework. To a certain extent, all represent falsifiable propositions. However, until probabilistic macrobotanical sampling strategies become standard practice, the proposed patterns should be regarded as the inductive product of semiquantitative analysis rather than any statement of absolute truth. With these theoretical and methodological points aside, it is now possible transition to the case studies to which these methods are applied.

[113] There has been a tendency to refer to EDA techniques as simple statistics (e.g., Marston 2014), however this notion has been criticized as obfuscating not only how complicated certain techniques within EDA are, but also for the general implication that by being simple the techniques are somehow less robust (Farahani 2016).

Chapter 4 – Staple Cereals: Hybridity and Entanglement at Jaffa

Any discussion of plant-based foodways in either ancient Egypt or the southern Levant must begin with wheat and barley. Not only did they provide the foundational ingredients to most daily fare, but their production, harvest, processing, and culinary transformation occupied much of the waking hours for denizens of both regions (see Lang 2017). Because of their ubiquity, cereal-based foodstuffs have been argued to be central to the Egyptian and Levantine habitus. The Late Bronze Age inhabitants of the southern Levant have been referred to as the "wheat people of Canaan" (Frumin, Melamed, and Weiss 2019), and familiar varieties of bread and beer are hypothesized to have been central to garrison life for Egyptian personnel in the southern Levant (Pierce 2013).[114] The archaeobotanical data support this, with nearly every sample from either region containing at least one element—grains, crop waste, or accompanying weeds—related to cereals. Cereals are not, however, a generic, interchangeable staple. Wheat and barley varieties possess different qualities related to agricultural performance, culinary characteristics, and even the sensory profile of the finished product. Consequently, to speak of wheat and barley generically is to elide socially significant taskscapes, sensescapes, and technological systems from inquiry. But if we consider the relationship between different varieties and culturally significant systems of practice, then it is possible to delineate substantive differences in regional foodways in Egypt and the southern Levant. Moreover, when these differences are mapped onto the data from the Egyptian garrison at Jaffa, it is possible to gain a new appreciation of Egypto-Levantine interaction within garrison communities.

[114] The centrality of each to daily life is well attested within textual and artistic resources as well. For Egypt, this is especially true in New Kingdom sources (see Darby, Ghalioungui, and Grivetti 1977b, 2:463–75), where cereals played a major role in workmen's wages (e.g., Černý 1954), medicinal applications (e.g., Germer 2008), and culinary systems (see Samuel 1999b; 2000, 200; Murray 2000a). While the southern Levant offers less iconographic evidence, cereals are central to period taxation texts, as seen in the archive at Ugarit (e.g., Heltzer 1975).

Using the archaeobotanical dataset outlined in Chapter 3 and Appendix 1, I address the main cereal varieties cultivated in both regions: emmer wheat (Section 4.1.1), free-threshing tetraploid wheats (Section 4.1.2), bread wheats (Section 4.1.3), and barley (Section 4.2). Each section contains a discussion of the history of cultivation in each region, taxonomic issues related to archaeobotanical identification, agricultural/culinary/sensory characteristics, and finally, chronological and regional distribution. The first three points address regional distribution with respect to both potential data biases and the sense- and taskscapes that can be associated with each variety. Subsequently, I use chronological and regional distributions to demonstrate the manifestation of practices in both regions over the *longue durée*. This is followed by a discussion section wherein I bring these distributional patterns back to the realm of practice, exploring the potential significance of cereal-based foodways at Jaffa (Section 4.3). As will be shown, certain varieties of wheat constitute signature plants of Levantine and Egyptian foodways writ large, forming a firm boundary between the two regions. This boundary was, however, not maintained at Jaffa or in the southern Levant more generally, as garrison personnel, imperial troops, and colonial administrators consumed the same cereal varieties as their Levantine vassals. The result was a process and product substantively different from the staples of Egyptian foodways. Consequently, while it is possible to speak of bread and beer as being central to the Egyptian habitus, this non-negotiable element was in fact flexible in its satisfaction. Despite the lower overall labor requirements of Levantine cereals, the Egyptian encounter with these varieties was not sufficiently enthusiastic as to result in their adoption in Egypt after the imperial period. Instead, the entangled foodways formed during the Egypto-Levantine encounter remained altogether confined to the imperial periphery.

4.1 Wheat (*Triticum* sp.)

In this section, I discuss the varieties of wheat cultivated in the southern Levant and Egypt before, during, and after the period of the New Kingdom empire. While each variety is subject to independent discussion, there are several salient points common to the genus that directly affect the data from both regions. The main issue relates to taxonomy, as this is directly related not only to the archaeobotanical identification of ancient wheats but also the properties that can be ascribed to each variety. While ancient emic taxonomies in both Egypt and the southern Levant identify distinct varieties of wheat, none can be convincingly mapped onto modern categories (de Vartavan 1987; Murray 2000a, 512).[115] I therefore defer to modern taxonomic systems for all subsequent discussion. Archaeological identifications, however, are split between studies using a descriptive, Linnaean system and those that applied modern chromosomal taxonomy, resulting in a profusion of competing terms. Linnaean systems, which characteristically produce a greater number of species (see Ereshefsky 1994), recognize approximately 20 distinct species of wheat (Kislev 1984, 148) in contrast to the five from chromosomal taxonomy. Within this study, I use the chromosomal system as per convention (Zohary, Hopf, and Weiss 2012, 24), albeit with one exception—*Triticum turgidum* ssp. *parvicoccum* (see Section 4.2.2).[116] In practice, species

[115] While there is no distinction between cereals in Egyptian art (Murray 2000a, 512; though see already Erman 1885, 577), seven wheat varieties are noted within the ancient Egyptian lexical tradition (Gardiner 1947, 2:222; Darby, Ghalioungui, and Grivetti 1977b, 2:489) based on region of origin and color (Gardiner 1941, 28; Germer 2008, 66–67), and potentially even religious reasons (Gardiner 1941, 28; de Vartavan 1987; Murray 2000, 512). A similar profusion exists within ancient Semitic languages, wherein terms also cannot be associated with modern taxonomies. For instance, there is an ongoing debate over whether the Akkadian *burrum* was a species (Riehl et al. 2013, 126–27) or a stage in the processing of grain (Rattenborg 2016). Such distinctions were clearly meaningful in the ancient world, as when ancient Assyrian scribes saw fit to adapt the Anatolian *tabalattum* to indicate both a cereal variety and the type of beer associated with it (Dercksen 2007, 37). The reasoning behind their differentiation, however, remains elusive.

[116] The five chromosomal species comprise two diploid wheats (*Triticum monococcum* and *Triticum urartu*), two tetraploid wheats (*Triticum turgidum* and *Triticum timopheevi*), and one hexaploid wheat (*Triticum aestivum*). Of these, both diploid species and hulled hexaploid wheat were not cultivated in either Egypt or the southern Levant during the target period (Zohary, Hopf, and Weiss 2012, 23–24).

identified using descriptive taxonomy can be filed within the chromosomal system, and therefore major taxonomic disputes are immaterial to my comparison of cereal agriculture in Egypt and the southern Levant.[117]

Of the wheat species recognized by chromosomal taxonomy, only the tetraploid *Triticum turgidum* and hexaploid *Triticum aestivum* groups were cultivated in the study area during the target period (see n. 116). For the purposes of this study, however, ploidy groups are of less interest than the divisions within them. Each ploidy level comprises two species, a free-threshing and a hulled variety, and of the tetraploid and hexaploid varieties, all were cultivated in the study area except for hulled hexaploid wheat (Zohary, Hopf, and Weiss 2012, 50).[118] In the case free-threshing wheats, the structure of the ear is such that the rachis remain together with the glume and other chaff during threshing, immediately releasing grain from the ear and requiring only winnowing to separate the chaff from the freed grain (Nesbitt and Samuel 1996, 41; Zohary, Hopf, and Weiss 2012, 31). In contrast, for hulled wheats the tough glumes are firmly attached to the rachis, with this union surviving the act of threshing. Instead of freed grains, threshing only separates the spikelets that contain the grains, with the spikelets requiring further processing to free the grain (Nesbitt and Samuel 1996, 41; Zohary, Hopf, and Weiss 2012, 30).[119] Consequently, the selection of hulled or free-threshing grains affects the entire taskscape of

[117] The greater part of species separations within the descriptive system relate to grain morphometrics, the diagnostic character of which being subject to dispute (Kislev 1984; Hillman et al. 1996; Nesbitt and Samuel 1996).

[118] The common identification of hulled hexaploid spelt wheat—*Triticum aestivum* ssp. *spelta*—in Egyptian and Levantine cultivation is based on a translation error. The German terms *Spelzen* and *Spelzweizen*—which refer to hulled wheats in general—led to confusion regarding the variety in question, with the error being reproduced throughout secondary literature and translations of ancient texts (Darby, Ghalioungui, and Grivetti 1977, 2:490; Hillman 1984, 146; Germer 1986; M. Nesbitt and Samuel 1996, 76; Murray 2000, 513). It passed into technical literature (Kees 1961, 74), which further confused the issue. To date, all identifications of spelt outside of Europe are regarded as dubious (Nesbitt and Samuel 1996, 69).

[119] Grain must be freed from the spikelet, otherwise fibrous roughage would prevent nutrient absorption (Samuel 2000, 545) and have a negative culinary value (Miles, Kelsay, and Wong 1988; Schweizer and Würsch 1991).

cereal consumption, something which includes the accoutrement necessary for each stage as well as secondary products derived from the process—all of which were central to the choices made by ancient growers and consumers. Since the free-threshing or hulled status of archaeologically recovered wheat is distinguishable via macrobotanical remains, these elements can be used to delineate substantive differences between Egyptian and southern Levantine foodways.

4.1.1 Emmer Wheat (*Triticum turgidum* ssp. *dicoccum*)

This section discusses emmer wheat (*Triticum turgidum* ssp. *dicoccum*), hereafter emmer. It is a hulled, non-shattering species of tetraploid wheat that was subject to cultivation since at least the 10th millennium BP in the Levant, appearing in Egypt via Levantine vectors by at least the 7th millennium BP.[120] In the Levant, emmer was the dominant wheat species from the Neolithic through the Early Bronze Age (Zohary, Hopf, and Weiss 2012, 40), though by the Middle and especially Late Bronze Ages, free-threshing varieties came to dominance (Miller 1991; Zohary, Hopf, and Weiss 2012, 46–47). In Egypt, emmer remained the preeminent cultivated wheat from its introduction until the systematic transformation of Egyptian agriculture under the Ptolemies in the third century BCE (D. Crawford 1979; Nesbitt and Samuel 1996, 76–77; Berlin et al. 2003).[121] The Egyptian predilection for emmer is of major interest, therefore the specific characteristics of the variety merit scrutiny.

[120] One of the earliest founder crops of the Neolithic (Dennell 1973), emmer first appeared in the Levant as a cultivated domesticate during the 11th/10th millennia BP (Zohary, Hopf, and Weiss 2012, 42–43) and in Egypt by the 8th/7th millennium BP (Germer 1985, 212; Murray 2000, 511–12; Zohary, Hopf, and Weiss 2012, 44).

[121] Other varieties are reported from Egyptian sites (de Vartavan, Arakelyan, and Amorós 2010, 236–38, 241–45), but identifications are contested. Other hulled wheats such as *Triticum monococcum* (Einkorn wheat) could have been present as weeds within the cultivated assemblage (Murray 2000a, 513), something which their consistently low frequency and ubiquity suggests. Identifications of free-threshing wheats are more problematic, since despite initial assessments that all such identifications were dubious (e.g., Nesbitt and Samuel 1996, 76), more secure examples are now known (see section 4.1.1.1). The question now relates to whether intentional cultivation occurred.

As a hulled wheat, the threshing of emmer yields not freed grain but rather tough spikelets that require further processing to free the grain (Murray 2000a, 527; Samuel 2000, 545; Zohary, Hopf, and Weiss 2012, 24).[122] Rather than freeing the grain immediately, spikelets were stored and processed as needed.[123] To remove the grain from the spikelet required pounding (Hillman 1984b, 135–36; Bower 1992, 238; Meurers-Balke and Lüning 1992, 352; Nesbitt and Samuel 1996, 51), only after which could the grain be milled or cooked.[124] That pounding played a central role in the processing of emmer is well attested in New Kingdom Egypt especially, with mortars closely corresponding to querns within domestic emplacements.[125] Processing emmer was labor intensive, with the movement from stored commodity to comestible requiring approximately 50% more time and a great deal more exertion than would have been the case for

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[122] The notion that ancient Egyptian emmer was easier to process than emmer elsewhere (e.g., Sallares 1991, 370–72) has been rejected as having no botanical basis (Nesbitt and Samuel 1996, 76).

[123] There is extensive evidence for the storage of spikelets in Egypt. Depictions of spikelet processing are not known from harvest scenes, suggesting that it occurred in a separate sphere from initial harvesting (Harpur 1987, 158). Other evidence includes the presence of emmer spikelets in granary models to represent stored grain, a practice evidenced from the Middle Kingdom through the New Kingdom (Hepper 1990, 54, 66; Nesbitt and Samuel 1996, 50; Murray 2000a, 527). Also, sacks filled with emmer spikelets were discovered in Tutankhamun's tomb (Hepper 1990, 53–54). Direct evidence comes from Amarna, where multiple excavation areas have yielded domestic contexts with extensive deposits of emmer chaff (Stevens and Clapham 2010; Clapham and Stevens 2012). Given that the residential areas at Amarna are nearly two kilometers from the area where cultivation—and presumably threshing—took place, it seems reasonable that emmer was stored in spikelet form at the domestic level. Additionally, the practice is known ethnographically from around the Mediterranean (Nesbitt and Samuel 1996, 50–51).

[124] Grain could be have been freed by milling, but experiments have shown that this results in an inferior product saturated with indigestible chaff fragments (Beranová 1986, 323; Meurers-Balke and Lüning 1992, 350). Additionally, the common assumption that emmer required parching is incorrect (see Nesbitt and Samuel 1996, 42–48). Experiments have shown it to be unnecessary to free the grain (Meurers-Balke and Lüning 1992, 341–42; Nesbitt and Samuel 1996, 48), with the origin of the idea seemingly being from Pliny's note in his *Natural History* that emmer is roasted and then pounded to free the grain in Etruria (18.23). Ethnographic literature has shown that heat is used to process emmer for other reasons, including removing the awns (Peña-Chocarro 1996, 139), drying unripe grains, hardening grains in anticipation of grinding, and to prepare malt for brewing (Fenton 1978, 37). It was therefore not necessary for removing the grains from the spikelet, though it may have played a role in processing.

[125] While early excavations at Amarna noted the common presence of mortars in food preparation areas (Peet and Woolley 1923, I:64–65), modern excavations have recovered thousands of elements of emmer chaff in the vicinity of such mortar emplacements (Clapham and Stevens 2012, 29–32), clinching the association.

free-threshing wheats.[126] Once freed from the spikelet, however, emmer was processed no differently than its free-threshing counterparts, though culinarily it would have behaved differently due to several aspects of emmer grain composition.

While it is difficult to generalize about the composition of ancient grains, aspects of spikelet and grain morphology between ancient and modern emmer variants renders certain equivalencies safer (Hillman et al. 1996, 179) and make it possible to assess the performance characteristics of ancient emmer.[127] Revisiting a point made in Chapter 2, the desire is not to argue how ancient peoples experienced their food, but to use modern sensory studies to delineate that appreciable differences existed between cultivated wheats. First, emmer has a higher crude protein content than the other varieties discussed within this dissertation, a nutritional characteristic that directly links to feelings of fullness after consumption.[128] Even more important is the gluten content of the grain, as this gives dough its viscoelastic properties and therefore dictates dough consistency and the overall density of cooked bread (Shewry et al. 2002). Of the varieties of wheat discussed in this dissertation, emmer has the lowest glutenin

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[126] Elizabeth Lang estimated that 2.4 liters if emmer—a plausible ration for a family of five (husband, wife, two children, and husband's mother)—would have required 5.25 hours of labor: 0.5 hours of cleaning spikelets, 1 hour of pounding, 1.25 hours of winnowing/sieving, 2 hours of grinding and 1.5 hours for dough preparation and baking. Lang also allots a possible 3 hours of drying should water be used in the pounding phase (Lang 2017, 182, Table 4.4). Free-threshing wheats would have lacked the first three steps, as these would have occurred during the harvest.

[127] Regarding intraspecies variation within emmer, studies have shown that samples of emmer collected from different regions can exhibit different growth characteristics (M. Davies and Hillman 1988). Given the relationship between growth characteristics and grain production—e.g., as with differing rates of senescence (Adu et al. 2011)—emmer should broadly be understood as being heterogenous. This applies especially to the protein content of grains, which are dictated by approximately one-third genetic factors and two-thirds environmental (Shewry 2009, 1541). This lends something like a terroir to various landraces of emmer (Kissing Kucek et al. 2017). For the term performance characteristics, I am referring the "interaction specific capabilities" of any object utilized within a given activity (Michael Brian Schiffer and Skibo 1997, 30).

[128] Numerous studies have noted the consistently higher crude protein content in emmer in comparison to other species (Perrino et al. 1993; Arzani 2011, 346; Konvalina, Capouchová, and Stehno 2012, 346; Konvalina et al. 2013, 83). The relationship between crude protein and fullness has been demonstrated across a variety of demographic groups (Vandewater and Vickers 1996; Leidy et al. 2008; 2011; Gentile et al. 2015), though test group diversity has also been used as a cautionary note for treating the association as universal (Dhillon et al. 2016).

content, leaving it to be widely regarded in the modern world as an exceptionally poor wheat for baking.[129] Though modern qualitative assessments of emmer performance do not shed light on ancient emic understandings, the production and consumption of emmer bread would have possessed appreciable differences from other varieties of wheat. Emmer dough would have been of low elasticity and high extensibility (Geisslitz et al. 2018, 205), which in turn would have produced a much denser loaf of bread (Arzani 2011, 74). The culinary preparation of emmer therefore had its own constellation of practices, sequential operations, material accoutrement, and even bodily logics in comparison to other varieties of wheat available to ancient consumers. Returning to the vocabulary of Chapter 2, emmer bread required its own chain of socialized learning to account for its unique culinary characteristics, and furthermore, the finished product would have fit within a particular understanding of cuisine that centered around the sensory characteristics of emmer. In short, reliance upon emmer affected the entire habitus of food, and therefore its distribution in Egypt and the southern Levant is crucial for understanding regional foodways.

4.1.1.1 The Distribution of Emmer in Egypt

The distribution of emmer in Egypt—summarized in Appendix 3.1—is discussed within this section, including any peculiarities or uncertainties within the data. As discussed in Chapter 3, these data are considered across several metrics, notably the proportion within an assemblage or sample as well as the overall ubiquity at a site. For any instances wherein a taxon is absent, this absence will be addressed with reference to the qualitative characterization of data in Appendix 1. As will be seen, explaining the absence of emmer from sites or samples from Egypt does not require the use of diversity indices as there is always a clear mitigating circumstance. With this

[129] Low gluten content for emmer has been shown across multiple studies (Wieser 2000; Konvalina et al. 2013).

in mind, I will first address some peculiarities with the data, and then move on to the distribution of emmer more generally.

The first data issue pertains to the assemblage from Memphis, where ubiquity measurements for emmer are adapted from figures where chaff and grain were combined in a single value (after Murray 2000b). Consequently, the proportional value of emmer within the assemblage is perhaps of more utility for its relative importance at that site. Another issue comes from the Grid 12 report for the Main City at Amarna, where it is not possible to calculate the exact proportion of emmer within the assemblage since high numbers of recovered taxa were recorded as abstract quantitative ranges rather than exact counts (Stevens and Clapham 2010, 427).[130] While this complicates the direct, quantitative use of the data, the qualitative picture is akin to that from other Egyptian sites. Fundamentally, emmer grain is always a relatively low proportion of the overall assemblage, generally falling under 10%.[131] This picture is unsurprising, considering that in all the Egyptian reports surveyed for this study the sites were abandoned rather than destroyed. Therefore, the entry of whole grains into the archaeological record would have been the product of incidental events, a direct contrast with the situation in the southern Levant (see Section 4.1.1.2).

The most accurate information for the distribution of emmer in Egypt comes from the distribution of emmer chaff. Given the multi-stage process necessary to separate emmer grains

[130] Quantities are broken up over four distinct categories, the smallest of which, "+", equates with 10-50 items, whereas the largest, "++++" with 500 or more items. Independently, the authors also used ranges (e.g., 10-25) and exact counts within rich samples (Stevens and Clapham 2010, 441). For the sake of the numeric transformations in Appendix 3.1, a conservative estimate was made by selecting the lowest possible number in the range.

[131] There are a few exceptions (see Appendix 3.1), though the most are phases from the Theban Road survey sites of Gebel Romaʿ, Wadi el-Hôl, and Gebel Qarn el-Gir, for which the entire phase NISP was extremely low. The only meaningful exceptions are the charred assemblage from Amarna Grid 12 and the desiccated assemblages from New Kingdom/Third Intermediate Period Gebel Romaʿ and Third Intermediate Gebel Qarn el-Gir.

from their chaff, as well as the Egyptian practice of storing emmer within its spikelet, emmer chaff is a major component of all Egyptian assemblages, comprising more than 10% of the total NISP of macrobotanical remains at 41 of 65 surveyed phases. Furthermore, for all phases wherein five or more samples were published (n = 16) emmer has a ubiquity value of 50% or greater (mean = 90.06%, SD = 10.44, CV = 0.12), though at 14 of these 16 phases it has a ubiquity value of 80% or greater. At the two sites where the ubiquity is under 80%, there are mitigating circumstances.[132] At Amara West (64.29% ubiquity), the number is adversely impacted because four of the 14 published samples had an NISP of zero. As for Tell el-Dabʿa, this is almost certainly due to the differential preservation possibilities of a Nile Delta site wherein waterlogged contexts make the recovery and taxonomic identification of macrobotanical remains difficult. Consequently, several contexts included elements that were not identifiable below the genus level of *Triticum*, all of which likely represent emmer (Thanheiser 2004).

In the few phases where emmer chaff or grain occupy a low proportion of the overall assemblage NISP (less than 5%), some explanatory notes can be offered. All the phase-level assemblages wherein emmer formed 0% of the overall assemblage come from the Theban Road Survey, and in each case the phase-level NISP was 6 or fewer across all taxa (see appendices 2 and 3.1). In the remaining cases where emmer is present but in low proportions, a few groups emerge. The first are those wherein the assemblage is dominated by weeds that accompany cereal cultivation, which includes Second Intermediate Period Tell el-Dabʿa and 12th/13th Dynasty Memphis Stratum VII. In the case of the former, more than 60% of the assemblage comes from seeds identified broadly to the *Poaceae* family or to the genera of *Lolium* or

[132] This excludes Middle Kingdom Umm Mawagir, where 115 samples were taken but were published as a lumped assemblage, making the calculation of ubiquity impossible (Cappers et al. 2014).

Trifolium, which apart from being incidentally harvested with cereal crops could have also been introduced into the archaeological record via animal dung (Thanheiser 2004). As for Memphis Stratum VII, more than three quarters of the assemblage is derived from five taxonomically broad genera, all of which could accompany either cereal production or serve as fodder: *Crypsis, Scirpus, Phalaris, Lolium*, and *Trifolium* (Murray 2000b). The other group showcasing a low proportional value for emmer are those sites where other cultivated crops were found in such abundance that emmer became proportionally suppressed within the assemblage. This applies to Tell Maskhuta Stratum 1, Umm Mawagir, and the desiccated assemblage from Middle Kingdom Gebel Romaʿ. In the case of all three, other crops were found in unusually high quantities (see Appendix 2). At Tell Maskhuta Stratum 1, the main components were barley as well as an unusually high NISP assemblage of nutlets from the genus *Cyperus*—potentially from the tiger nut (*Cyperus esculentus*).[133] Umm Mawagir had an unusually high NISP assemblage of barley and dates (*Phoenix dactylifera*), which together comprised almost 90% of the total assemblage. Finally, at Middle Kingdom Gebel Romaʿ, the desiccated assemblage contained more than 70% seeds from the sycamore fig (*Ficus sycomorus*), a common fruit at pharaonic-period sites.

Quite simply, there is no reason to assume any other variety of wheat was grown in Egypt before, during, or after the New Kingdom imperial period. In any case where emmer is absent or present in a low overall proportion, some mitigating factor provides an explanation. Furthermore, in none of those instances—or ever, for that matter—is it accompanied by substantial quantities of other wheat varieties. In the only instance where a large collection of macrobotanical elements related to a non-emmer variety were found in Egypt, 86 rachis nodes were identified as belonging to *Triticum turgidum* ssp. *durum* from the charred assemblage at New Kingdom Gebel

[133] More securely identified examples of tiger nut were found in Stratum 1 at Tell Maskhuta, albeit with a low NISP.

Qarn el-Gir. However, they were found alongside 2,695 rachis nodes from emmer (Cappers et al. 2007). Therefore, even if the identification is correct, it is well within the margin of incidental diversity within a field wherein only one variety is being intentionally cultivated. Similar criteria have been used to explain the consistent, low frequency of einkorn wheat in Egypt throughout all periods (Murray 2000a). Consequently, since nearly every Egyptian context produced emmer grain or chaff in substantial quantities and with a high ubiquity, there is little need for quantitative verification of the obvious. In short, there is no need to adapt diversity indices to qualify absence as there is no meaningful absence to qualify. In Egypt, foodways were built on a foundation of emmer. The *chaîne opératoire* that brought emmer from field to table and the sensory experience of emmer-based foodstuffs were integral to the Egyptian habitus.

4.1.1.2 The Distribution of Emmer in the Southern Levant

In contrast to the straightforward picture of emmer in Egypt, its distribution in the southern Levant—summarized in Appendix 3.2—is more complex. The two main issues are the low survival rate of diagnostic chaff and variable criteria used by specialists for archaeobotanical identification of emmer. For the former, Appendix 3.2 shows that of the emmer chaff was only identified in 6 of 52 surveyed phases in the southern Levant. Furthermore, in only two of those phases was it identified in tandem with emmer grain. Consequently, those identifications wherein less-diagnostic grain was identified as emmer without the more diagnostic chaff must be treated with caution. However, some specialists are more confident in making species-level identifications without chaff, resulting several sites where these identifications are made using more disputed criteria such as grain morphology.[134] Identification criteria have evolved

[134] Kislev argued for the systematic use of grain morphology as an identifying criterion for wheats (Kislev 1979, 1981). Consequently, his macrobotanical reports usually present several subdivisions between wheat varieties irrespective of the presence of chaff (e.g., (Kislev and Mahler-Slasky 2009 at Tel Aphek).

gradually, and it was not until relatively recently that confident separations within ploidy levels were possible (Hillman et al. 1996). Consequently, there have been cases where the revisiting of a dataset has resulted in the reassignment of taxa.[135] Even still, it is possible to say a few things with confidence.

First, the Middle Bronze Age coincides with the waning popularity of emmer in the southern Levant. Emmer was the wheat variety of choice at Middle Bronze Age IIA Tel Ifshar, where it was identified as the main component of a massed granary deposit in Stratum E with an NISP of 21,106 grains and 2,529 chaff elements—nearly three quarters of the total phase assemblage (M. Chernoff and Paley 1998).[136] The only other Middle Bronze Age site where it is attested as the primary wheat variety is at Middle Bronze Age Megiddo, where emmer grain and chaff comprise nearly a quarter of the total assemblage (NISP 85 of 347 elements), with the remainder mostly consisting of weed species associated with wheat cultivation and the generic classificatory scheme for unidentifiable cereal grains, "*cerealia*" (Borojevic 2006). Despite the smaller assemblage at Megiddo, there is no reason to assume other varieties of wheat were cultivated at the site during the Middle Bronze Age. At other sites, however, emmer was already subsidiary to free-threshing varieties, as indicated by its total absence from all Middle Bronze Age phases at Ashkelon, Manaḥat, and Tel Shiloh, and its marginal presence in comparison to free-threshing species at Area R of Beth Shean. Of the fully published assemblages, the chronologically latest phase where emmer might have been the primary cultivated variety of wheat is the Late Bronze Age IA Stratum X at Tel Batash, where a context that was more than

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[135] This is especially relevant for Tel Ifshar, since in an initial study wheat was never identified below the genus level (M. Chernoff 1988). In a subsequent study, the Middle Bronze Age *Triticum* examples were reidentified as emmer, and the Late Bronze Age examples as *Triticum turgidum* ssp. *parvicoccum* (M. Chernoff and Paley 1998).

[136] This is not reflected in Appendix 3.2 because wheat was not identified below the level of genus until the partial republication of Middle Bronze Age contexts in later work (see n. 135).

90% grains from the genus *Hordeum* also produced an NISP of 68 emmer grains—5.63% of the total assemblage. Even if these grains are not an incidental product of the barley harvest and represent intentional cultivation, by the Late Bronze Age emmer was relegated to a secondary status, confirming the often-noted observation that emmer wheat gradually faded from popularity through the second millennium BCE (Zohary, Hopf, and Weiss 2012, 40). The only possible exceptions to this are Tell es-Ṣafi/Gath and Tel Miqne/Ekron, where a recent, preliminary publication has indicated a near co-equal frequency of emmer with free-threshing varieties during the Late Bronze Age (Frumin, Melamed, and Weiss 2019), though the preliminary state of publication means that the full significance of this find is unclear.[137]

Emmer did not completely disappear from the landscape. In the 35 surveyed phases occurring between the Late Bronze Age IB and Iron Age I, well after the recognized transition to free-threshing wheat agriculture in the southern Levant, it still appears in 12 phases—albeit with a low NISP, low proportion within the assemblage, and/or low ubiquity (see Appendix 3.2). In fact, at sites where emmer is present in this period and more than five samples were taken, its ubiquity only equals or surpasses 20% on four occasions—the Late Bronze Age IB Stratum VIII at Tel Batash (21.43%), the Late Bronze Age IIB Stratum X-12 at Tel Aphek (80%), Iron Age I Deir ʿAllā (20%), and Iron Age I Megiddo (40%). In the case of Tel Batash, Tel Aphek, and Deir ʿAllā, the ubiquity belies a proportionally low NISP within the assemblage (less than 1%) that can be contrasted with an overwhelming NISP of free-threshing wheat varieties. Emmer seems to

[137] A few elements make the exact significance of the find unclear. First, the authors refer to free-threshing *T. parvicoccum* as "free-threshing emmer", to be contrasted with hulled emmer (*Triticum dicoccum*). Furthermore, grain fragments received a full taxonomic identification between the two wheat varieties. While absolute quantities are presented at the conclusion of the article, there is no distributional data to assist in determining whether emmer might have remained present at the site as an incidental accompaniment to other wheat varieties. If the bulk of the surveyed contexts are characterized by crop-processing waste rather than storage contexts, then the coequal frequency between the two varieties is much less significant. Moreover, no diagnostic chaff was recovered.

be an incidental presence among the intentionally cultivated free-threshing wheat crop. At Megiddo however, while it does form an appreciable proportion of the overall assemblage (6.99%, NISP 19 of 286), nearly a quarter of the assemblage stems from elements identified solely to the genus *Triticum* (NISP 66 of 286) with the remaining major components being weeds from the genera *Buglossoides/Echium* and species *Lolium rigidum*, both of which can reasonably be assumed to be the product of cereal crop waste. Given that the archaeobotanical report from Megiddo only rarely identifies wheat below the level of genus (Borojevic 2006), the exact significance of emmer in this phase is difficult to demonstrate. It does not change the picture of the relative rarity of emmer in the southern Levant by this point.

After the Late Bronze Age IA there is only one site with a high-NISP assemblage where emmer forms an appreciable proportion of the assemblage, and therefore it bears further attention. The context in question is a single pit from the Iron Age IB Stratum X-10 at Tel Aphek (Locus 1700), where emmer grains outnumber free-threshing tetraploid wheat grains 152 to 130, however there are some caveats to the identification. The only diagnostic chaff found in the pits were rachis fragments (NISP 69) and spikelet forks (NISP 59) from a free-threshing tetraploid wheat variety (Kislev and Mahler-Slasky 2009, 514). Furthermore, both wheat varieties are outnumbered by the grains of crop weeds such as canary grass (*Phalaris paradoxa*, NISP 181) and darnel grass (*Lolium temulentum*, NISP 479), plus 80 grains of barley. Consequently, the deposit is more indicative intermixed field conditions rather than the specific cultivation of emmer. Regardless of whether this last, late identification of emmer is meaningful, the picture remains relatively clear. In those cases where emmer is present after the Middle Bronze Age, it is most likely that it was incidental among the intentionally cultivated free-threshing tetraploids. This is rendered more likely by the frequent presence of a small proportion of emmer within assemblages characterized almost exclusively by free-threshing tetraploid grains.[138] Therefore, before, during, and after the period of Egyptian domination in the southern Levant, the intentional cultivation of emmer was rare or nonexistent. As will be seen in Section 4.1.1.1, there was instead a definitive preference for free-threshing wheats.

4.1.2 Free-Threshing Tetraploid Wheats (*Triticum turgidum ssp. turgidum*, *Triticum turgidum* ssp. *durum*, *Triticum turgidum* ssp. *turgidum* convar. *parvicoccum*)

In this section, I address the characteristics and distribution of free-threshing tetraploid wheats that were exploited in the periods before, during, and after the period of the New Kingdom. Some form of free-threshing tetraploid wheat had been exploited in the southern Levant beginning by the 10th millennium BP at the latest, after which it coexisted with emmer until it became the wheat crop of choice. This contrasts with the situation in Egypt, where it was not purposefully cultivated prior to the Ptolemaic period (see Section 4.1.1).[139] While this contrast seems relatively straightforward, from an archaeological standpoint the nature of free-threshing tetraploid wheat exploitation is a complex issue, since within both archaeobotany and modern botanical taxonomy there are a profusion of taxonomic principles for the separation of varieties, differing nomenclature, disputes over diagnostic characteristics, and finally—and perhaps most importantly—the thorny issue of separating free-threshing wheats at the ploidy level. This has

[138] For example, at both Tel Batash Stratum VIII (Late Bronze Age IB), where there are 43 grains of emmer to 23,143 of free-threshing tetraploid wheat (Kislev, Melamed, and Langsam 2006), and at Beth Shean in Area R (Late Bronze Age IIA), where there are 30 grains of emmer to 35,408 of free-threshing tetraploid wheat (Simchoni, Kislev, and Melamed 2007).

[139] Free-threshing tetraploid wheats developed under cultivation from their immediate evolutionary predecessor, hulled emmer wheat (Zohary, Hopf, and Weiss 2012, 40–41). The earliest attestation in the Levant is at Tell Aswad in Syria (10,200-9,550 cal BP) (van Zeist and Bakker-Heeres 1985), which is joined by later finds from Tell Bouqras, Syria (9,450-8,600 cal BP) (van Zeist and Waterbolk-van Rooijen 1985).

directly impacted the dataset for this dissertation in that several taxonomic schemata have been applied among the surveyed archaeobotanical reports.

The issue of nomenclature was already addressed in Section 4.1, and as previously noted I utilize the chromosomal system within this dissertation. In the case of free-threshing tetraploid wheats, however, there has been a greater application of descriptive taxonomy, which in turn has produced a profusion of varieties within archaeobotanical catalogs (Nesbitt and Samuel 1996, 57; Hillman et al. 1996, 197; Hillman 2001, 28). Many of these initial identifications were based on criteria no longer considered to be diagnostic, with grain morphology and shape being especially controversial (Nesbitt and Samuel 1996, 55).[140] The most effective means for differentiation has been the study of diagnostic components of wheat chaff, which—unfortunately for free-threshing wheats—have a lower probability of preservation than grains (Hillman et al. 1996, 202; Nesbitt and Samuel 1996, 57; Hillman 2001, 30; Nesbitt 2001, 42; Zohary, Hopf, and Weiss 2012, 32). Thankfully, in the more general case of separating free-threshing wheats from emmer, the resiliency of emmer chaff and the tendency to store emmer in spikelet form renders differentiation at this level relatively straightforward. The main issue comes when it is necessary to separate within free-threshing wheats at the ploidy level, which cannot be done without the recovery of chaff (see Hillman et al. 1996; Nesbitt 2001, 43). The issue is sufficiently complex that some specialists have argued that such divisions should not be

[140] Several issues complicate the use of grain morphology in determining species. First, the position of the grain within the spikelet affects both grain shape and size, producing inter-assemblage variation (Kislev 1984, 141). Second, there is significant variation in grain shape and size that occurs at a regional level, with localized strains of the same species, subspecies, and even variants exhibiting difference (Hillman et al. 1996, 205; Maier 1996, 46). Moreover, charring—the main mode of grain preservation in the southern Levant—distorts both the size and shape of the grain (Ferrio et al. 2004). This is further confounded by the extreme genetic heterogeneity among ancient free-threshing tetraploid wheats that also would have affected grain morphometrics. This heterogeneity is related to the initial conditions of domestication (Allaby, Banerjee, and Brown 1999; T. Brown et al. 2009; Civáň, Ivaničová, and Brown 2013) and was such that even within individual fields, hybridity, migrants, and genetic drift would have ensured that diversity and variation remained the norm (M. Feldman and Kislev 2007).

made within ancient material, but rather all free-threshing wheats should be lumped together (Hillman et al. 1996, 198–99; Nesbitt 2001, 43).[141] Since the archaeobotanical reports that form the data of this dissertation commit to narrower identifications, however, it is necessary to comment on these subdivisions.

Archaeological identifications of free-threshing tetraploid wheat have centered around three types: *Triticum turgidum* ssp. *turgidum* (hereafter, rivet wheat), *Triticum turgidum* ssp. *durum* (hereafter, durum wheat), and *Triticum turgidum* ssp. *turgidum* convar. *parvicoccum* (hereafter, *T. parvicoccum*). The first two correspond directly with modern and early modern cultivated species, whereas *T. parvicoccum* was proposed by Mordechai Kislev to be an extinct species of free-threshing tetraploid wheat on the basis of its shorter grain and dense ear (Kislev 1979; 1981; 1984), though the identification is not without controversy (Hillman 2001, 30; Nesbitt 2001, 43). Given Kislev's prominence within Levantine archaeobotany, however, the identification has continued in usage there and remains common to the current day. Regardless, these varieties almost certainly constitute interfertile convariants rather than distinct species, and therefore at this stage their archaeological distinction from one another is less important than their distinction from emmer.[142] As such, while they might be separated as distinct species within published reports, I treat them collectively. While such distinctions likely represent true variation that was present in the ancient world (see Hillman et al. 1996, 197; M. Feldman and Kislev 2007, 217), free-threshing tetraploid wheats are still united by several general characteristics.

[141] Many studies publish grains as *Triticum durum/aestivum*, using the Latin binomial structure to indicate a free-threshing wheat with no ploidy differentiation (Zohary, Hopf, and Weiss 2012, 32).

[142] Studies of modern accessions of rivet and durum wheat have shown they are taxonomically inseparable convariants of the same species and fully interfertile with all other tetraploid variants (Oliveira et al. 2012, 6).

The first obvious commonality relates to the structure of the ear, which is unified in all free-threshing wheats by papery, thin glumes that connect the grain to the tough rachis. Consequently, threshing breaks the glume while the spikelet remains intact, resulting in the single-stage separation of grain from chaff (Zohary, Hopf, and Weiss 2012, 40). But the grains themselves also share several composition characteristics. Notably, because of a gene transcription factor, grain from all free-threshing species possess a higher overall starch content than emmer, influencing its agricultural and culinary performance as well as the overall sensory profile of food products.[143] While free-threshing tetraploid wheats exhibit the same compositional variability and overall high protein content seen in emmer (Boyacioğlu and D'Appolonia 1994; Ames et al. 1999; Edwards et al. 2007), there is a notable difference from emmer with respect to the ratio between the proteins glutenin and gliadin. Where gluten affects dough elasticity, and consequently, dough performance during fermentation, gliadin is more related to dough viscosity and extensibility, with the ratio between them having a dramatic effect on both the process and product of breadmaking (Edwards et al. 2003). Specifically for free-threshing tetraploid wheats like durum, their evolutionary history has resulted in an increased glutenin to gliadin ratio, optimizing the viscoelastic properties of its dough for breadmaking (De Santis et al. 2017). Consequently, earlier strains of free-threshing wheats would have produced softer, stickier, more extensible dough with limited elasticity, affecting both the process of working the dough and the fermentation process (Boyacioğlu and D'Appolonia 1994; Edwards et

[143] Both wild emmer (*Triticum turgidum* ssp. *dicoccoides*) and most strains of domesticated emmer possess a NAC gene transcription factor (*NAM-B1*) that accelerates senescence, and consequently remobilizes micronutrients from the plant to the grain, resulting in approximately 30% higher protein, zinc, and iron content in the grain. In contrast, all tested strains of free-threshing tetraploid and hexaploid wheats carry a non-functioning version of that allele, resulting in a higher overall starch content (Uauy et al. 2006; M. Feldman and Kislev 2007, 212).

al. 2007).[144] The high gliadin-to-glutenin ratio would have resulted in unique physical properties that would have in turn influenced culinary practices and the sensory profile of the final product, which—when combined with the simpler processing requirements of free-threshing wheat—meant that foodways embracing free-threshing wheats would have had major differences compared to those in which staples were derived from emmer.

4.1.2.1 The Distribution of Free-Threshing Tetraploid Wheats in Egypt

With the substantive differences between free-threshing tetraploid wheats and emmer in mind, the variable distribution pattern of the former in Egypt and the southern Levant is striking. In Egypt, all free-threshing wheats are rare, and their identification is generally disputed. Of the proposed identifications from early archaeobotany in Egypt, only three of the publications were regarded as reliable after being revisited in the 1990s (Nesbitt and Samuel 1996, 76). Of these three, two antedate the development of more reliable taxonomic criteria—one by almost a century—and the third is unpublished (de Vartavan, Arakelyan, and Amorós 2010, 241–42). Since that review article, however, more recent publications have offered reliable identification of free-threshing wheats at several sites, though never in frequencies indicative of purposeful cultivation.

The first study was a multi-site survey, where free-threshing wheats were identified at Old Kingdom Giza with a ubiquity of 3.2%, at Middle Kingdom Memphis (20%), and New Kingdom Memphis (4.2%), though there was no attempt to subdivide between tetraploid and hexaploid free-threshing wheat—hence its rendering as *Triticum* cf. *durum/aestivum* type in the

[144] Small modifications to durum doughs can produce a dramatic effect on both process and product, resulting in breads like those made from modern bread wheats. For instance, reducing fermentation time can produce a higher volume loaf of bread (Sapirstein et al. 2007). Also the addition of a small quantity of salt to the dough reduces its stickiness, thereby making it easier to work (Boyacioğlu and D’Appolonia 1994, 26).

original archaeobotanical tables (see Appendix 4.1). In every sample where free-threshing wheats were recovered, however, the macrobotanical assemblage was overwhelmingly comprised of emmer, with the free-threshing wheat grains likely being incidental (Murray 2000b, 135). More recently, examples—notably of diagnostic chaff—were also recovered from several sites examined by the Theban Desert Road Survey (see Appendix 4.1). In all cases but two, free-threshing wheats have a low NISP in relation to emmer and therefore are likely an incidental element within the assemblage. The two cases, however, merit comment: the charred assemblage from New Kingdom Gebel Qarn el-Gir and the desiccated assemblage from New Kingdom/Third Intermediate Period Gebel Romaʿ. In the case of the former, 86 rachides from durum wheat were identified, comprising 3.0% of the overall assemblage. But this must be compared with the 2,695 emmer rachides within the same assemblage—93.9% of the total assemblage. For the latter site, 18 rachis nodes from durum were identified, comprising 2.2% of the overall assemblage. Yet as with Gebel Qarn el-Gir, this can be contrasted with 140 grains and 574 rachis nodes identified as being from emmer, collectively more than three quarters of the assemblage.

Therefore, there is no reason to assume that these sites and phases constitute a breach of the pattern outlined above in the discussion of emmer. All free-threshing wheat varieties recovered from Egypt can be explained as incidental components of the overall assemblage; they were not independently cultivated. Since every example wherein free-threshing wheat was found can be contrasted with an overwhelming quantity of emmer, and likewise since every phase in which it is absent exhibits emmer in abundance, there is no need to use diversity indices to qualify the absence of free-threshing wheat. It simply was not present in ancient Egypt in any appreciable quantity. The archaeobotanical record therefore reflects the image derived from historical texts. Purposeful cultivation of free-threshing wheat in Egypt was rare or non-existent until its forced introduction under the Ptolemies, after which these varieties came to dominate Egyptian agriculture (D. Crawford 1979; Berlin et al. 2003; Cappers 2016).

4.1.2.2 The Distribution of Free-Threshing Tetraploid Wheats in the Southern Levant

The distribution of free-threshing tetraploid wheat in the southern Levant is far clearer. As can be seen in Appendix 4.2, they are attested at 33 of 52 phases in some quantity. Given the common assertion that free-threshing wheats grew to prominence in the southern Levant during the second millennium BCE, levels in which they are either absent or present with a low NISP require close examination. With respect to the 19 phases from which they completely absent, several are immediately explainable. First, seven are from Tel Ifshar, in which the original report did not attempt to identify wheat below the level of genus. In those subsequent reports where the identification was refined to emmer, it was only for Middle Bronze Age IIA contexts and no other contexts were revisited (M. Chernoff and Paley 1998). Another group are those phases with an unusually low NISP or low species diversity, comprising a further eight sites.[145] Of the remaining four sites, both Middle Bronze Age IIB/C and Iron Age I Megiddo had emmer as the dominant recovered wheat variety (see Section 4.1.1.2), whereas Late Bronze Age IIB and Late Bronze Age III/Iron Age I ʿUmayri seem to have bread wheat (*Triticum aestivum*) as their dominant variety (see Section 4.2.2).

Consequently, at all Levantine sites where free-threshing tetraploid wheats are completely absent, there is either no identifiable wheat or an alternative variety present—either

[145] This includes Middle Bronze Age IIB/C Stratum VIII at Tel Shiloh (NISP = 6, only olive and pomegranate attested), Late Bronze Age IA Stratum R-2 at Beth Shean (NISP = 6, all fig), Late Bronze Age IA Megiddo (NISP = 29, with only *Phalaris paradoxa* and olive identified to the level of species), Late Bronze Age IIA Stratum R-1b at Beth Shean (NISP = 55, all fig), the Late Bronze Age IIB Ashdod Beach Site (NISP = 18,568, but more than 99% grape elements), Late Bronze Age III/Iron Age I Megiddo (NISP = 22, of which 12 are identified to the genus *Triticum*), Iron Age I Deir ʿAllā (NISP = 71, only barley), and Iron Age I ʿUmayri (NISP = 57, of which 41 are identified to the genus *Triticum*).

hulled tetraploid (i.e., emmer) or free-threshing hexaploid (i.e., bread wheat) wheats. This also applies to those phases where free-threshing tetraploid wheats are present in proportionally low quantities (<5%).[146] For the remaining sites/phases wherein free-threshing tetraploid wheats are absent or rare, all except one are comprised of assemblages that were composed almost exclusively of one or two species from enormous seed caches.[147] If anything, the continued presence of free-threshing tetraploid wheats in these near-pure deposits offers testimony to its ubiquity in antiquity. The last stratum in question is Middle Bronze Age IIB/C Manaḥat, which produced and NISP of 9 free-threshing tetraploid wheat grains out of an assemblage of 411 objects (2.19%), a curious situation within a relatively small but surprisingly diverse sample.[148] That they are surpassed in proportion by so many exploited species as well as a common cereal weed is extremely unusual, especially given that no single taxon is truly dominant within the assemblage. However, it remains the sole attested wheat variety, which suggests that the low frequency is from an intervening bias rather than the preference for some other wheat.

Period	Preservation	µ IH	SD IH	CV IH	µ SW	SD SW	CV SW	n
MB IIA	Charred	0.21	0.20	0.98	1.00	0.68	0.68	81
MB IIB/C	Charred	0.19	0.26	1.41	0.64	0.57	0.89	20
LB IA	Charred	0.31	0.30	0.99	0.49	0.38	0.77	8
LB IB	Charred	0.33	0.45	1.38	0.16	0.22	1.37	4
LB IIA	Charred	0.57	0.41	0.72	1.08	0.78	0.72	4

[146] This applies to five strata: Late Bronze Age IA Stratum X at Tel Batash (NISP = 3, 0.25%), Late Bronze Age IIB Deir ʿAllā (NISP = 963, 2.42%), Late Bronze Age IIB Stratum V at Deir el-Balaḥ (NISP = 21, 1.47%), Late Bronze Age IIB Stratum VIB at Tel Batash (NISP = 18, 1.16%), and Iron Age I Stratum S-3a at Beth Shean (NISP = 1, 0.0001%).

[147] For the Late Bronze Age IIB levels, Deir ʿAllā produced an assemblage composed almost exclusively of barley (NISP = 34,346, 86.30%) and the common cereal weed *Lolium temulentum* (NISP = 4,182, 10.51%), and Deir el-Balaḥ also produced an assemblage that was almost exclusively barley (NISP = 1,400, 98.18%). Tel Batash Stratum VIB on the other hand produced an unusual find in the form of an enormous cache of fenugreek (*Trigonella foenum-graecum*, NISP = 1500, 96.59%). Finally, from the early Iron Age I, Stratum S-3a at Beth Shean contained several enormous caches of nearly pure flaxseed (*Linum usitatissumum*, NISP = 621,800, 99.34%).

[148] The samples also produced grape elements (NISP = 126, 30.66%), olive pits (NISP = 75, 18.25%), barley grains (NISP = 59, 14.36%), weeds from the genus Lolium (NISP = 49, 11.92%), and, somewhat uniquely, a large collection of seeds from the terebinth tree (*Pistacia palaestina*, NISP = 20, 4.87%).

Period	Preservation	μ IH	SD IH	CV IH	μ SW	SD SW	CV SW	n
LB IIB	Charred	0.25	0.28	1.12	0.40	0.55	1.36	26
LB III/IR I	Charred	0.11	0.16	1.45	0.76	0.68	0.89	40
IR I	Charred	0.34	0.32	0.94	0.66	0.63	0.96	29

Table 2: Summary breakdown of the Index of Heterogeneity (IH) and Shannon-Weaver Index of Diversity (SW) for Levantine samples lacking evidence for free-threshing tetraploid wheats.

As can be seen, the absence of free-threshing tetraploid wheats from any of the surveyed Levantine phases is explainable via the sorts of biases outlined in Appendix 1 or due to preference for an alternative variety of wheat. Diversity indices are unnecessary to qualifying their absence. In contrast to the discussion of emmer, however, the larger body of samples from Levantine sites that lack free-threshing tetraploid wheats provide an opportunity to demonstrate the efficacy of the diversity index method. Table 2 offers the mean (μ), standard deviation (SD), and coefficient of variation (CV) for both the index of heterogeneity (IH) and Shannon-Weaver Index (SW) for all samples from the southern Levant lacking free-threshing tetraploid wheat. With IH, apart from Late Bronze Age IIA levels, the samples lacking free-threshing tetraploid wheats have relatively low access to the overall diversity of the phase-level assemblage. That the Late Bronze Age IIA deviates from the pattern is unsurprising, since it comprised only four samples—three of which are from Tel Ifshar, an assemblage characterized by generally low taxic diversity due to the high number of identifications at the genus level. As a result, samples from this site tend towards a high IH. Despite the consistently low mean from each phase, the coefficient of variation for the IH values is high, generally close to or greater than one. Consequently, although samples lacking free-threshing tetraploid wheats generally had relatively low access to phase-level taxic diversity, they also lack consistent access to phase-level taxic diversity. The picture from SW is similar, albeit with more sensitivity to sample NISP. There is a relatively low mean SW, with the Late Bronze Age IIA yet again the exception for the same reasons as outlined above. This time, the same issue extends to the Middle Bronze Age IIA, again due to samples from Tel Ifshar. The fact that Middle Bronze Age IIA Tel Ifshar exhibits divergent diversity scores across the two methods is testimony to their tandem use, as the inordinately high NISP from this phase substantially elevated its SW value—something IH would not identify. With respect to the overall picture, while SW shows an improved coefficient of variation over IH, those periods showing a lower CV only indicate that each sample has consistently low access to phase-level taxic diversity. Consequently, even if we ignore the qualitative characterization of the assemblages wherein free-threshing tetraploid wheats are rare or absent, the diversity indices strongly indicate that biases are affecting the data. There is, therefore, no reason to assume the absence of free-threshing tetraploid wheats at any southern Levantine site during the target period is a direct reflection of the situation in antiquity unless another variety of wheat is dominant.

The most important consideration for the distribution of free-threshing tetraploid wheat in the southern Levant is the number of high-NISP caches that have been recovered, comprising direct evidence for its intensive cultivation (see Appendix 5.2), with 11 phases producing an NISP greater than 1,000. Furthermore, in the 33 phases in which it is found, it forms more than a quarter of the total assemblage in 15 of them, and for those sites in which it was present and more than five samples were taken, it has a ubiquity range of 22.2% - 100% (mean = 68.61%, SD = 27.70, CV = 0.40, n = 15), all of which are indicative of its status as a staple. Much like emmer in Egypt, free-threshing tetraploid wheats were clearly the primary cultivated variety in the Levant before, during, and after the New Kingdom occupation.

4.1.3 Bread Wheat (Triticum *aestivum*)

The place of bread wheat within either ancient Egyptian or southern Levantine wheat cultivation is poorly understood, as explicit identifications within archaeological literature are both rare and controversial. Bread wheats encompass all hexaploid wheats, and while hexaploid wheats include both hulled and free-threshing varieties, to date there have been no convincing identifications of hulled hexaploid wheats in either the broader ancient Near East or Egypt.[149] Therefore, bread wheat here explicitly refers to free-threshing hexaploid varieties (*Triticum aestivum* ssp. *aestivum*). Bread wheat likely first originated in the Caspian belt at around 8000-7000 BP (Dvorak et al. 1998), and its spread after domestication is unclear given the difficulty of taxonomically separating archaeological discoveries of free-threshing wheat to the ploidy level (Zohary, Hopf, and Weiss 2012, 51). Despite this, work is ongoing, with major strides having been made especially in European contexts where waterlogged sites have sufficient preservation of diagnostic chaff elements (Maier 1996). Lacking such modes of preservation, the situation in the southern Levant and Egypt is hazier. In the following discussion, I only separate bread wheat from free-threshing tetraploids wheats when sufficient criteria are offered in the original report, typically in the form of diagnostic chaff.

4.1.3.1 The Distribution of Bread Wheat in Egypt

There are no reliable, high-NISP identifications of bread wheat in Egypt prior to the period of Ptolemaic agricultural reform, when several new varieties of wheat were introduced to Egypt

[149] The earliest occurrences of hulled hexaploid wheats are mostly known from Neolithic Central Asia and Eastern Europe, which is likely the location of their domestication, though the issue is still hotly debated (Nesbitt 2001, 50–52). The most famous hulled hexaploid wheat, spelt (*Triticum aestivum* ssp. *spelta*), potentially originated in Bronze Age Europe and is not known to have been cultivated south of modern Greece (Zohary, Hopf, and Weiss 2012, 50). For the erroneous identification of spelt in the Levant and especially Egypt, see the discussion in n. 118.

(see Appendix 5.1).[150] In the case of free-threshing wheats recovered from Middle and New Kingdom Memphis (see Section 4.2.2.1), the identification was not differentiated at the ploidy level and therefore can only be said to refer to free-threshing wheat generally—hence their inclusion in Appendix 4.2. While the *T. aestivum/durum* label could technically indicate a bread wheat, the lack of diagnostic chaff to clinch the identification makes the more conservative association with free-threshing tetraploid wheats more attractive. A recent archaeobotanical study from the 18th Dynasty fortress site at Tell el-Borg in the northern Sinai, however, identified a small quantity of bread wheat in the charred assemblage as both grain (NISP = 1, 0.14% of the assemblage) and more diagnostic chaff (NISP = 16, 0.26% of the assemblage). There is no reason to doubt the identification, especially considering that it was made using multiple examples of chaff. Bu this must be weighed against the fact that this phase also produced 302 grains of emmer (4.82% of the assemblage) and 1448 elements of emmer chaff (23.10% of the assemblage), marking the presence of bread wheat as an incidental component of the expected emmer agricultural system (Malleson 2019). While the find is unusual, there remains no reason to assume that bread wheat was cultivated in Egypt during this period.

4.1.3.2 The Distribution of Bread Wheat in the Southern Levant

Much like Egypt, bread wheat is exceedingly rare in the southern Levant (see Appendix 5.2). A single chaff element is reported from Middle Bronze Age II/III Megiddo (Level F-13), the higher ubiquity level (16.7%) coming from the relatively few samples taken from this phase (Borojevic 2006, 534). In the Late Bronze Age IIB and Late Bronze Age III/Iron Age I assemblages from Deir ʿAllā, wheat was identified as free-threshing using the label *Triticum durum/aestivum*, and

[150] While several variants were introduced under a variety of names, most seem to have been tetraploid free-threshing wheats closely related to durum wheat. It has been proposed that at least one of them, the so-called "Syrian Wheat" referred to in various administrative documents, was a hexaploid *aestivum* variety (Berlin et al. 2003).

therefore it must be included in Appendix 5.2 as a possibility. The main phases of interest are those of ʿUmayri, which produced bread wheat in both the Late Bronze Age IIB assemblage (grain NISP = 5, 1.85% of the assemblage; chaff NISP = 32, 11.81% of the assemblage) and Late Bronze Age III/Iron Age I assemblage (grain NISP = 35, 5.04% of the overall assemblage). When compared with the distribution of other wheat species at the site, it seems that there is bread wheat cultivation alongside several other wheat varieties, with bread wheat actually forming the majority within the wheat assemblage (Ramsay and Mueller 2016, 17).[151] The authors do not comment on the diversity of wheat varieties at the site, but as there is no reason to challenge the identification it seems plausible that the inhabitants of ʿUmayri exploited multiple varieties of wheat, perhaps optimizing their agricultural system for combatting uncertainty. A similar situation may have persisted at Iron Age I Megiddo, which also presents securely identified bread wheat chaff alongside emmer cultivation, though it should be noted that in this case the assemblage is so small and fragmentary that its representativeness is unclear. Regardless, while these data are interesting, bread wheat cultivation was clearly rare in the southern Levant, and it may be better to consider it simply as free-threshing wheat cultivation until better data is available.

4.2 Barley (Hordeum vulgare)

Of all staple grains, barley has been undervalued in modern scholarship, to the point where it has been effectively dismissed as a human food outside of its role in beer production by scholars working on southern Levantine foodways (e.g., MacDonald 2008, 20–21). However, practices related to barley production, processing, and consumption are just as central to understanding the

[151] Included among the other wheat varieties attested in this level are emmer and *Triticum aestivo-compactum*, the latter of which being an identification that is rarely used in current literature where it is usually subsumed under the generic *aestivum/durum* designation. When used, it indicates a free-threshing hexaploid wheat, though Kislev has proposed that all examples of *Triticum aestivo-compactum* are in fact examples of his *T. parvicoccum* (Kislev 1979).

foodways in the Late Bronze Age as any other foodstuff, especially given the proposed centrality of beer for Egyptians at Levantine garrisons during the New Kingdom (Pierce 2013). My discussion of barley therefore has several main objectives. First, I address the centrality of barley to both Egyptian and Levantine foodways. This is then followed by an attempt to delineate if there are differences in normative practices with respect to barley cultivation, processing, or consumption patterns in either region that could then be mapped onto Jaffa to delineate socially significant behaviors. Consequently, the following section covers several topics, notably the taxonomic issues that hinder inquiry and the agricultural and culinary characteristics of barley (Section 4.3.1), as well as the distribution of cultivated varieties in Egypt (Section 4.3.2) and the southern Levant (Section 4.3.3). As will be shown, barley is less well understood in comparison to wheat for several reasons, but it is possible to demonstrate its centrality to the foodways of both regions and its potential for future study.

4.2.1 Barley: History, Taxonomy, and Characteristics

Along with wheat, barley was among the Neolithic founder crops, remaining one of the most significant cultivated grains throughout both Levantine and Egyptian history. In both regions it has been cultivated since the beginning of agriculture, from at least the 10th millennium BP in the Levant and the 7th millennium BP in Egypt.[152] The domestication process for barley is of interest to this study as its continued interfertility with its wild predecessor (*Hordeum vulgare* ssp. *spontaneum*), which grows in both Egypt and the southern Levant, means that the species

[152] In both Egypt and the southern Levant, barley was a dietary staple before domestication, with collection of its wild predecessor (*Hordeum vulgare* ssp. *spontaneum*) attested in Paleolithic contexts both regions. Includes the Epipaleolithic (c. 23,000 BP) site of Ohalo II in the Levant (Kislev, Nadel, and Carmi 1992) and several Late Paleolithic sites (18,300 – 17,000 BP) sites within Wadi Kubaniyya in Egypt (Wendorf et al. 1979). The cultivation of barley in the Levant is attested immediately alongside emmer at Middle Pre-pottery Neolithic B (10,200 – 9,550 BP) Tell Aswad in modern-day Syria (van Zeist and Bakker-Heeres 1985). Likewise, it is attested in basket granaries in the Neolithic (c. 5200 BCE) Fayum alongside emmer in Egypt (Wendrich and Cappers 2005).

exhibits a great deal of localized variation.[153] This contributed to the—conscious or unconscious—development of hyper-localized strains that in turn could be subjected to other selection pressures by growers to produce a variety desired properties (Zohary, Hopf, and Weiss 2012, 53). As a result, both ancient emic and modern botanical taxonomies for barley are complex, though biologically all can be classified as a single species. As was the case with ancient wheat taxonomies, it is impossible to map ancient varieties onto modern understandings of taxic diversity, though these categories clearly bore significance within ancient worldviews.[154] In the case of modern botanical taxonomy, however, there are several points of immediate relevance to the dataset from Egypt and the southern Levant.

In modern taxonomy, there are two major subdivisions of domesticated barley based on spikelet morphology: two-row barley (*Hordeum vulgare* ssp. *distichum*) and six-row barley

[153] Wild barley still grows throughout the Levant in a variety of environments (Zohary, Hopf, and Weiss 2012, 54), including adjacent to modern cultivation (Hübner et al. 2012). In Egypt, significant environmental modification has dramatically reduced the distribution of wild barley, however it still exists in isolated, protected environments (Nabil El Hadidi et al. 1986). The interfertility of wild and domesticated barley ensures a high degree of gene flow and introgression (Hübner et al. 2012). The recent genetic evidence for polycentric domestication (Poets et al. 2015; Allaby 2015) suggests that the distribution of a spectrum of localized varieties throughout the ancient Levant is plausible. These varieties would not have been altogether unrelated, and it is likely best to understand them as the expression of variable adaptive characteristics within larger ecogeographical groups (Knüpffer et al. 2003).

[154] In New Kingdom Egypt, there were as many as eight different terms for barley (de Vartavan 1987, 12). These were separated by geographic origin between upper and lower Egypt and grain color (Darby, Ghalioungui, and Grivetti 1977b, 2:480–81), with color specifically thought to contribute different functional properties within medical papyri (Germer 2008, 38). While color is part of normal intraspecific variation, it can be controlled through selection practices. In Ethiopia, the emic notion that black-grained barley has higher aridity tolerance in comparison to white-grained barley has resulted in a situation wherein black-grained barley is predominantly grown in arid regions. Whether or not this emic understanding has a true functional basis, human selective pressures have fundamentally borne out the original emic selection pattern and black- and white-grained barleys now can be associated with specific ecological niches. This pressure was so strong that in the course of surveying grain color variation, researchers found that the general emic preference for white-grained barley so heavily masked normal variation in grain color that it has become grossly overrepresented in Ethiopia in comparison to other regions (Demissie and Bjørnstad 1996). Consequently, while there is no true biological separation of barleys based on color, it is possible that human selective pressure in ancient Egypt created distinctions based on color. In the Levant, lexicographical variants of barley are complex though less well understood. An illustration of the issues can be seen in the possible translations for the Akkadian loanword *a/irġn* in the Ugaritic Hippiatric Texts. The word definitively refers to some sort of vegetal material, having been interpreted as either unripe date, fennel, a plant similar to cucumber, a conifer, a spice, a plant similar to milkweed, or finally, a high quality barley (W. Watson 2004, 242).

(*Hordeum vulgare* spp. *vulgare*).[155] In both variants, the ear consists of opposed triplets of spikelets stacked vertically. In the case of two-row barley, only the center spikelet is hermaphroditic and fertile, with the two flanking spikelets lacking both grains and awns. With six-row barley, however, all three spikelets are hermaphroditic, fertile, and bear awns, resulting in six rows of grain-producing spikelets, three to each side of the ear (Germer 1985, 207–9; Zohary, Hopf, and Weiss 2012, 52). An additional subdivision is between hulled and free-threshing varieties, with the latter designated through the convariant status *nudum*. Notably, it is possible to tell both two-row from six-row and hulled from free-threshing varieties using grain morphology (Zohary, Hopf, and Weiss 2012, 52–53)—though this level of classification is rarely attempted in the literature (see Appendix 2). As will be seen in the distributional discussion, subclassification has mostly been attempted in more recent studies, and therefore the differential distribution of each type will likely be a productive avenue for research in the future.

Each variety possessed different performance characteristics, with the division of hulled from free-threshing barley having the same processing requirements as the separation of emmer from free-threshing wheats.[156] The selection of two- versus six-row barley, however, is more complex, as the number of fertile rows is not simplistically related to grain yield. Both strains perform differently in different environments, thereby ensuring their simultaneous cultivation in

[155] The Latin binomial designations for 2- and 6-row barley bear mention due to their prevalent use within paleoethnobotanical literature. The former is *Hordeum distichum*, whereas the latter is *Hordeum hexastichum*. The common identification of ancient four-rowed barley—especially in Egyptian archaeology—is based on erroneous taxonomic separation of a lax-eared form of six-row barley, and no such variety existed (de Vartavan 1987, 11; Murray 2000a, 512). The designation for four-rowed barley—*Hordeum tetrastichon*—is mostly found in macrobotanical catalogs up until the first half of the 20th century, after which it was only repeated in synthetic studies (e.g., Darby, Ghalioungui, and Grivetti 1977b, 2:480; Germer 1985, 208–9).

[156] This includes storing hulled barley in spikelet form (Samuel 2000, 545).

geographically proximate but ecologically diverse regions.[157] This has been directly observed in Third Intermediate Period Egypt, where recent genetic studies of grain recovered from Napatan Qasr Ibrim in Lower Nubia (modern Egypt) indicate that its inhabitants preferred a variant of two-row barley, which can be contrasted with the Egyptian preference of six-row barley farther north (S. Palmer et al. 2009).[158] This opens the very real possibility that we should expect the proximal cooccurrence of different barley regimes, and therefore subtle differences in regional foodways. Interestingly, these agricultural characteristics also contribute into differences in final culinary product (Marklinder et al. 1996). The main compositional differences that lend barley different culinary properties do not necessarily fall across the distinction of two- and six-row barley, but rather can be the product of a host of different variables (Åman and Newman 1986, 135). What unifies all varieties, however, are high quantities of protein and starch (Newman and Newman 2008, 58). Barley protein lacks the characteristic gluten network of wheat, meaning that barley produces dense loaves of a distinct character (Hart et al. 1970). The high starch content is what makes barley ideal to produce beer. Starches are converted to sugars through malting, which involves the limited germination of grains, after which they are dried or cooked to

[157] Barley is well suited for arid environments, as the xeromorphic structure of its awns assist grain production when under heat stress. Barley awns are more active within photosynthesis, providing a much more resilient, water-conservative structure to assist in grain growth during periods of leaf stress (Grundbacher 1963; Evans and Wardlaw 1976, 327). Additionally, studies have confirmed the suitability of barley for reclaiming high-salinity soils, something which has been especially relevant in regions such as ancient Egypt that utilized basin irrigation practices (Tadros and Atta 1958; Noaman et al. 2011). The differential performance of both strains under these conditions has been shown in yield tests, with two-row barleys being much more stable when exposed to varying levels of dry conditions (Hadjichristodoulou 1990). This occurs because of compensatory growth patterns in two-row barley, wherein its lower numeric grain yield but larger average grain size make it less susceptible while under drought stress to difficulties in the reallocation of plant nutrients during grain production (Forster et al. 2004). The selective adaptation of two- and six-row barley in regions of close proximity has been observed for specifically this reason, with modern agricultural communities in Ethiopia selecting two-row barley in the more arid lowlands, whereas highland communities have adopted six-row variants in temperate environments (Demissie and Bjørnstad 1996).

[158] Interesting, the phylogeny of the two-row barley from Qasr Ibrim shows that it was developed under cultivation backwards from six-row barley, which was only possible through extreme—although not necessarily conscious—selective pressure (S. Palmer et al. 2009, 5).

immediately arrest growth.[159] The practice of malting has been confirmed at New Kingdom Amarna, where organic preservation was such that malted barley was recovered and that the tell-tale signs of malting are still visible in starch granules found adhering to ceramics (Samuel 2000, 548, 551–53). Consequently, when considering the role of barley in both Egypt and the Levant, it is necessary to consider it a multi-functional object, inextricably linked with human foodways either as a foodstuff in its own right, an important step in the production of a more complex foodstuff, or, as fodder for animals.

The multifunctionality of barley within ancient foodways has contributed to its devaluation as a component of human diets within modern scholarship, in that its function as fodder has led to the presumption that it was either a famine or poverty food (e.g., MacDonald 2008, 20–21; Zohary, Hopf, and Weiss 2012, 52). This notion was heavily influenced by classical and biblical texts, which has led to the creation of a false picture that human consumption of barley was somehow abnormal.[160] The temporal gap between these sources and the Late Bronze Age already merits caution with respect to their use, especially since New Kingdom Egyptian texts reveal that barley and wheat were equivalently priced (Janssen 1975, 129). Additionally, the archaeological record demonstrates that barley was regularly consumed, either as the base for beer, cooked in a porridge, or in barley bread (Samuel 2000). Consequently,

[159] By germinating the grain, the starchy endosperm is modified through the accumulation of hydrolytic enzymes. When the dried malt is mixed with warm water, these enzymes catalyze the hydrolysis of the starch, proteins, polysaccharides, and nucleic acids in the grain, which then produces sugars. The extract from this, called wort, is critical in the production of fermented food and drink, though it can also be consumed as a finished product. Finally, in addition to malt, the byproducts of the malting process can be recycled as livestock feed (Briggs 1978, 526–27).

[160] Perhaps the most frequently cited classical reference (e.g., Darby, Ghalioungui, and Grivetti 1977, 2:481) is Herodotus' reference to barley as being considered a disgraceful food in Egypt (II: 36), though much has also been made (e.g., MacDonald 2008, 21) of Josephus' reference from Roman Palestine in which the rich ate wheat bread while the poor ate barley bread (*War of the Jews*, 5.427). From the Bible, scholars have noted the use of wheat bread in offerings (e.g., Exodus 29:2) as opposed to barley, the description of barley as animal fodder (1 Kings 4:28), and references to prices wherein wheat flour is priced against barley flour in a ratio of 1:2 (e.g., 2 Kings 7:16) (*NRSV*, Coogan et al. 2007; MacDonald 2008, 20–21).

even if barley was viewed as inferior to wheat in some capacities, this cannot be used to say that it formed a negligible component of the human diet in either Egypt or the southern Levant. As will be seen in the distributional data, it formed an instrumental part of foodways in both regions, and therefore understanding its role in regional practice is instrumental to understanding the manifestation of foodways at New Kingdom Jaffa.

4.2.2 The Distribution of Barley in Egypt

Barley is sufficiently omnipresent at Egyptian sites that diversity measures and other quantitative qualifications are unnecessary (see Appendix 6.1). Barley grains or chaff are present in almost all sampled loci, though generally in proportions consistently lower than emmer. While the relatively lower proportion of barley within New Kingdom assemblages has been hypothesized in the past to represent a shift in agricultural practices after the Middle Kingdom wherein emmer cultivation was emphasized at the expense of barley, this assertion has been challenged (Cappers 2016). In truth, there is little difference in the relative abundance of barley between Middle Kingdom and New Kingdom sites (see Appendix 6.1). Unfortunately, none of the reports from Egypt differentiate between barley varieties, using only the designation *Hordeum vulgarum*. It is impossible, therefore, to know if different varieties of barley were being consumed at these sites. However, the case of nearby Qasr Ibrim mentioned previously, while from a slightly later period, offers a tantalizing hint that perhaps there was regional variety within Egyptian barley strains. Considering that Egyptian agriculture embraced several different ecologies it is certainly a possibility, but for the time being it must remain conjecture. What can be said with certainty though is that barley consumption, whether for food, beer, or fodder, was a constant feature of New Kingdom life.

4.2.3 The Distribution of Barley in the southern Levant

Much like Egypt, barley is omnipresent within the surveyed southern Levantine macrobotanical assemblages (see Appendix 6.2). One contrast is that barley chaff is rare in the southern Levant, being attested only in eight phases at five sites despite barley grains being present at 37 of 52 surveyed phases.[161] Whether this implies a specifically Levantine *chaîne opératoire* for barley processing that contrasts with that prevailing in Egypt is difficult to say, as it also could be a result of taphonomic processes or preservation bias. Regardless, it is unusual that multiple strata produced an NISP of more than 1,000 barley grains without evidence for barley chaff (see Appendix 6.2), including extraordinary deposits like the tens of thousands of charred barley grains from Deir ʻAlla (van Zeist and Bakker-Heeres 1973). This does not necessarily indicate the cultivation of free-threshing barley (convar. *nudum*) throughout the southern Levant. While free-threshing barley grains are attested in the region, they are rare even in those studies that offer barley identifications at the subspecies and convariant level.[162] Consequently, the few examples of free-threshing barley likely attest only to natural genetic variation within the species, thereby leaving the general rarity of barley chaff in southern Levantine contexts unexplained.

Few studies from the southern Levant subdivide barley identification below the level of *Hordeum vulgare*, and therefore discussing preferences for specific barley variants is tentative.

[161] Only Tel Aphek Stratum X-10 and Tel Shiloh Stratum V produced an NISP of greater than 100 chaff elements. At Tel Aphek, a grain storage pit that was used for either barley or wheat (Locus 1700) produced 122 elements of barley chaff. However, given the near equal quantity of chaff from *T. parvicoccum* (n = 128), it is unclear which was the primary species stored in the pit (Kislev and Mahler-Slasky 2009, 514). At Tel Shiloh Stratum V, a silo (Locus 1462) produced 403 elements of barley chaff alongside 2,218 elements of *T. parvicoccum* chaff.

[162] This can be seen at ʿUmayri, where the transitional Late Bronze Age to Iron Age I level had a single sample (no. 5) including 483 grains of two-row barley, 14 identified to the level of *Hordeum vulgare*, and three which were identified specifically as six-row free-threshing barley (*Hordeum vulgare* ssp. *vulgare* convar. *nudum*) (Ramsay and Mueller 2016, 17). A similar situation occurs at Deir el-Balaḥ, where a pit context containing more than 1,300 barley grains also included 20 that were identifiable as free-threshing (Kislev 2010).

There are a few examples where sufficient density of a single variety is attested that it can be safely argued that it was emphasized within local agriculture, such as at ʿUmayri, Beth Shean Area S Stratum S-3a, Tel Shiloh, and Deir ʿAlla—but of these only ʿUmayri offers the identification as part of a systematic collection strategy. The latter three come from extraordinary contexts, and consequently it is difficult to say if they are representative of unified practices across the entire site.[163] However, it should be noted that in all cases at Levantine sites where a specific variety of barley has been identified as forming the majority of the barley assemblage, it is always 2-row barley. Given that each site where it is recorded occupies a substantially different ecological niche, there is no simple explanation for the distribution. Until more sites produce high resolution identifications, the question of barley variation within the Levantine agricultural system will remain unanswered.

While the picture must remain tentative, there is one clear conclusion regarding the southern Levantine barley assemblage. At nearly every site in the southern Levant, irrespective of period, barley was a consistent presence alongside free-threshing tetraploid wheat. The only exception is Megiddo, as after the Middle Bronze Age II/III there is no barley attested in any of the samples (Borojevic 2006). Given that most of the samples from these levels at Megiddo are extremely poor in organic material, the situation likely stems from sampling and/or preservation issues rather than the reality of the situation in antiquity. For all other sites where barley occupies less than five percent of the overall macrobotanical assemblage, it is the result of extreme cases where a single, cached taxon has overwhelmed the relative proportion of all other taxa. Even in

[163] In the case of ʿUmayri, systematic sampling resulted in an overwhelming majority of two-row barley (Ramsay and Mueller 2016, 17). In contrast, at Beth Shean Area S Stratum S-3a, Tel Shiloh, and Deir ʿAlla, the results are from mass deposits of charred grain. At Beth Shean and Tel Shiloh they were found in storage contexts (Kislev 1993, 357; Kislev et al. 2009, 768), whereas in the case of Deir ʿAlla the samples come from two massed deposits of charred barley (van Zeist and Bakker-Heeres 1973, 21–22).

the case where both ubiquity and proportion are low—as at Tel Batash in all levels—it is because only a few extraordinary contexts were sampled.[164] Consequently, the exploitation of barley in the Levant was equally intense as it was Egypt. While we cannot yet make firm arguments about regionally specific practices, it cannot be sustained that barley formed a negligible component of Levantine foodways in the periods before, during, or after the New Kingdom empire.

4.4 Cereals and Practice at Jaffa

As the preceding discussion has made clear, the collective macrobotanical data from Egypt and the southern Levant reveals stable, distinct preferences at the level of regional foodways. In Egypt, foodways rested on the foundation of hulled emmer as the staple wheat crop, with emmer being classifiable as a signature food of Egyptian foodways over *la longue durée*. In contrast, free-threshing wheats fulfilled the same role in the southern Levant with only limited possible exceptions (see Section 4.1.1.2). The situation for barley is less clear due to the state of the data, with the only obvious distinction between the two regions being the near-total absence of barley chaff from southern Levantine macrobotanical assemblages—the significance of which remains ambiguous. The most that can be said of barley is that it was central to the foodways of both regions, and it likely formed a shared foundation of foodways in the imperial periphery. Consequently, in this section I will focus on the production and consumption of wheat at the Egyptian garrison of Jaffa as it relates to daily practice at the site, as wheat currently provides the greatest distinction between Egyptian and Levantine regional foodways as they pertain to cereals. After a discussion of the macrobotanical evidence for wheat at ancient Jaffa, I will shift from quantitative distribution to human experience, showing how even at a highly Egyptianized

[164] The case of Tell Batash is particularly demonstrative, as only two loci were sampled from the Late Bronze Age IIA. One, already discussed, is a single jar filled with charred wheat (Locus 437), the other is large cache of fenugreek seeds (Locus 466) (Kislev, Melamed, and Langsam 2006, 296).

center like Jaffa the processes and products of foodways were a hybridized manifestation of Egyptian and Levantine cultural practices.

The archaeobotanical assemblage from Jaffa, discussed in Section 3.2, is spread across three phases of a monumental gate complex dating to second half of the 12th century BCE—the final decades of Egyptian control at the site. All three phases exhibit an overwhelming majority of Egyptian-style ceramics (see Chapter 7), with the two phases that ended in violent destruction—phases RG-4a and RG-3a—also producing appreciable macrobotanical assemblages. The earliest, Phase RG-4a, produced an NISP of 32,545 elements across 61 taxa, which is followed by the small assemblage from Phase RG-3b with an NISP of 24 across 10 taxa, and finally Phase RG-3a with an NISP of 226 across 27 taxa. Given the robust sampling procedures at the site, the probable usage of the gate as a marketplace, and the high density of quotidian garbage found in the gate passageway (see Section 3.2 and Chapter 7), it is not unreasonable to assume that this material provides a robust snapshot of human-plant relations at the garrison. Consequently, it is notable that there is absolutely no indication that emmer was purposefully cultivated at Jaffa. Of the 113 samples taken from the destruction debris of the Phase RG-4a gate complex, 85 produced some evidence for free-threshing wheats (75.2% ubiquity), with free-threshing wheat grains forming 85.6% of the total assemblage (NISP 27,866). In contrast, emmer elements have a ubiquity of 7.1% and constitute a maximal 0.04% of the total assemblage.[165] While the other two assemblages are much smaller, the only attested wheats are free-threshing varieties.[166] There is, therefore, no evidence to suggest that emmer was

[165] The maximalist proportion includes 5 emmer spikelet forks, 3 glume bases, and 4 glume base fragments, and therefore assumes that each nonunitary fragment points towards one original object. Additionally, the assemblage contained a single rachis identified as coming from bread wheat.

[166] Five grains from free-threshing wheat were found from Phase RG-3b, with a ubiquity value of 33.3% (2 of 6 samples) and comprising 20.8% of the total assemblage NISP of 24. In the larger Phase RG-3a assemblage, 13

consumed in any capacity at the Egyptian garrison of Jaffa. Instead, the site adheres to the pattern seen throughout the southern Levant, with free-threshing wheat filling the role of staple dietary component.

Even though Jaffa is the first such Egyptian garrison site that has been subjected to systematic botanical sampling procedures, this result is not unexpected. Other garrisons with equally high frequencies of Egyptian-style ceramics such as Beth Shean, Deir el-Balaḥ, and Tel Aphek have all only produced evidence for free-threshing grain exploitation, albeit only from a limited number of dense accumulations within single contexts. Moreover, the few contemporary Levantine sites—namely Tell es-Ṣafi/Gath, Tel Miqne/Ekron, and possibly Megiddo (see Section 4.1.1.1)—that produced emmer in any quantity exhibit little to no evidence for Egyptian occupation (see Martin 2011b). At this point, there is a general consensus that some quantity of Egyptian imperial personnel were resident in the southern Levant as part of the imperial apparatus, either as administrators, scribes, soldiers, merchants, or some other form of garrison personnel (Killebrew 2005a; Morris 2005; Burke and Lords 2010; Martin 2011b; Pierce 2013; Fantalkin 2015; Streit 2019a; 2019b). Since the sites with the greatest body of evidence for direct occupation—Jaffa included—exhibit absolutely no evidence for emmer exploitation, this aspect of Egyptian foodways clearly does not correlate with the presence of Egyptians in the region. This can be combined with proxy evidence for direct Egyptian extraction of Levantine wheat to sustain the imperial system, notably from textual evidence for the Egyptian army seizing the harvest of Levantine fields as was the case after Thutmose III's victory at Megiddo (Breasted

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grains and 6 rachides from free-threshing wheats were recovered for a ubiquity of 60% (6 of 10 samples) and a total proportional value of 8.4% of the total assemblage NISP of 226. To this can also be added the small, nonrepresentative assemblage of seeds from the JCHP excavation of Kaplan's original baulk from the interior of the Lion Temple, which produced which produced 11 grains of free-threshing wheat and 3 of emmer from levels dating to the Late Bronze Age IIA (Phase LT-8) from a total NISP of 17 botanical elements. These data were excluded from the main Jaffa dataset due to the limited nature of excavations.

1906, II:462) and presence of bowls bearing Egyptian hieratic inscriptions at sites throughout the southern Levant that were meant to represent symbolic quantities of grain collected by the Egyptian administration.[167] In short, in the imperial periphery of the southern Levant, both imperial personnel and the indigenous Levantine population subsisted on the same staple wheat—one which was derived purely from Levantine foodways. This has important ramifications for understanding Egypto-Levantine interaction at Jaffa.

While the assumption of a collective, shared Egyptian habitus during the New Kingdom runs the risk of overly homogenizing the inhabitants of the geographic region of Egypt, there is little controversy that there was some sort of unified concept within Egyptian culture regarding the centrality of bread to the constitution of the individual (Chazan and Lehner 1990; S. T. Smith 2003c, 47; Samuel 2000; Pierce 2013; Lang 2017). As the macrobotanical evidence indicates, this element of the habitus was fully entangled with the practical realities of emmer wheat. The *chaîne opératoire* that moved wheat from field to table was wholly conditioned by the characteristics of emmer, notably its extra processing requirements and culinary performance. With respect to the latter aspect, the modern concept of wheat quality is useful, with the term referring to the capacity for a variety of wheat to produce flour for a specific product in accordance with cultural-specific notions of suitability (Alvarez and Guzmán 2013, 1). In the case of ancient Egypt, the compositional characteristics of emmer meant that the production of bread had specific techniques and embodied logics for dealing with the lower viscoelasticity of the dough, something which would have affected working the dough, fermentation, and baking. Moreover, if we think in terms of a cuisine, those same characteristics yielded a product that had

[167] Such bowls are known from Deir el-Balaḥ (Wimmer 2010), Lachish (Gilula 1976; Goldwasser 1982; 1991b; Sweeney 2004), Tel Sera' (Groll 1973; Goldwasser 1984), Tel Haror (Goldwasser 1991a), and Tell el-Far'ah South (Goldwasser and Wimmer 1999).

a characteristic sensory profile. Despite regional, technical, and aesthetic variation that almost certainly existed, the production of bread in ancient Egypt can therefore be understood as the overlapping expression of multiple communities of practice that were united not only by the technological need to engage with the properties of emmer, but also by the fact that it was the only possible ingredient for the desired outcome. Consequently, the fact that emmer does not manifest at southern Levantine sites like Jaffa requires exploration.

As the long history of emmer cultivation in the southern Levant indicates, there is no ecological reason as to why garrisons could not have been supplied with emmer from local agriculture.[168] At its simplest level, it might be that the requirement within the Egyptian habitus for bread was satisfied by Levantine free-threshing wheats through simple substitution, even if there were qualitative differences in process and final product. Free-threshing wheats still produced the economically valuable secondary products of straw and chaff that garrisons would have used for several important industries, and there was nothing about free-threshing wheat that left nutritive gaps in the diet compared to emmer.[169] In lieu of direct evidence, it is impossible to assess the reaction of imperial personnel to the new food, which could have ranged from enthusiastic reception to ambivalence to begrudging acceptance for lack of a better alternative.

[168] Neither variety outperforms the other under generic conditions such as aridity (Bamakhramah, Halloran, and Wilson 1984; M. Davies and Hillman 1988; Marconi and Cubadda 2005). Given the Egyptian reliance on basin agriculture (Butzer 1976), which produces saline soils (Smedema and Shiati 2002), it might be argued that Egyptian emmer strains were adapted to such environments and therefore unsuitable for the southern Levant, where winter rains regularly lower soil salinity (Isidoro and Grattan 2011). Even still, ecologically deterministic arguments cannot be sustained. The Mediterranean belt of Egypt and the extreme southern Levant have the same rainfall patterns (Zahran and Willis 1992, 8; Dudeen 2001, 208), some areas of the southern Levant have characteristically saline soils (Dan et al. 1982), and some regions—especially the wadis—in Egypt have low salinity soils (Zahran and Willis 1992, 13; El-Ghani and Amer 2003). Despite this, there is no shift in preferred variety in either region in accordance with ecological conditions.

[169] Secondary products from threshing were an important commodity in ancient Egypt (Murray 2000a, 513; Cappers 2016, 32; see also van der Veen 1999). That this economy would not be disrupted by free-threshing wheat is evident from Hellenistic and Roman Egypt when free-threshing varieties became the new staple (Boak 1955, 162; Youtie 1975). While compositional differences result in different culinary performance and taste between emmer and free-threshing wheats, their nutritive effect on the diet was largely identical (Shewry and Hey 2015; Geisslitz et al. 2018).

What is clear is that even if the reaction was negative, the problem was not sufficient as to require resolution via the transplanting the full suite of practices associated with emmer from Egypt to the garrisons. There is, however, another possibility that merits consideration, which is that Egyptian women, who constituted the primary community of practice associated with the domestic production of bread in Egypt (Lang 2017), were not part of Levantine garrison communities. Notably, no domestic context at a New Kingdom garrison in the southern Levant has ever produced an installation related to bread production that follows an Egyptian model (Damm Forthcoming a). Moreover, while an array of forms from the Egyptian ceramic tradition were produced locally at southern Levantine garrisons, cooking vessels from the Egyptian tradition are conspicuously absent, as are vessels that can convincingly be related to bread production (see chapters 7 to 8). There is, therefore, no evidence to suggest the transplantation into the southern Levant of any aspect of the *chaîne opératoire* for bread production in an Egyptian fashion. From the level of staple ingredient through final product, the production of bread at garrison sites like Jaffa was via a community of practice with roots purely in Levantine modes of doing. For their sustenance, garrison personnel became entangled with the local population for the creation of a hybridized cuisine in the imperial periphery.

4.5 Conclusions

Though we cannot necessarily discern individual tastes at Jaffa, it is notable that more than three centuries of colonial contact did not result in the adoption of free-threshing wheat in Egypt nor the resurgence of emmer in the southern Levant. When in the southern Levant, the Egyptian habitus was flexible as it pertained to bread, with Egyptian personnel subsisting on a hybridized foodways that were the product of entangled relations with the local Levantine population. While bread might have been central to the constitution of the individual within Egyptian culture, it would seem this need was adequately met by the substitution of a conspicuously different product made from Levantine wheat. Given that free-threshing wheats—despite their lower labor requirements—were not brought back to Egypt during or after the imperial period, it is not implausible to suggest that Egyptian personnel in the southern Levant were unimpressed with their new fare. Indeed, it would not be until foreign rulers forced agricultural reform on Egypt nearly a millennium later that free-threshing wheats—the same varieties that transformed Egypt into the breadbasket of Rome—became a regular feature of Egyptian foodways (D. Crawford 1979; Berlin et al. 2003; Cappers 2016). If anything, this suggests that the Egyptian reaction to southern Levantine wheats were at best ambivalent or at worst a soft rejection that was tolerated throughout the course of the imperial entanglement. It should also be noted that this had a profound effect on the local Levantine population, in that the communities of practice that produced both free-threshing wheats and their finished products were subject to their own entanglement, in that their labor now supplied Egyptian garrisons and administrators, served as army provisions during campaigns, and at times were shipped elsewhere in the empire. Whether bread ever served as a mode of distinction between imperial personnel and the local population, or whether it contributed to a sense of dissonance or displacement for the imperial interloper must remain conjectural. Regardless, it demonstrates the degree to which empire and daily life became intertwined at a site like New Kingdom Jaffa.

Chapter 5 –Bitter Vetch (*Vicia ervilia*): A Levantine Signature Food?

As discussed in Chapter 4, the objective of my paleoethnobotanical study is to move from the regional archaeobotanical dataset to meaningful social interpretations of foodways at New Kingdom Jaffa. Overall, my intent is to treat plant-based foodstuffs as taskscapes that unified communities of practice both through the culinary act and the common understanding of how foods should feel, taste, or smell. The selection of cereals in Chapter 4 was a straightforward product of their status as staple and their archaeological ubiquity. This chapter proceeds from a different starting point. Pattern searching highlighted a leguminous species, bitter vetch (*Vicia ervilia*), that exhibited variable distributions between both Egypt and the Levant in the period before, during, and after the New Kingdom empire. It was common in the southern Levantine dataset, being found both with relatively high ubiquity and cached in high densities, a situation contrasting with its near-total absence in Egypt. Legumes are a much-neglected field of study within both regions (see Section 5.1); however, they are also incredibly valuable for reconstructing ancient communities of practice due to their complex processing procedures and oftentimes extreme sensory characteristics—something which bitter vetch exemplifies. Consequently, the possibility of its exploitation in the southern Levant and avoidance in Egypt merits scrutiny, especially with respect to how this might manifest in a mixed population at a garrison site like Jaffa.

From a methodological standpoint, regional analysis of bitter vetch is more complex than was the case with cereals, as it—and legumes generally—have a lower preservation probability in the archaeological record. Consequently, for bitter vetch it is necessary to more aggressively utilize the methods outlined in Chapter 3 for demonstrating meaningful absence. Moreover, since bitter vetch can also be characterized as a weed, the significance of its presence merits scrutiny as it need not have resulted from intentional exploitation. As will be argued below, the data indicates a clear division between regional foodways of Egypt and the Levant based on bitter vetch consumption, with Egyptians avoiding the crop altogether, even as a source of fodder. In contrast, bitter vetch was widely exploited throughout the southern Levant. While a full distribution of bitter vetch around the ancient Mediterranean is well outside the purview of my argument, it is crucial to note that bitter vetch consumption was not unique to Levantine foodways—it was consumed widely around the ancient Mediterranean and broader Near East (see Riehl and Nesbitt 2003). My argument is that it was an important part of Levantine foodways, only becoming a clear element of distinction at the boundary of Egypt-Levantine interaction.

The discussion will progress through several topics. First, I examine the undervalued importance of legumes within ancient foodways (Section 5.1), which is in turn followed by a description of bitter vetch, which includes the unique—and potentially dangerous—culinary qualities that would have affected its transmission across cultural boundaries (Section 5.2). I then used the distribution of the species to show that its rarity in Egypt is a genuine product of antiquity, and furthermore, that its distribution in the southern Levant can be amplified to show that it was likely much more common than even these data suggest (Section 5.3). This is followed by an examination of the rarity of bitter vetch at the Egyptian garrison of Jaffa, which includes a discussion of how bitter vetch might have formed a mode of distinction between indigenous Levantine peoples and resident Egyptian personnel. Overall, I argue that bitter vetch was not just a signature element Levantine foodways, but that the *chaîne opératoire* moving it from field to exploitable product constituted a complex suite of socialized knowledge that was wholly foreign to Egyptian modes of doing. In turn, bitter vetch provides a versatile tool for examining interaction at sites characterized by the Egypto-Levantine imperial encounter.

5.1 Legumes in the Southern Levant and Egypt: A Poorly Understood Staple

As previously mentioned, legumes are understudied within ancient foodways. This is partially related to past overemphasis on the "Mediterranean Triad" of cereals, oil, and grape, which has been criticized for oversimplifying the diversity of subsistence models around the Mediterranean (Horden and Purcell 2000, 203). This point has been especially labored for legumes, which offer a crucial, non-animal source of protein, and therefore we should instead refer to a "Mediterranean Quartet" so as to not elide the importance of legumes within societies where cereals are a staple food (Sarpaki 1992; see also Porter 2013, 87).[170] And this was certainly the case for both Egypt and the southern Levant throughout history, with legumes accompanying cereal crops in both regions as being among the first domesticates (Kislev and Bar-Yosef 1988; Brewer, Redford, and Redford 1994, 69; Zohary, Hopf, and Weiss 2012, 75).[171] Consequently, this section outlines the much-neglected importance of legumes to ancient foodways, demonstrating the central place that crops like bitter vetch would have held in daily life.

[170] Legumes, which are high in lysine but low in sulfur-containing amino acids, and cereals, which have the inverse composition, form complementary components of a balanced diet (Murray 2000c, 637). High levels of legume consumption in the Late Bronze Age has been confirmed via bioarchaeological isotopic studies at Tell Ya'amun in modern Jordan (Sandias and Müldner 2015).

[171] Levantine exploitation of lentil (*Lens* culinaris) began with its wild progenitor (*Lens culinaris* ssp. *orientalis*) in the Mousterian period (c. 50,000 – 60,000 cal BP). The first unequivocal evidence for lentil cultivation in the Levant comes from Pre-Pottery Neolithic B (PPNB) Yiftah'el (c. 10,100 – 9,700 cal BP) (Zohary, Hopf, and Weiss 2012, 80). In Egypt, where lentil accompanied the earliest transmission of agricultural crops from the Near East, it is attested first at Neolithic Merimde (7,150-5,950 cal BP) (Brewer, Redford, and Redford 1994, 71; Zohary, Hopf, and Weiss 2012, 81), then in caches from tombs of the later Predynastic and Early Dynastic periods of the fifth through third centuries BCE (Murray 2000c, 639; de Vartavan, Arakelyan, and Amorós 2010, 146).

The role of legumes within foodways extended beyond their place in human diet. Legumes are divided into the categories of forage/fodder legumes and pulse crops, with the former being grown predominantly for their green herbage and the latter for their edible seeds (Langer and Hill 1991, 221). The distinction is imprecise, however, as crops like bitter vetch serve both purposes (N. Miller and Enneking 2014). Moreover, since most pulse crops are uprooted and threshed to release the edible seed, their harvest produces a great deal of secondary herbage that makes for high-protein livestock fodder due to the phytochemical characteristics of leguminous species (Zohary, Hopf, and Weiss 2012, 76; Langer and Hill 1991, 221).[172] In addition to serving as fodder, legumes are also central to restoring nitrogen stocks in soil, with crop rotations or maslins commonly used to restore soils depleted by cereal agriculture.[173] Whether ancient Near Eastern or Mediterranean cultures were aware of this function is unclear since the earliest textual records advocating legume rotations do not predate the Hellenistic period, though it is not unreasonable to assume that some sort of awareness existed.[174] Regardless, the evidence for large-scale cultivation of leguminous fodder crops such as clover species (*Trifolium* sp.) throughout Egyptian history (P. Crawford 2003; Malleson 2016b) indicates robust legume cultivation outside of exploitation for direct human consumption.

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[172] Ethnographic research in the hill country of northwest Jordan has shown the central importance of winter crops of lentil (*Lens culinaris*) as an economically viable seed crop that produces a valuable secondary product in leguminous hay. The hay can then either be stockpiled or sold to pastoralist groups (C. Palmer 1998).

[173] Nitrogen fixation is accomplished through symbiotic relationships between legumes and bacteria from the genus *Rhizobium*, which bond with the roots of legume species and fix atmospheric nitrogen in the soil. *Rhizobium leguminosarum* is the symbiote of the species discussed in this chapter (Yamaguchi 1983, 257, Table 21.2).

[174] The earliest textual references for legumes replenishing soil health are found in Xenophon's *Geoponica* (Dalby 2011, β.12) and Theophrastus' *Historia Plantarum* (VIII.VII.2), with later Roman references including Cato's *De Agri Cultura* (37) and Pliny's *Natural History* (18.134, 137) (Flint-Hamilton 1999, 373). For earlier periods, Oded Borowski discusses the biblical prohibition against sowing fields with mixed seed ("שדך לא תזרע כלאים" Lev. 19:19, see also Deut. 22:9) as indicating avoidance of maslins in favor of crop rotation (Borowski 1987, 149–51).

Despite their obvious importance, legumes are poorly represented within ancient Egyptian and Levantine textual and iconographic sources.[175] As with the discussion of cereals in Chapter 4, the association of ancient terms with modern legume taxonomies has had limited success in either region.[176] Consequently, archaeological data is crucial for understanding the place of legumes within the foodways of both regions. Legumes, however, possess several characteristics that inhibit their archaeological preservation. First, culinary technologies for most pulses involve soaking, boiling, pulverizing, or the exploitation of undried seeds, which means that incidental preservation via accidental charring is limited (W. Smith 2003, 45; Alexia Smith 2005, 211). Excepting fodder legume seeds (e.g., *Trifolium*) preserved in dung (Malleson 2016b), pulses and their secondary waste products are rare even in Egypt, where desiccation preserves even the most fragile plant components. This likely relates to the complete exploitation of the harvested plant, with crop waste either being used as fodder or plowed under as "green manure" (Cappers et al. 2007, 135). Ancient preservation biases are further exacerbated by modern recovery methods, as carbonized legumes have the tendency to sink within heavy fraction during flotation, and even if they are freed from the surrounding soil matrix large seeds often disintegrate or explode upon contact with water (see Hansen 2000, 14). Additionally, heavy

[175] There are no known depictions of leguminous species from any period in ancient Egypt (Murray 2000c, 637), an issue echoed in the sparse iconographic record of the southern Levant.

[176] For Egypt, lexicography has yet to identify convincing modern analogs for the ancient Egyptian terms for leguminous species. It has been argued that it is necessary to recognize a generic term "bean" that was applied with equal fluidity as it is used in modern English, in that it is neither specific to species or even to the legume family (Darby, Ghalioungui, and Grivetti 1977b, 2:682–85). This seems especially true for the term *ỉwrit*, which has been variously translated as referring to the fava bean (*Vicia faba*) (Darby, Ghalioungui, and Grivetti 1977b, 2:682) or the cowpea (*Vigna unguiculate*) (Keimer 1928, 77–79, there referred to as *Vigna sinensis*), though recent scholarship notes that the evidence for either is extremely thin (Germer 2008, 21). For Northwest Semitic languages, etymological equivalencies with modern Semitic languages make the retrodiction of certain terms simpler. For instance, the Hebrew word for lentil (*Lens culinaris*), עדשים, directly is related to the Late Bronze Age Ugaritic *ʕdš/t* (del Olmo Lete and Sanmartín 2003, 151), likewise the West Semitic *pôl*, the Coptic *fel*, and the modern Arabic *foul* in reference to the fava bean (*Vicia faba*) (Darby, Ghalioungui, and Grivetti 1977b, 2:682–83; King and Stager 2001, 93). This is only possible for a few common terms, and the inclusion of Eastern Semitic languages to resolve the remainder complicates the issue rather than resolving it (e.g., Ellison 1981).

fraction is often not published (e.g., Borojevic 2006, 521), meaning that in in all but the most extraordinary cases, legumes typically present a very low NISP regardless of their role in ancient foodways.[177] Extraordinary instances wherein cached leguminous seeds are preserved—rare as they may be—are therefore of singular importance for demonstrating intentional cultivation. Many leguminous species—including bitter vetch—also grow as synanthropic and agricultural weeds, therefore low numbers are not direct evidence for their consumption. Moreover, most cannot be separated from their wild counterparts except in cases where the fragile seed coating is preserved (Zohary, Hopf, and Weiss 2012, 76). Caches offer the only definitive proof of intentional cultivation, lending credence to the prospect that ubiquity elsewhere signifies the general importance of a specific taxon. Indeed, it was such contexts that offered the initial clue that bitter vetch might be an important component of southern Levantine foodways.

5.2 Bitter Vetch (*Vicia ervilia*): Characteristics and Distribution

Bitter vetch has a long history of exploitation across the ancient Near East and Mediterranean, though its domestication remains unclear due to the difficulty in differentiating domesticated bitter vetch from its wild progenitor.[178] By the Bronze Age, however, pure caches are attested across the eastern Mediterranean and into Mesopotamia, indicating its purposeful cultivation in throughout the region (Hansen 2000; Rivera et al. 2012b, 2:608–10; Zohary, Hopf, and Weiss 2012, 92–94). The species likely arrived in Egypt—where it had no wild progenitor—with the Neolithic founder crops (Germer 1985, 77), though early distributions are sparse and no caches

[177] For example, in the 117 phase-level archaeobotanical assemblages from both Egypt and the Levant considered in this study, only in 12 cases do elements of the common legume genus *Vicia* constitute more than 5% of the total assemblage, and in only 36 did they constitute more than 1% (see Appendix 2). Distributions are sparse even for common culinary species like the lentil (*Lens culinaris*), which only occupies more than 5% of a total phase-level assemblage in seven cases and more than 1% in 30 phases.

[178] The wild progenitor for bitter vetch has a narrow range, indicating that domestication occurred within the Fertile Crescent (Zohary and Hopf 1973, 893; Ladizinsky and van Oss 1984). The earliest evidence for bitter vetch consumption in the Levant is from the Middle Paleolithic (65,000 – 48,000 BP) (Lev, Kislev, and Bar-Yosef 2005).

indicative of intensive cultivation have been found.[179] Given that bitter vetch as an aggressive weed in addition to cultivated crop, it is distinctly possible that its arrival in Egypt was akin to its current status there today—an invasive, wild species along field margins.[180] To the uninitiated, bitter vetch is a noxious weed on account of its toxicity to humans and animals when processed incorrectly, and therefore it is likely it simply was not accepted into cultivation by the Neolithic inhabitants of Egypt. To those with the knowledge and desire to process the crop, however, it provided a versatile addition to foodways. Indeed, these unusual characteristics are central to my argument that bitter vetch cultivation indicates a community of practice united by the socially learned means for its safe exploitation.

The positive characteristics of bitter vetch induced specific communities of practice to develop methods for its exploitation. It is both drought and cold tolerant, more broadly suited for all ecological niches of the Middle East/North Africa (MENA) region in comparison to other common pulse crops (Butler 1990, 89; Moneim 1993; N. Miller and Enneking 2014, 255). Its protein content is equivalent to or superior to other legumes, both with respect to its seed and green herbage, making it ideal as human food or fodder (M. Kaplan, Uzun, and Kökten 2014).[181] Its resiliency makes it a safe investment for highly nutritious human and livestock food, but only if the consumer knows how to exploit it safely. Classical sources are replete with references to the dangers of bitter vetch consumption, which played a major role in its dismissal by early

[179] The earliest finds are from Naqada dating to 5,650-5,300 cal BP (Wetterstrom 1993), with other Predynastic finds known from Tell el-Fara'in (Buto) (Thanheiser 1996) and Tell Ibrahim Awad (Thanheiser 1992).

[180] In modern Egypt, it is most commonly found along field margins in the Mediterranean coastal region (Täckholm 1974, 276; Boulos 1999, 1:345–46).

[181] 16 lines of bitter vetch presented a range of crude protein values at 264.38 ± 6.34 g kg^{-1}, or 26.44% ± 6.34% (Aletor, Goodchild, and El Moneim 1994). This equal or greater than less resilient pulse crops such as chickpea (*Cicer arietinum*), cowpea (*Vigna unquiculata*), lentil, and green pea (*Pisum sativum*), which comprise 24.0% ± 0.30%, 24.7% ± 0.10%, 26.1% ± 0.09%. and 24.9% ± 0.03% crude protein, respectively (Iqbal et al. 2006, Table 1).

Western scholarship as a viable component of ancient foodways (Flint-Hamilton 1999, 378–79).[182] The litany of symptoms listed in classical sources—vomiting, bowel irritation, weakness, and even madness—were central to the early, incorrect association of bitter vetch with the neurodegenerative disorder lathyrism in modern medical studies.[183] More recent analyses have identified the dangerous compounds in bitter vetch, a class of non-protein amino acids (NPAAs) that includes trypsin inhibitors, tannins, lectins, and L-canavanine. Commonly known as anti-nutritional factors (ANFs), these compounds specifically contribute to the bitter flavor from which the name of the species is derived (Sadeghi et al. 2009, 55, Table 5; Enneking 1994; 1995). Of these, the first three predominantly inhibit nutrient uptake during digestion, requiring sustained consumption levels to produce symptoms akin to malnourishment.[184] In contrast, L-

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[182] An early botany text draws on classical authorities to declare it fit only for fodder or medicinal use, whereas men should abstain due to its "very unpleasant taste, and naughtie iuice" (Gerarde 1597, 1051). This stems from both Greek and Latin texts, where it is referred to as ὄροβος and *ervum*, respectively. From Greek literature, the main text is Theophrastus' *Enquiry into Plants* (II.IV.2), where he notes that the season in which bitter vetch is sown leads to varying levels of toxicity, with only those sown in the spring being harmless. This developed further in later Roman literature, where Columella notes in his *On Agriculture* that bitter vetch grown in the wrong season is not suitable for fodder and will cause a madness of the brain in cattle (II.34). Pliny's *Natural History* offers the clearest commentary on its use as a human food, referring to it as unwholesome, causing vomiting, bowel irritation, heaviness of the head, and weakness of the knees (XII.153).

[183] The key transition between classical sources and modern medical studies was Bernhard Schuchardt's medical review of lathyrism, where he explicitly associated bitter vetch—there referred to as *Ervum ervilia*—with lathyrism, citing Palladius' 4th-5th century CE *Opus agriculturae* as his authority (1887, 316 especially n. 1). Since Palladius' work was modelled on Columella (Browning 1982, 771), this bridged the classical and modern literature. Subsequent medical reviews repeated the association, identifying the chemical compounds that cause lathyrism but not testing bitter vetch to see if they were present in the species (Selye 1957; Barrow, Simpson, and Miller 1974; Aletor, Goodchild, and El Moneim 1994). Instead, it was assumed that since bitter vetch caused symptoms akin to lathyrism, it must contain lathyrogenic compounds. Once phytochemical testing was conducted, it was demonstrated that bitter vetch contained no lathyrogenic compounds (see Enneking 1994; 1995). Medical reviews of lathyrism no longer mention bitter vetch (Manna et al. 1999; Woldeamanuel, Hassan, and Zenebe 2012), though the association between bitter vetch and lathyrism still appears in archaeological studies (e.g., Graff 2012)

[184] Trypsin inhibitors and tannins inhibit nutrient uptake by depressing the ability of the digestive system to synthesize certain proteins and amino acids (Santidrian and Marzo 1989; Kakade et al. 1969; Longstaff and McNab 1991; Ortiz, Centeno, and Treviño 1993). Overconsumption of lectins achieves a similar effect as they bond with and disrupt of the absorptive surface of the intestinal mucosa (Wiryawan and Dingle 1999; Sadeghi et al. 2009, 56). Notably, the human response to long-term consumption of toxic legumes is mostly known from species bearing lathyrogenic compounds (e.g., Haimanot et al. 1990). For bitter vetch, however, it is mostly known from livestock feed studies, which indicate suboptimal growth rates for meat-bearing species (e.g., Wiryawan and Dingle 1999). In these studies, the interrelationship between depressed nutrient uptake and symptoms of L-canavanine saturation can

canavanine is more dangerous, with overexposure causing inhibited nutrient uptake, fetal malformation, neurotoxic disturbances, hallucinogenic effects, hair loss, diarrhea, paralysis, cirrhosis of the liver, hypoglycemia, and arrythmia—effects which have been recorded across several species (Enneking 1994, 42–47, Table 1; Enneking and Wink 2000, 675). To effectively exploit bitter vetch, these compounds must be neutralized via a complex processing sequence.

The ANFs present in bitter vetch are present in variable concentrations in different portions of the seed, making detoxification a multi-stage process. Both lectin and trypsin inhibitors can be deactivated with heat, however, L-canavanine is stable at high temperatures. L-canavanine and tannins are water soluble, with acidic or alkali solutions being especially effective for neutralizing L-canavanine. Since the heaviest concentration of ANFs is in the exterior seed testa, simple mechanical force to remove the testa also reduces toxicity (Valamoti 2009, 29–30; Valamoti, Moniaki, and Karathanou 2011, 390). Consequently, the most effective means to detoxify bitter vetch is by a combination of grinding, soaking, heating, and drying (Barbour, Kallas, and Farran 2001; Sadeghi et al. 2009, 58).[185] Failure to employ a composite method would result in an inferior—and potentially dangerous—product. Special processing and knowledge are necessary even if bitter vetch is used as fodder. Both its hay and seed are toxic to monogastric animals without the same processing sequence that renders it safe for human consumption, and while ruminants can consume unprocessed bitter vetch, it cannot comprise

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be difficult to separate, since the objective is to find the smallest quantity of bitter vetch that can be added safely as a high-protein supplement for feeds while still maximizing growth patterns (Berger, Robertson, and Cocks 2003).

[185] Fermentation is a proposed but untested possibility for ANF neutralization in bitter vetch (N. Miller and Enneking 2014, 255). In India, it has been used to process grass pea (*Lathyrus sativus*), the primary culprit behind lathyrism epidemics. With grass pea, fermentation removes approximately 95% of the lathyrogenic toxin Oxalyldiaminopropionic acid (ODAP) (Enneking and Wink 2000, 679). Given the digestibility of unprocessed bitter vetch in ruminants, for which the rumen provides a first stage of digestion by fermenting foods, it is possible that fermentation also mitigates the ANF content of bitter vetch (González and Andrés 2003).

more than 25% of their diet without causing severe issues (Enneking 1994, 16; N. Miller and Enneking 2014, 255).[186] Notably, most of these processing techniques appear in texts from the Mediterranean and Near Eastern world, albeit mostly from periods post-dating the Late Bronze Age.[187] Even without contemporary texts, the ancient distribution of bitter vetch at archaeological sites clearly indicates its purposeful exploitation. Whatever the reason for its exploitation, be it for food or fodder, any evidence for its cultivation points towards a concomitant community of practice capable doing so safely.

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[186] For monogastric animals like horses and pigs, the margin of error is small, with a single consumption episode being potentially fatal. Symptoms include convulsions, vomiting, various bowel disorders, and in some cases, death by asphyxiation. While only pigs are listed among the cases where bitter vetch was specifically implicated, high concentrations of L-canavanine-containing species were recorded as being deleterious for numerous species of livestock—including ruminants in several extreme cases. While most of the toxicity of bitter vetch concentrates in the final stages of seed maturation, L-canavanine toxicity has been reported in livestock even when the animals consumed the offending plant in pasture (Enneking 1994, 44–47, Table 1; M. Kaplan, Uzun, and Kökten 2014). It is for this reason that the association between bitter vetch cultivation and horse-rearing for chariot warfare (e.g., Stol 1985, 130; N. Miller and Enneking 2014, 261) cannot be sustained. When adequately controlled, however, bitter vetch provides an excellent feed for ruminants, especially in early stages of development where meat production is the primary concern (S. Haddad 2006; Ayaşan 2010; Reisi et al. 2011).

[187] Despite the array of classical texts discussing the negative aspects of bitter vetch exploitation (see n. 182), several discuss its use for human and animal consumption. Athenaeus in *The Learned Banqueters* notes its use as fodder (IX.406c), which is reiterated in Cato's *On Agriculture* (XXVII). In the passage of Pliny cited in n. 182, he states that if one processes it by soaking, it provides excellent cattle feed. Pliny also notes its use in leavening barley bread (*NH* XVIII.103), and Cato mentions that it can sweeten harsh wine (*On Agriculture* CIX). The identification of bitter vetch in early Semitic texts is complex. In Akkadian and Assyrian texts, it is potentially represented by the term *kiššanu*, a species that was both human food and fodder, but the identification is not without controversy (cf. Eidem 1985, 142; Postgate 1987, 94; Rivera et al. 2012b, 2:610; Stol 1985, 129–32). A similar root is rendered in the West Semitic language of Ugarit as ks/śm(n), likely a transcription of the Akkadian *kiššanu*. It has been proposed to signify spelt (del Olmo Lete and Sanmartín 2003, 462), an unlikely identification given that spelt was not cultivated in the region (see Chapter 4). The earliest secure identification is with the Sumerogram GÚ.ŠEŠ in Hittite texts from the 2nd Millennium period archive at Boğazköy. Literally translating to "bitter pulse," the species was used for human consumption (Hoffner 1974, 99; 2001, 201–2). Secure identifications from the Levantine world in association with processing technologies are much later and based off of the modern Arabic term for bitter vetch, *karsenna* (Stol 1985, 130). The root is absent in biblical Hebrew and Aramaic (see F. Brown, Driver, and Briggs 1906; Koehler, Baumgartner, and Stamm 2001), but common to late Hebrew and Aramaic texts of the 1st century CE and later where it is rendered כרשינה/כרשינא. While several of the references are metaphorical or symbolic, it is discussed as food in the priestly portion, it appears in dietary laws, was made into a dough, and perhaps most importantly, it is discussed in a law regarding whether soaking bitter vetch on the Sabbath constitutes work (Jastrow 1903, 673–74). Classical Arabic texts on agricultural practice such as the 12th Century CE *Kitab al-Felahah* contain similar references to processing by soaking (al-'Awwam 1866, II:95).

5.3 The Distribution of Bitter Vetch

As noted in the introduction to this chapter, the rarity of bitter vetch in Egypt in comparison to southern Levantine sites prompted its investigation as a potential substantive difference between the regional foodways of either region. Its broad distribution at eastern Mediterranean and ancient Near Eastern sites means that it was never uniquely Levantine, but rather my interest is the place of bitter vetch on the boundary of Levantine and Egyptian cultural practices. To demonstrate whether such boundaries exist, it must be demonstrated that the species was not cultivated in ancient Egypt, and furthermore, that any instances wherein bitter vetch was present in Egypt are the product of other causes such as its persistence as a weed. Moreover, the argument that it constituted a signature component of Levantine foodways requires close examination of its absence there as well. This section then will detail its distribution in both regions, utilizing the full suite of quantitative and semiquantitative tools delineated in Chapter 3 to demonstrate that bitter vetch exploitation might have formed a mark of distinction between indigenous Levantine peoples in contrast to the Egyptian other, an assertion that will be discussed specifically with respect to Jaffa in Section 5.4.

5.3.1 Egypt

Bitter vetch is rare in archaeobotanical assemblages from Egypt, where there are no known caches from either excavated settlement sites or tombs.[188] Of the 47 phases from Egyptian sites that were analyzed, bitter vetch was only recovered from eight, and of those cases only five produced an NISP of greater than ten elements (see Appendix 7.1).[189] From samples more

[188] I obtained a copy of the archaeobotanical report from Sai Island prior to submitting this dissertation. While its results could not be integrated quantitatively, no bitter vetch was present there (Heinrich and Hansen 2020).

[189] The proportion is lowered if phases are separated into charred and desiccated assemblages. This results in 65 total assemblages, with bitter vetch only appearing in eight charred/lumped assemblages and one desiccated assemblage.

generally, of the 236 samples taken at Egyptian sites, only 37 produced bitter vetch in any quantity. The largest assemblage attested for a single phase is 27 seeds coming from mid-/late 18th dynasty Area A Stratum III at Memphis—forming 0.11% of an overall phase NISP of 24,417 objects. These 27 seeds were recovered in a single sample with a total NISP of 1,972 individual elements, of which the overwhelming majority were crop waste related to cereal agriculture, including 1,348 grains from common cereal weeds of the genus *Lolium* (68.36% of the total assemblage), 248 examples of emmer grain/chaff (12.58%), and a further 121 elements associated with the grass family *Gramineae* (6.14%). This is highly suggestive that the bitter vetch found within this single sample likely represents an incidental weed that was part of the crop waste from emmer processing.

As shown by Appendix 7.1, the highest overall proportion bitter vetch achieves within any single phase is at Second Intermediate Period Abu Ghâlib, which produced 16 individual seeds—4.51% of the overall assemblage NISP of 448 elements (Schiemann 1941a). This site, which was excavated in the 1930s, provides the only instance where bitter vetch occupies more than half percentage of an overall assemblage, and therefore this case merits comment. First, 85.04% of the assemblage from this level comes from both barley (274 of 448 elements) and emmer (107 of 448 elements). After barley, emmer, and bitter vetch, the only other elements identified securely to species level were two grains of *Lolium temulentum* and three seeds of *Hibiscus trionum*. The former comprises one of the most common finds in Egypt after emmer and barley, and therefore it is extremely unusual that it was recovered in such low numbers. The latter is a completely unique identification within the archaeobotany of Egypt (see de Vartavan, Arakelyan, and Amorós 2010, 123). From what can be determined from the original report, it would seem that the collection of samples at the site stemmed from opportunistic collection from dense charred deposits (Larsen 1941). Given the density of emmer and/or barley in all samples and the contrasting rarity of bitter vetch (see Appendix 2), it seems likely that we are still seeing an accompanying weed—albeit more commonly than in deposits elsewhere in Egypt. However, the erratic nature of recovery suggested by both the floral list—namely the low density of *Lolium temulentum*—and the early date of the field collection means that these results cannot be overinterpreted. Regardless, there is nothing to suggest the purposeful cultivation of bitter vetch at this site.

After Abu Ghâlib, bitter vetch never approaches a proportion greater than a half-percentage point within an overall phase assemblage, with the second greatest proportion being in the charred assemblage from Amarna's Grid 12 (0.45% of a total phase NISP of 3,542 elements). However, the desiccated assemblage for this phase—with an NISP of 1,240 total elements—completely lacks any evidence for bitter vetch. Furthermore, if we examine the remaining content of the charred assemblage its composition is much clearer (see Appendix 2). 64.26% is derived from emmer waste products like chaff (NISP of 2,276 elements) and a further 15.19% stem from weeds that accompany emmer in Egypt (NISP of 538 elements)—in this case grasses from the genus *Phalaris* as well as the ubiquitous *Lolium temulentum*. Given that much of the charred assemblage at Egyptian sites likely stems from the use of dung cakes wherein cereal chaff either served as a binder or was fed directly to livestock (Cappers 2005, 439), the sole preservation of bitter vetch in low quantities within the charred assemblage suggests that it too should be associated with the presence of crop waste within dung cakes.[190]

[190] For the desiccated assemblage from this context, 42.74% (NISP of 530 elements) of the overall assemblage consists of either emmer chaff or weeds associated with cereal agriculture (see Appendix 2).

Turning to the spatial distribution evidenced by ubiquity, the results are variable. This is to be expected since the total number of samples taken at each site is also variable. In the eight phases where bitter vetch is present, ubiquity ranges from 5.3 – 66.67% (μ 28.8%, n = 9, SD = 20.86, CV = 0.72).[191] Three specific contexts merit mentioning, as they all produced a ubiquity of greater than 20%. The highest value comes from Abu Ghâlib, where bitter vetch was found in four of six samples (66.67%). This is followed by Memphis Stratum VIc (12th/13th Dynasty) where it was found in four of seven samples (57.14%), and then finally by Tell el-Dabʿa, where it was found in six of fourteen samples (42.85%). Of these, Tell el-Dabʿa is perhaps the most notable because of its higher sample count. As useful as ubiquity is to balance NISP based calculation, its utility diminishes in situations with lower sample counts. What is perhaps more telling is the ubiquity of bitter vetch at phases from which more than 10 samples were collected. If we look to Appendix 6.1, this criteria is satisfied by eight sites in Egypt.[192] Of these, bitter vetch was recorded at four: Second Intermediate Period Tell el-Dabʿa (charred assemblage, ubiquity 42.85%, 6 of 14 samples), 18th Dynasty Amarna Grid 12 (charred assemblage, ubiquity 30%, 6 of 20 samples), 18th Dynasty Amarna Stone Village (charred assemblage, ubiquity 20%, 3 of 15 samples)[193], and 18th Dynasty Stratum III at Memphis (charred/desiccated assemblage, ubiquity 5.26%, 1 of 19 samples). Perhaps most notable is its total absence from 12th/13th Dynasty Umm Mawagir, a site wherein 118 samples were collected. Effectively, while ubiquity

[191] The Amarna Stone village produced bitter vetch in both its charred and desiccated macrobotanical assemblages, hence why it is present in eight phases, but the mean ubiquity is calculated from nine values.

[192] This statement merits some qualification, as several the sites published in Egypt lumped their sample assemblages by phase rather than individual samples and thereby made it impossible to calculate ubiquity. These sites are identifiable by the data present in the Appendix 1, and most notably include the three intensively surveyed sites of Theban Desert Road survey— Gebel Romaʿ, Wadi el-Hôl, and Gebel Qarn el-Gir.

[193] Bitter vetch was also found in the desiccated assemblage in the Stone Village at Amarna, however in much smaller quantities (ubiquity 6.67%, 1 of 15 samples). In this case however, the desiccated examples were found in the same samples wherein charred bitter vetch elements were recovered, not affecting the final ubiquity score.

results in a few unusually high scores for bitter vetch in Egypt, there is nothing to suggest that it was commonly encountered there in the course of daily practice, even as a weed. The only site for which this might be an exception is at Tell el-Dabʿa, and even there it is substantially less common than other leguminous species such as the grass pea (*Lathyrus sativus*, NISP 76 of 4947 elements, ubiquity 64.29%) and garden pea (*Pisum sativum*, NISP 35 of 4947 elements, ubiquity 21.43%).[194]

Period	μ IH	SD IH	CV IH	μ SW	SD SW	CV SW	n
12th/13th Dynasty	0.63	0.22	0.35	2.15	0.14	0.07	24
Second Intermediate Period	0.63	0.25	0.39	1.83	0.42	0.23	44
18th Dynasty	0.28	0.20	0.73	1.69	0.56	0.33	87
19th Dynasty	0.59	0.39	0.66	1.08	0.48	0.44	3
20th Dynasty	0.37	0.29	0.81	1.46	0.40	0.27	14

Table 3: Summary breakdown of the Index of Heterogeneity (IH) and Shannon-Weaver Index of Diversity (SW) for all Egyptian samples lacking evidence for bitter vetch.

The picture can be sharpened it we examine those contexts from which bitter vetch is absent, adapting the method described in Chapter 3 for exploring the degree of absence for a taxon within a regional assemblage. The results of the various diversity indices can be seen in Table 3, which represents the mean (μ) for the Index of Heterogeneity (IH) and Shannon-Weaver Index of Diversity (SW) for all samples from Egypt in which bitter vetch was absent along with the Standard Deviation (SD) and the Coefficient of Variation (CV) for each mean.[195] The mean IH—which can have a maximum value of one—is consistently greater than 50% except for 18th and 20th dynasty levels, which are substantially lower. This is largely because the high number of

[194] Of these two, the former is likely a leguminous weed species and the latter was likely purposefully cultivated.

[195] Sites from the Theban Desert Road survey (Gebel Romaʿ, Wadi el-Hôl, and Gebel Qarn el-Gir) and Umm Mawagir were excluded. In each case, samples were lumped together by broad chronological periods, rendering diversity scores impossible to calculate.

samples taken from these periods also corresponds to a higher number of samples in which no macrobotanical remains were recovered (n = 12), thereby rendering their IH to be zero.[196] Additionally, there is also the issue that when a large body of samples is taken from a phase that has a high diversity of recovered taxa, the probability increases that samples with low NISP/diversity will be recovered. Proportionally, this skews the mean IH lower. For example, if we consider the Amarna Stone Village—an 18th Dynasty site that contributed 22 samples lacking bitter vetch (see Appendix 2)—we find that despite having a high diversity of taxa recovered from the phase (nTaxa = 75), the mean IH is low because no sample ever produced more than 50% of that diversity. Though IH scores range from 0.01 to 0.42, the first three quartiles of that range are from 0.01 to 0.25, which inevitably produces a lower mean IH. Consequently, despite the 18th Dynasty having the most samples and an extremely high recovered biodiversity, the mean IH is dragged down because of NISP considerations—which is further suggested by its higher CV in relation to the other phases. Overall, if we consider both SD IH and CV IH in relation to the above points, there is no one phase where samples lacking bitter vetch had consistently low access to attested biodiversity as per IH scores. Bitter vetch is mostly absent from samples that provided insight into an appreciable proportion of the recoverable taxa.

If we turn our attention to SW—which accounts for NISP—we can see that the mean value for each period follows a similar pattern to IH, albeit with some minor adjustments. But again, if we consider SD SW and CV SW, no one phase is outside the realm of variation seen in any of the other phases with the small exception that 12/13th Dynasty samples tend to be characterized by a higher level of diversity present. Consequently, the picture for SW is largely

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[196] Of the 12 samples wherein this is a factor, 8 are from 18th Dynasty Amarna's Grid 12 and 4 are from 20th Dynasty Amara West, hence the major effect on these two periods.

identical to that of IH. If we compare these values to the diversity scores of samples in Egypt in which bitter vetch *is present* (see Table 4 below), however, an interesting pattern emerges.

Period	µ IH	SD IH	CV IH	µ SW	SD SW	CV SW	n
12th/13th Dynasty	0.63	0.22	0.35	2.15	0.14	0.07	24
Second Intermediate Period	0.63	0.25	0.39	1.83	0.42	0.23	44
18th Dynasty	0.28	0.20	0.73	1.69	0.56	0.33	87
19th Dynasty	0.59	0.39	0.66	1.08	0.48	0.44	3
20th Dynasty	0.37	0.29	0.81	1.46	0.40	0.27	14

Table 4: Summary breakdown of the Index of Heterogeneity (IH) and Shannon-Weaver Index of Diversity (SW) for all Egyptian samples wherein bitter vetch was recovered.

As can be seen in Table 4, the mean values for the samples from Egypt in which bitter vetch was found closely correspond to the diversity scores for those samples in which it was absent. Had either the mean IH or SW been considerably higher in the samples in which bitter vetch was found, this would suggest that the samples taken in Egypt are simply not robust enough to capture the phenomenon of bitter vetch cultivation. Since the mean diversity indices of the samples in which bitter vetch was found are either commensurate to or lower than those in which it was not found, there is nothing to suggest that its absence from Egyptian assemblages is the product of bias in the data. In fact, its rare and seemingly random distribution is highly suggestive of a relatively uncommon weed that was occasionally harvested by mistake with the cereal crop and discarded during processing. This situation can be further clarified by contrasting it with the distribution of the species in the southern Levant.

5.3.2 The Southern Levant

Bitter vetch is substantially more common in the southern Levant and—more importantly—is attested there in several large caches.[197] The earliest such cache comes from a Late Bronze Age IIA palace excavated at Beth Shemesh in modern Israel. In locus L1505, the excavators encountered several dense, relatively pure deposits of charred crop remains, indicating discrete storage contexts for several distinct species. While bitter vetch was present at least in small quantities within most deposits, achieving a ubiquity value of 75% (6 of 8 samples), in most cases it was in such small proportions that it was clearly a contaminant with respect to the dominant crop. In one instance, however, excavators found a cache of 11,403 bitter vetch seeds within a single jar (Jar 6062.02), with the deposit being nearly pure (94.22%, NISP 11,403 of 12,133). The remaining material comprised mostly pericarps of rough-fruited bedstraw (*Galium tricornutum*), a common weed in legume fields (Weiss et al. 2019, 87–90) that was likely harvested incidentally with the bitter vetch. Another large cache of 3,050 bitter vetch seeds was recovered from Iron Age IA Deir ʿAllā (Jordan), dated by the excavators to 1200-1150 BCE (van Zeist and Bakker-Heeres 1973, 22). The report indicates that the sample was mostly pure at 67.3% (3,050 of 4,535), with the remaining material predominantly from other cultivated species. There is unfortunately little clarity regarding the context, and therefore little else can be said other than that it signifies purposeful cultivation of bitter vetch at the site.

Another Iron Age I cache of bitter vetch was recovered in a storage jar from Stratum III ʿAfula (Israel), though I excluded this data from the quantitative study due to limitations of the original publication, where the author only notes that

[197] While this study is only concerned with the Middle Bronze Age IIA and the Iron Age IB, caches of bitter vetch are known more broadly from Early Bronze Age southern Levantine sites as well (see Graff 2012).

> Among the material examined I found large quantities of whole and broken carbonized seeds […] The largest contingent—several thousand seeds—were kirsenne (bitter vetch), of the family of Leguminosae. (Zaitschek 1955, 71)

The terse description cannot be linked to any specific context, but the material is likely derived from the final destruction of the large building found by Moshe Dothan in the course of his excavations along the southwestern part of the mound—thereby rendering a date of the Iron Age IB (M. Dothan 1955; 1993, 38). While quantities are vague, several thousand seeds are direct evidence for intense, purposeful cultivation. These three caches, while far from exhausting the assemblage of bitter vetch in the southern Levant, are indicative of intensive cultivation at three distinct points in time in three completely different ecological zones: the Shephelah Valley (Beth Shemesh), the Jordan Valley (Deir ʿAllā), and the Jezreel Valley (ʿAfula). As carbonized, cached legumes, they offer rare insight into the intentional exploitation of bitter vetch, which in turn helps characterize the hazier picture from its broader distribution in the region.

At southern Levantine sites more generally, bitter vetch is more common than any other leguminous species, being present in half of all surveyed strata and at all but two sites (26 of the 52 strata at 16 of 18 sites). However, because of the irregular sampling strategies applied at Levantine sites these numbers require greater characterization (see Appendix 1). First, the two sites where bitter vetch is completely unattested are Deir el-Balaḥ and Tell es-Ṣafi/Gath. In the case of the former, the entire assemblage comes from a single pit that contained an almost pure deposit of barley (98.2%, NISP 1,400 of 1,426), with all other elements being explainable as contaminants taken in with the barley harvest and incidentally stored (Kislev 2010).[198] With respect to Tell es-Ṣafi/Gath, the publications are highly preliminary and only include a small

[198] The remainder includes an unidentified seed, 21 grains of *T. parvicoccum*, and four grains from the genus *Lolium*.

quantity of contexts (Mahler-Slasky and Kislev 2012; Maeir 2013). However, subsequent work at the site, which to date has only appeared in a preliminary form, indicates that the species was present in Late Bronze Age and early Iron Age levels (n = 31, Frumin, Melamed, and Weiss 2019, 30, Table 2.1). Consequently, at the level of site-by-site distribution, bitter vetch is only absent from Deir el-Balaḥ, where sample bias is sufficient to suggest that its absence there is not definitive. When we characterize samples in general, bitter vetch is present in 56 of 375 samples collected from Levantine sites. Of the 319 samples lacking bitter vetch, 16.0% had a total NISP of 0-1 (51 of 319 samples), 19.7% had a total NISP of 2-5 (63 of 319 samples), and 8.2% had a total NISP of 6-10 (26 of 319 samples). As such, in more than half of the samples wherein bitter vetch is absent, low sample NISP is likely the explanatory variable.

For samples that possess a total NISP of 100 or greater but wherein bitter vetch is absent (n = 95), another pattern emerges. 61 produced less than ten taxa, indicating samples in which a few taxa are attested with a high NISP. Given the number of functionally constrained contexts at Levantine sites that were opportunistically sampled due to an abundance of visible macrobotanical remains (e.g., grain silos), it is unsurprising that these relatively clean, high-NISP samples lack evidence for bitter vetch. This is further supported by the fact that on average, the high NISP samples wherein bitter vetch is absent also present low diversity scores—either with respect to IH (μ = 0.30, SD = 0.26, CV = 0.85) or SW (μ = 0.54, SD = 0.50, CV = 0.92). In fact, the only two sites that produced high diversity samples wherein bitter vetch is consistently absent are Jaffa and Tel Aphek, which will be returned to in Section 5.4.[199] In short, the data

[199] One context that is excluded from consideration here despite producing a high number of taxa (n = 23) is a store jar from Late Bronze Age IIA Tel Batash (Locus 437). The reason for this is simple. It was sampled several times, resulting in a massive assemblage of uncleaned *T. parvicoccum* (NISP 167,882 elements including chaff) that was accompanied by 22 weed taxa related to cereal cultivation. While bitter vetch can be a weed locally, this jar represents a functionally restricted context wherein it might not necessarily occur in this capacity.

from the Levant must be used with caution as the absence of bitter vetch is potentially explainable for multiple reasons apart from its relative abundance in antiquity, an assertion that can be supported other indices.

Despite the general biases against bitter vetch recovery from Levantine archaeological contexts, or any other legume for that matter (see Section 5.1 and Appendix 1), bitter vetch is still more common in the southern Levant than at Egyptian sites.[200] As can be seen in Appendix 6.2, it is attested with an NISP of greater than 10 at 16 of the 52 surveyed phases, which is especially remarkable when compared to its rarity in systematic surveys from Egyptian sites. Ubiquity is more difficult to utilize due to its sensitivity to low sample counts. For several of the phases that produced bitter vetch at Levantine sites, only a single sample was collected and therefore ubiquity cannot be calculated. Similarly, some sites wherein bitter vetch was recovered only have their samples published as a lumped assemblages (e.g., Ashkelon), causing the same issue. If we confine ourselves to phases that both produced bitter vetch and had five or more samples collected (n = 13), ubiquity values range from 9.7% - 75% (μ = 32.1%, SD = 22.9%, CV = 0.7; see Appendix 6.2).[201] Again, this is more of a reflection of sampling strategy than actual distributions. The picture can be clarified using diversity indices.

Period	μ IH	SD IH	CV IH	μ SW	SD SW	CV IH	n
MB IIA	0.17	0.17	1.02	0.85	0.64	0.75	66
MB IIB/C	0.23	0.29	1.24	0.86	0.73	0.85	22
MB IIC	0.13	NA	NA	1.00	NA	NA	1
LB IA	0.38	0.37	0.95	0.46	0.36	0.77	9
LB IB	0.23	0.26	1.12	0.41	0.49	1.19	12
LB IIA	0.37	0.30	0.80	0.47	0.33	0.70	12

[200] The main biases include charring being the only vector for preservation and the limited application of systematic macrobotanical survey in comparison to its more common application in Egypt.

[201] This excludes the value from Jaffa, which produced a ubiquity of 0.9% across 113 samples, a value which will be returned to in Section 5.4

Period	µ IH	SD IH	CV IH	µ SW	SD SW	CV IH	n
LB IIB	0.32	0.31	0.98	0.49	0.65	1.33	31
LB III/IR I	0.14	0.14	0.98	0.70	0.57	0.82	135
IR I	0.36	0.34	0.93	0.90	0.87	0.96	31

Table 5: Summary breakdown of the Index of Heterogeneity (IH) and Shannon-Weaver Index of Diversity (SW) for all Levantine samples lacking evidence for bitter vetch.

Period	µ IH	SD IH	CV IH	µ SW	SD SW	CV IH	n
MB IIA	0.41	0.24	0.60	1.53	0.61	0.40	16
MB IIA/B	0.78	NA	NA	2.00	NA	NA	1
MB IIB/C	0.50	0.37	0.74	1.58	0.97	0.62	6
LB IB	0.36	0.10	0.28	0.40	0.50	1.24	3
LB IIA	0.48	0.29	0.60	0.66	0.63	0.96	9
LB IIB	0.63	0.31	0.50	1.69	0.98	0.58	6
LB III/IR I	0.65	0.25	0.40	1.60	0.64	0.40	4
IR I	0.67	0.30	0.45	1.00	0.91	0.91	11

Table 6: Summary breakdown of the Index of Heterogeneity (IH) and Shannon-Weaver Index of Diversity (SW) for all Levantine samples wherein bitter vetch was recovered.

When we compare the IH and SW values for Levantine contexts in which bitter vetch is absent (see Table 5) and present (see Table 6), a few points are apparent. First, the mean IH and SW values are consistently lower in those samples where bitter vetch is absent when compared to those in which it is present except for in the Late Bronze Age IB, wherein the SW values for both groups are similar—a product of extreme sample bias in this period. The one Late Bronze Age IB sample from Beth Shean contained only fig seeds (*Ficus carica*), and the remaining 14 from Tel Batash are skewed by functionally specific contexts with high NISPs of single, cultivated species (see appendices 1 and 2). Consequently, where bitter vetch is present at Tel Batash, it is incidentally within low-diversity assemblages dominated by high NISPs of cereals and their accompanying weeds, a sample type that produces characteristically low IH/SW scores.[202] For the Late Bronze Age IB especially then, the presence or absence of bitter vetch within an assemblage is wholly independent of its frequency in antiquity.

In other periods, the samples wherein bitter vetch is present have characteristically higher diversity scores across both IH and SW. Furthermore, especially with IH, they tend to have a lower coefficient of variation. This means samples containing bitter vetch tend to have greater access to recovered biodiversity than samples where bitter vetch is lacking. There is no reason, therefore, to assume that the absence of bitter vetch within a Levantine assemblage necessarily indicates its actual absence in antiquity. Leaving aside those cases discussed above where the intentional cultivation of bitter vetch is unequivocal, the frequency of bitter vetch as Levantine sites is being suppressed by biases that prevent its preservation and/or recovery from the archaeological record. That we see it as much as we do, especially considering its tendency to be present within samples with higher diversity indices, indicates it was far more common at southern Levantine sites than the data suggests. When the IH and SW values from both regions are compared, our understanding of the presence/absence data for bitter vetch can be sharpened. The consistently high diversity and limited variability in samples from Egypt regardless of the presence of bitter vetch (see Table 3 and Table 4) can be contrasted with the higher sample diversity that seems to be conditional for the recovery of bitter vetch within Levantine macrobotanical assemblages (see especially Table 6). While this already suggests more consistent sampling coverage at Egyptian sites and genuine rarity of bitter vetch there, the image can be sharpened specifically by comparing SW in both regions.

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[202] Collectively for IH at Tel Batash, the range was between 0.02 – 0.47 ($\mu = 0.20$, SD = 0.13, CV = 0.63), whereas the SW range was 0.00 – 1.67 ($\mu = 0.44$, SD = 0.48, CV = 1.09). No sample, therefore, ever produced half of the total biodiversity attested at the site, and most only produced about a quarter of it.

As discussed in Chapter 3, SW produces an absolute value wherein SW ≥ 0, making it possible to directly compare values between the two regions. For those samples in which bitter vetch is absent, at Egyptian sites the SW scores range from 1.08 – 2.15, whereas in the Levant they range from 0.41 – 1.00. Consequently, the samples from Egypt in which bitter vetch is absent tend to express a great deal more biodiversity than their counterparts in the southern Levant. Moreover, the CV range for the SW of samples from Egypt wherein bitter vetch is absent is 0.07 – 0.44. When compared to the CV range of SW values from Levantine samples wherein bitter vetch was absent (0.7 – 1.33), Egyptian samples wherein in bitter vetch is absent are clearly not only more diverse in their content, but their higher diversity is also a fairly stable, consistent attribute. In contrast, the southern Levantine examples are extremely variable—a product of the biases outlined in Appendix 1. This further supports that the absence of bitter vetch in Egypt is a genuine condition stemming from ancient practices, but its absence at Levantine sites is not. When combined with the caches known from Levantine sites, bitter vetch exploitation seems to form a major point of contrast between the regional foodways of Egypt and the Levant in the periods before, during, and after the New Kingdom empire.

5.4 Bitter Vetch at Jaffa as a Mark of Distinction?

As the previous section has made clear, there is a distinction between regional foodways in Egypt and the southern Levant based on bitter vetch exploitation. Bitter vetch is exceedingly rare or totally absent from Egyptian sites in the periods before, during, and after the New Kingdom despite regional tendencies towards higher sample diversity, lower variation in sample diversity, and the prospect of preservation through both charring and desiccation. Indeed, one context in Egypt—the House of Ranefer at New Kingdom Amarna—has produced almost as much biodiversity from five loci as has been attested thus far for the entire southern Levantine Bronze

Age.[203] It is very unlikely, then, that the rarity of bitter vetch in Egypt is the product of preservation bias. If anything, it was a weed, and not a particularly common one at that.[204] There is no ecologically deterministic argument for its lack of cultivation in Egypt, simply that regional foodways relied on other pulse crops (Murray 2000c, 637–42) and made special use of *Trifolium* species for fodder (P. Crawford 2003; Malleson 2016b). The southern Levant, however, forms the southern extent of a regional pattern of bitter vetch exploitation that connected the broader eastern Mediterranean and ancient Near East. For almost all southern Levantine sites, bitter vetch is either common or its absence can be explained via several variables that impacted recoverable biodiversity within a given study. Furthermore, as the palatial context at Beth Shemesh indicates, bitter vetch exploitation transcended class distinctions within Levantine foodways. Interestingly, Jaffa forms one of the only clear exceptions to this pattern.

As discussed in Chapter 4, the assemblage from Jaffa was collected across 129 samples spanning the last three phases of the Ramesses Gate complex.[205] Among these, 113 samples come from the Phase RG-4a destruction (NISP 32,545), which yielded collections of cultivated taxa indicative of an array of exploited species—including dense deposits of pulses like fava

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[203] The five samples include both a charred and a desiccated assemblage comprising 147 different taxa (Stevens and Clapham 2010). In contrast, a recent regional survey of biodiversity at southern Levantine Bronze Age sites (c. 3900 – 1200 BCE) recorded 178 taxa from archaeological contexts (Frumin et al. 2015).

[204] The bulk of archaeobotanical assemblages from Egypt comprise crop processing waster (Cappers et al. 2007, 135; Stevens and Clapham 2014, 156), which explains the inordinately high NISP of cereal weeds from the genera *Lolium* and *Phalaris* (P. Crawford 2003, 114). In modern Egypt, bitter vetch is a common weed on the margin of fields (Täckholm 1974, 276), and should the same situation have applied in ancient Egypt it is unsurprising that it only rarely appears in assemblages derived predominantly from the weeds that were interspersed within the fields. Notably, its distribution as far south as Amarna in ancient Egyptian assemblages is farther to the south than its modern range, which is mostly along the Mediterranean coast (Täckholm 1974, 276; Boulos 1999, 1:345–46).

[205] The Jaffa macrobotanical was identified by Andrea Orendi (Forthcoming), though the data is publicly available via the ADEMNES database (Riehl and Kümmel 2005).

bean (*Vicia faba*, NISP 702) and lentil (*Lens culinaris*, NISP 42).[206] While the succeeding Phase RG-3b and RG-3a have smaller assemblages (NISP 24 and 226), both provide insight into quotidian garbage from the gate passageway and latter also includes samples from destruction debris. Notably, bitter vetch is only attested at Jaffa by a single seed coming from the large, diverse assemblage from the Phase RG-4a destruction (see Appendix 6.2). Given the frequency of lentil and fava bean in the assemblage, there is no reason to assume a general bias against leguminous species, and the high frequency of common cereal weeds (e.g., NISP 1,670 from the genus *Lolium*) also attest to a high density of incidentally harvested elements. While these data can only speak to the specific context of the Ramesses gate, they point towards a singular rarity of bitter vetch in comparison to other sites in the southern Levant.

The relatively high frequency of fava bean and lentil at Jaffa suggest that these formed the primary pulse crops at Jaffa. With respect to leguminous fodder crop options, Jaffa is singular among southern Levantine sites for the frequency seeds from the genus *Trifolium*, where it comprises 2.3% (n = 746) of the RG-4a assemblage and 20.4% (n = 46) in RG-3a. In the former, it has a ubiquity value of 31.9%, being present in 36 of 113 samples, and in the latter its ubiquity is 90%, with it appearing in 9 of 10 samples.[207] The next largest assemblage of *Trifolium* from any Levantine site during the period of interest is the Iron Age IB Stratum X-10 at Tel Aphek, which produced only three seeds in an assemblage of 1,629 objects. Given the association between *Trifolium* and foddering practices at Egyptian sites (P. Crawford 2003;

[206] Other cultivated species include free-threshing wheat (*Triticum durum/aestivum*, NISP 27,886), fig (*Ficus carica*, NISP = 441), grape (*Vitis vinifera*, NISP 194), barley (*Hordeum vulgare*, NISP 178), olive (*Olea europea*, NISP 44), pomegranate (*Punica granatum*, NISP 15), pea (*Pisum sativum*, NISP 5), coriander (n = 3), and chickpea (*Vicia sativa*, NISP 1).

[207] *Trifolium* examples are present in the Phase RG-3b assemblage (NISP 6), but the small assemblage-level NISP of 24 makes their significance unclear.

Malleson 2016b), it is likely that this might represent the unique adoption of Egyptian foddering practices at a garrison site in the southern Levant. Collectively then, bitter vetch does not seem to have played a role in foodways at Jaffa, either as food for humans or fodder for livestock.

Jaffa has been subject to the most intensive macrobotanical survey of all published New Kingdom garrisons in the southern Levant; therefore it presents a singular dataset through which to discuss the presence/absence of bitter vetch. It is notable, however, that the robust dataset from nearby Tel Aphek—likely an Egyptian agricultural estate (Martin, Gadot, and Goren 2009; Gadot 2010, 201; Martin 2011b, 180–87)—also seems indicate the extreme rarity of bitter vetch.[208] The context in question is the Stratum X-12 Palace VI/Building 1104 (Late Bronze Age IIB), which while not subject to systematic macrobotanical survey, produced several large caches of macrobotanical remains from a rich destruction debris. Surveyed loci include hallways in the palace (Loci 1721 and 1731), a plastered floor adjoining the exterior of the palace (Locus 2731), a paved path (Locus 2959), and remnants of the upper floor of the palace (Locus 3827). The assemblage is large (NISP 29,119) and attests to the presence of 63 taxa (Kislev and Mahler-Slasky 2009). The assemblage produced an NISP of 16 bitter vetch seeds, forming 0.05% of the total assemblage with a ubiquity value of 60% (see Appendix 6.2)—the latter stemming from the low quantity of samples taken (n = 5). Interestingly, the densest accumulation of bitter vetch was in the two hallway loci (1721 and 1731), samples wherein the dominant legume was lentil. Bitter vetch was only slightly more common than rough-fruited bedstraw (*Galium triconutum*)—a

[208] The architectural layout, locally produced Egyptian-style ceramics, and epigraphic finds from Palace VI led to its consistent association with the Egyptian imperial administration (Rainey 1975; 1976; Singer 1977; Owen 1981; Hallo 1981; Beck and Kochavi 1985). It is at the center of the debate regarding the so-called Egyptian "governor's residences" in the Levant (see Oren 1984, and bibliography there), though interpretation has since moved away from ethnic associations to the generic designation of "administrative building" (Higginbotham 2000, 84–86).

common weed in legume fields (Kislev and Mahler-Slasky 2009, 509).[209] Collectively, the distribution suggests the intentional cultivation of lentil, after which bitter vetch and rough-fruited bedstraw might represent incidentally harvested weeds. While these data are less comprehensive than that of Jaffa, it suggests the absence of bitter vetch from another site associated with the imperial Egyptian occupation.[210] Given that none of the sites where bitter vetch is common (e.g., Late Bronze Age IIA Beth Shemesh) have produced any evidence for Egyptian occupation, it is possible that it became a mark of distinction between imperial personnel and the indigenous Levantine population.

The near-total absence of bitter vetch from a garrison site like Jaffa is striking, suggesting either indifference to or rejection of a Levantine staple within the garrison community. While the ethnic composition of the Jaffa garrison is unknown, it is worthwhile to consider the factors that might hinder cross-cultural consumption of bitter vetch. Certainly, if an individual from Egypt—where bitter vetch exploitation is foreign—were to consume the species without the appropriate knowledge of how to process it, immediate aversion would be inevitable. The evolutionary predisposition to avoid bitter foods must be overridden by cultural conditioning or other mechanisms (P. Rozin 1987, 182, 189), and foods with strong sensory characteristics have proven some of the most resistant to cross-cultural exchange.[211] Moreover, the toxic ANF profile of poorly processed bitter vetch means that even a single episode of light consumption would

[209] Locus 1721 produced 44 examples of lentil, 13 examples of bitter vetch, and 6 mericarps of rough-fruited bedstraw (referred to as *Galium* sect. *Kolgyda* in the taxa list). Locus 1731 produced 9 examples of lentil, 2 examples of bitter vetch, and 1 mericarp of rough-fruited bedstraw.

[210] Bitter vetch is also completely absent from the garrison sites of Beth Shean and Deir el-Balaḥ, but samples from both sites were only collected from nearly pure caches of cereals and flax (see Appendix 1).

[211] The slow adoption of the chili pepper (*Capsicum annuum*) within European foodways (E. Katz 2009) and the continued geographic isolation of strong-smelling fermented fish dishes such as the Swedish *surströmming* (Valeri 2011) provide modern and early-modern analogues.

have triggered a deleterious physiological response. Such experiences are integral to the human rejection of novel foodstuffs, with severe gastrointestinal distress being one of the primary contributors to food aversions (Garb and Stunkard 1974). Specifically, the symptoms of L-canavanine toxicity outlined in Section 5.2 has the potential to trigger nearly every neophobic food rejection motivation.[212] All of this is to make a relatively simple point. Bitter vetch would not have crossed cultural boundaries without substantial interpersonal interaction, either being prepared by someone familiar with the *chaîne opératoire* required for its safe exploitation or the sharing of the requisite knowledge via socialized learning. This applies to its use as either food or fodder, given that in the latter case improper use would have had disastrous results for herd management. Given the rarity of bitter vetch at garrison sites in the southern Levant and its total absence from sites in Egypt during and after the imperial period, there is no indication to suggest it ever was accepted across cultural boundaries.[213]

The situation is curious when compared to the situation of wheat discussed in Chapter 4, because if properly processed, there is no reason to assume that bitter vetch would have been particularly offensive.[214] Moreover, if we assume that an individual to whom the species was

[212] The hierarchy of rejection behaviors for novel foodstuffs includes distaste, danger, inappropriateness, and disgust. Distaste relates to sensory factors wherein the food does not conform to individual or societal taste profiles. Danger involves food rejections specifically based on the anticipation of harm on a scale ranging from the individual (e.g., allergenic reaction) to universal (e.g., the knowledge of poisonous fungi). Inappropriateness is mostly ideational, with the object being culturally classified as inedible. Disgust is characterized by both ideational and sensory-affective motivations, and can include the capacity of the object to contaminate acceptable items (P. Rozin and Fallon 1987, 24–25). The taxonomy is fluid, with foodstuffs potentially falling into multiple categories or contextual values (P. Rozin 1987, 185).

[213] Even well after the New Kingdom, there is no indication of bitter vetch cultivation in Egypt. It is absent from Ptolemaic or Roman period sites, either in the macrobotanical assemblage or within the well-preserved textual records of various agricultural estates (Rowlandson 1996, 20–21). There are some references to ὄροβος in late antique papyri, though it thought to signify fava bean (*Vicia faba*) (Bagnall 1993, 26). Additionally, macrobotanical remains from 19 sites ranging from the Ptolemaic to Islamic periods only revealed bitter vetch at four, and never in substantial quantities (W. Smith 2003, 75).

[214] No experimental work has been done on bitter vetch processing in the Levant, though methods have been reconstructed from Aegean macrobotanical remains (Valamoti, Moniaki, and Karathanou 2011). Consequently, the

foreign consumed properly processed bitter vetch, modern psychological literature on food acceptance behaviors suggests that it would have had a high probability of acceptance.[215] It is therefore necessary to recognize an array of possibilities to explain the absence of bitter vetch at a garrison like Jaffa. There is always the possibility that we have simply not found the proper context where bitter vetch might appear, though given the general biases against legume preservation and the robust presence of two pulse crops and one species of fodder legume in the Jaffa assemblage, this seems less likely. Instead, the regional survey of southern Levantine sites suggests that we are viewing an instance of genuine absence that requires an explanation accounting for ancient practices. Given that there was no shared tradition between Egypt and the southern Levant for bitter vetch exploitation, it seems that it faded in the cultural interaction zone in favor of pulse crops shared between both traditions, either as an accommodation between both groups during the development of a hybrid colonial foodways or because of active rejection by imperial personnel. The curious case of *Trifolium* at Jaffa might suggest the importation of a specifically Egyptian foddering practice to the region, suggesting a systematic transformation of legumes within local foodways, but these data are highly preliminary. Regardless of how we might view the absence of bitter vetch from Jaffa, it remained central to Levantine foodways at sites exhibiting limited evidence for direct imperial occupation. Consequently, it stands that bitter vetch—while a shared element of foodways throughout the eastern Mediterranean and

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sensory experience of Levantine bitter vetch consumption is unknown. All discussion has been anecdotal, namely Mordechai Kislev's assertion that Levantine peoples enjoyed its bitter flavor (personal communication in Butler 1990, 90) and Dirk Enneking's statement that after soaking in several changes of water it develops an "agreeable texture and a pleasant nutty flavor" (N. Miller and Enneking 2014, 262).

[215] Food acceptance is well-studied within child psychology, with a high maximum of 15 positive interactions being proposed as necessary for overcoming neophobia, a number that reduces with age (Lafraire et al. 2016).

Near East—likely became a mode of distinction specifically at the boundary of Egypto-Levantine interaction.

5.5 Conclusions

Universally agreed upon markers for ethnic distinction are rare in archaeology, and for the period of the Egyptian imperial occupation only one object type has achieved that status thus far in the literature—locally produced coarse culinary ceramics (see chapters 6 to 8).[216] Bitter vetch exploitation offers an equally valid possibility for similar reasons in that its use and appreciation signify more than just evidence of the object itself. Evidence for bitter vetch exploitation indicates a body of knowledge and a collection of techniques that unite a community of practice in the ability to use or consume it safely. In the southern Levant, this community of practice had deep roots that not only extended to the pre-agricultural period, but they also connected them to a foodways tradition common to neighboring regions to their north and east. Egypt lacked such a tradition, and therefore at the boundary of Egypto-Levantine contact bitter vetch must be regarded as a tradition wholly foreign to members of the colonial Egyptian population. But in the hybrid foodways that developed at garrison sites like Jaffa, there is currently no evidence to suggest that bitter vetch played a role despite the clear entanglement of imperial personnel with the local indigenous population evidenced in other realms of foodways. Bitter vetch exploitation persisted at other sites in the region, even at the highest social levels (e.g., Beth Shemesh), and yet it seems to have vanished from mixed population centers like Jaffa. It is impossible to say definitively why this happened. Bitter vetch could have become low-prestige local fare in the wake of the colonial encounter, it could have been actively or indifferently rejected by the

[216] This has been agreed upon for both the northern and southern extremes of the Egyptian empire, with Egyptian culinary ceramics marking the presence of Egyptians in Canaan (Martin 2011b; Fantalkin 2015) and Nubians at Egyptian colonial fortresses in modern-day Sudan (S. T. Smith 2003b; 2003c; 2013b).

imperial authority, or locals could have simply abandoned it in favor of a new, hybrid system that embraced other pulse and fodder crops. Continued acquisition of high resolution macrobotanical data—especially from garrison sites like Jaffa—is necessary to resolve whether the Egyptian attitude towards bitter vetch was one of indifference or aversion, and therefore whether it functioned as a more active or passive symbol of distinction. Nothing about bitter vetch suggests that it should have crossed the boundary between Egyptian and the Levantine foodways, and all evidence suggests that it never did. While the presence of bitter vetch in a southern Levantine context does not unequivocally inform on the identity an individual, it certainly indicates their position within a long chain of socialized learning, one with deep roots in local foodways.

Chapter 6 –The Jaffa Ceramics Study: Typology and Methods

Four decades ago, James Weinstein highlighted the local manufacture of Egyptian-style pottery[217] at southern Levantine sites as one of the most important—albeit overlooked—pieces of evidence pertaining to the New Kingdom empire (Weinstein 1981, 21). Since then, a growing appreciation of the diversity and frequency—indeed, oftentimes majority—of Egyptian-style pottery at southern Levant sites has contributed to a scholarly consensus that this industry is best explained through the influx of Egyptian personnel associated with the New Kingdom imperial apparatus (Killebrew 1998; 2005a; Morris 2005; Martin 2011b; Fantalkin 2015). Not everyone who used these forms originated from Egypt. And yet, both the production and consumption of Egyptian-style ceramics are linked to foodways with roots in Egyptian modes of doing. Since local Levantine ceramics remained available at all sites where Egyptian-style ceramics have been found, the selection of forms from one tradition over the other to fulfill daily needs was therefore a choice, variably informed by the individual habitus, the exigencies of context, and the shifting needs of identification in a dynamic colonial periphery. In this chapter, and the following chapters 7 and 8, I interrogate the archaeological evidence for this choice through time at the New Kingdom garrison site of Jaffa, Israel, using patterns across four functional categories of foodways ceramics—tableware, culinary forms, containers, and varia.[218] In this chapter, I introduce the methods applied within the broader ceramics study, including a brief delineation of the typological systems applied to the Jaffa assemblage (Section 6.1), the problem of differentiating Egyptian-style from Levantine ceramics (Section 6.2), an introduction to the data

[217] "Egyptian-style" pottery is used in this work to refer to forms that are morphologically, technologically, and/or decoratively Egyptian in character and yet were manufactured in the southern Levant. For differentiation vis-à-vis the terms "Egyptian" and "Egyptian-type," see Section 6.2.

[218] These categories are defined in Section 6.4.3.

recording system and computational system used within this dissertation (Section 6.3), and finally, an examination of the quantitative and analytical methods applied to the ceramics data (Section 6.4). These methods were selected to grapple with the issues of frequency analyses as it pertains to quantifying fragmentary pottery elements and, moreover, to deepen our understanding of the relationship between ceramics and identity beyond the more traditional metric of the bulk proportion between ceramics of various cultural traditions at a site (e.g., the proportion of Egyptian-style to Levantine ceramics as a direct index of "Egyptianization").

6.1 Typological Approaches to Egyptian and Levantine Ceramics in the Late Bronze Age and Their Implications for Cultural Analyses

Despite their common genesis in the early work of Sir Flinders Petrie, the typological study of Late Bronze Age Levantine and New Kingdom Egyptian ceramics remained largely separate fields of inquiry.[219] The limited overlap between the two fields meant that for much of the history of inquiry into Egypto-Levantine interaction, locally manufactured Egyptian-style ceramics—especially mundane coarse wares—went largely unnoticed within the assemblages of southern Levantine sites (Weinstein 1981, 21).[220] The first regional typology of New Kingdom ceramics—which examined sites in Nubia (Holthoer 1977)—transformed the field, providing a reference point and terminology for quotidian Egyptian ceramics that was then applied by both

[219] Levantine typologies effectively begin with Petrie's work at Tell el-Hesi, Israel (Petrie 1891), which was succeeded by the unpublished typology of Clarence S. Fisher ("Clarence S. Fisher" 1941; Amiran 1970, 13) and the *Corpus of Dated Palestinian Pottery* (Duncan, Petrie, and Starkey 1930). For Egypt, Petrie's numerous site-level typologies of New Kingdom ceramics (e.g., Petrie, Griffith, and Newberry 1890) defined the state of the field for the 19th through mid-20th century (see Aston 1996), with only Georges Nagel's partial typology from New Kingdom Deir el-Medina having a similar impact (Nagel 1938).

[220] For instance, Ruth Amiran regarded all forms of Egyptian pottery as scarce at Late Bronze Age Levantine sites (Amiran 1970, 187–90), predominantly because analysis at that point was based only on conspicuously foreign types such as those excavated by Petrie at Tell el-ʿAjjul and published in the *Ancient Gaza* series (Petrie 1931; 1932; 1934). This is especially true of decorated jars (Amiran 1970, Plate 58: 2-3, 6-7), which are largely unique to Tell el-ʿAjjul for chronological reasons (see Kopetzky 2011). Early exceptions to this issue include ceramics studies from the northern cemetery (Oren 1973) and habitation levels (James 1966; Yadin and Geva 1986) of Beth Shean.

regional and site-level studies of southern Levantine sites.[221] Anne Killebrew built off of these findings to construct a joint typological system that encompassed both Egyptian-style and Levantine ceramics jointly (Killebrew 1998; 2005a), an effort that transformed the disciplinary appreciation for the density and diversity of Egyptian-style forms at New Kingdom garrisons.[222] Up to this point, however, studies engaged with data from early excavations and only rarely was it possible to offer summary statistics comparing the frequency of Egyptian-style to Levantine ceramics. The situation was dramatically transformed with publication of an enormous body of data from Late Bronze Age sites—including Egyptian centers—throughout the southern Levant, which in turn corresponded with the publication of contemporary New Kingdom sites in Egypt and Nubia.[223] The rapid transformation of the data not only allowed for more refined regional typologies of Egyptian (Wodzińska 2010a; 2010b; 2010c; 2010d) and Levantine forms (Gitin 2015; 2019), but also improved field collection and data recording procedures made it possible to conduct rigorous quantitative studies. Work over the past two decades by Mario A.S. Martin has synthesized these new findings into a regional typology of Egyptian-style ceramics found at

[221] Holthoer's typology was especially influential in the analysis of Egyptian-style ceramics at Late Bronze Age IIB Beth Shean (James and McGovern 1993a; 1993b), which in turn greatly informed the early efforts for a regional typology of Egyptian-style ceramics (Yannai 1996; Higginbotham 2000, 145–70).

[222] Killebrew's work was assisted by a reappraisal of late New Kingdom ceramics published from Egyptian sites (Aston 1996). Simultaneous to Killebrew's work, Robert Mullins made important strides with the typology of Egyptian-style and Levantine ceramics dating to the Late Bronze Age I (Mullins 2002; 2007).

[223] In the southern Levant, this includes major publications of Late Bronze Age levels at Tel Aphek (Gadot and Yadin 2009), Ashdod (M. Dothan and Ben-Shlomo 2005), Ashkelon (Stager et al. 2008; Martin 2008; 2009a), Beth Shean (Mazar 2006b; Mazar and Mullins 2007; Panitz-Cohen and Mazar 2009), Tel Dan (Biran and Ben-Dov 2002; Ben-Dov 2011), Tel Dor (Gilboa et al. 2018a; 2018b; 2018c), Deir el-Balaḥ (T. Dothan and Brandl 2010a; 2010b), Hazor (A. Ben-Tor, Ben-Ami, and Sandhaus 2012; A. Ben-Tor et al. 2017), Lachish (Ussishkin 2004), Megiddo (Finkelstein, Ussishkin, and Halpern 2000; 2006; Finkelstein, Ussishkin, and Cline 2013), Tel Mor (Barako 2007b), Qashish (A. Ben-Tor, Bonfil, and Zuckerman 2003), Tel es-Safi/Gath (Maeir 2012), Tell es-Sa'idiyeh (J. Green 2006), Tel Sera' (Martin 2011b, 221–29), and Yoqne'am (A. Ben-Tor, Ben-Ami, and Livneh 2005). Comparative data from New Kingdom sites—especially those with domestic contexts—in Egypt and Nubia includes final reports for Amarna (Rose 2007), Askut (S. T. Smith 1995), Elephantine (Aston 1999), Memphis (Bourriau 2010; Hope 2016), Mendes (Hummel 2009), Qantir (Aston 1998; Aston and Pusch 1999), Tell el-Borg (Hoffmeier 2014; Hoffmeier and Bertini 2019), and Sai Island (Budka 2020).

Levantine sites (see especially Martin 2004; 2005; 2006a; 2011b), the finds of which largely remain the state of the field.[224]

6.1.1 The Typological System of this Study

The complex history of typologies for both Egyptian and Levantine ceramics has meant that published typologies are often confined to the level of individual sites. Even the most recent regional typologies of Egyptian (Wodzińska 2010a; 2010b; 2010c; 2010d) and Levantine forms (Gitin 2015; 2019) do not constitute exhaustive replacements for the profusion of published local typologies. For this dissertation, I adapted a hybrid system, both creating a unique intra-site typology for local Levantine forms as well as imported Cypriot and Aegean forms at Jaffa but adopting Martin's (2011b) regional typological system for imported Egyptian and locally manufactured Egyptian-style ceramics.[225] While the formal typology of the ceramic assemblage from Jaffa will be published elsewhere (Damm and Pierce Forthcoming; Damm Forthcoming b; Pratt Forthcoming; Yannai Forthcoming), a brief summary of typological groups is provided in appendices 8 through 10, which includes the type codes and corresponding reference images/drawings for all types referenced within this dissertation. Typological separation was based almost exclusively on vessel morphology or type-specific decoration, though in some cases fabric provides the main criteria for delineating morphologically similar Egyptian-style and Levantine types (see Section 6.2). Collectively, the nomenclature used for each type follows the

[224] An updated summary of Martin's work was recently conducted by Eliezer Oren (2019).

[225] Notably, there are a number of intra-site typologies for Egyptian-style ceramics including Tel Aphek (Martin, Gadot, and Goren 2009), Ashkelon (Martin 2008; 2009a), Beth Shean (James and McGovern 1993a, I:69–80; Mullins 2006; 2007, 440–50; Martin 2006b; 2009c), Dan (Ben-Dov and Martin 2011), Deir el-Balaḥ (B. Gould 2010), Jaffa's 18th Dynasty kitchen (Pierce 2013, 471–531), Hazor (Martin 2017), Megiddo (Martin 2009b), Tel Mor (Martin and Barako 2007), and Tell es-Sa'idiyeh (J. Green 2006, 310–66). To this list can be added the body of work by Katia Nataf, which offers a typology for those forms found at Hazor, Megiddo, and Lachish (Nataf 2012; 2013; 2014). These systems are subsumed by Martin's (2011b) broader typology, and consequently the alternative designations for forms from these other reports will not be used within this dissertation.

same system. Vessels were first given a two-letter shape code, which was then followed—if necessary—by a numeric designation for a subcategory of that shape. If further subdivision was required, a lower-case letter was appended. For example, the designation BL3a indicates an Egyptian-style bowl (BL) from subtype 3 (simple bowls with flaring rim) of subdivision a (medium deep flaring-rim bowl).[226] The system is useful in that it offers three scales of precision, allowing small vessel fragments that resist narrow classification to be placed within broader type families, which is critical especially for classifying the highly fragmentary assemblage excavated by Kaplan in the Lion Temple area (see Chapter 8).

6.2 Egyptian vs. Egyptian-style vs. Levantine – The Problem of Terminology and Ceramic Traditions

While the typological system described above in Section 6.1.1 implies a relatively stable system for differentiating between the various cultural traditions for ceramics at Jaffa, the situation is in fact complex and the classificatory terminology bears further comment. Ceramic forms that exhibit the morphological, decorative, and technological features common to pottery produced in New Kingdom Egypt are split between two distinctions: Egyptian-style and Egyptian. I use the former in reference to forms that exhibit the hallmarks of the Egyptian ceramic tradition yet were produced locally at sites in the southern Levant, whereas I only apply the latter term to vessels imported from Egypt.[227] When both categories are referred to collectively, I use the umbrella term "Egyptian-type" pottery (following Martin 2011b, 17). This can be contrasted with my usage of the term "Levantine," which encompasses locally produced vessels that exhibit all the

[226] In this way, my typological system for both the local Levantine and Cypriot/Aegean forms at Jaffa follows the generic nomenclature system used by Martin (2011b), allowing for simpler data processing (Section 6.3).

[227] This is the consensus usage (James and McGovern 1993a; Killebrew 1998; 2004; 2005a; Higginbotham 2000; Mullins 2002; 2007; Morris 2005; Martin, Gadot, and Goren 2009; Martin 2011b; Pierce 2013; Fantalkin 2015).

hallmarks of the Levantine ceramic tradition, as well as “Cypriot” and “Mycenaean,” which are used exclusively in reference to imports from either of those regions.[228] Finally, rare forms that exhibit characteristics of both the Egyptian and Levantine ceramics traditions are subsumed under the term “hybrid,” a purely technical classification that is not meant to interpret the motives behind the manufacture of the vessel.[229]

Since there are shared morphologies and decorative styles across both the Egyptian and Egyptian-style as well as Levantine and Egyptian-style manufacturing traditions, these terms are deeply entwined with the typological system used in this dissertation (see Section 6.1.1). The differentiation between Egyptian imports from locally manufactured Egyptian-style forms is a relatively simple prospect, they are readily distinguished based on fabric, with New Kingdom fabrics being well-studied (Bourriau and Nicholson 1992; Bourriau, Smith, and Nicholson 2000) and macroscopically distinct from local Levantine clay sources.[230] Since Egyptian-style and Levantine forms are both manufactured from local clay sources, their distinction is more complex. Following convention, I only applied the designation Egyptian-style to vessels with the co-occurrence of multiple features from the Egyptian ceramic tradition. These criteria have been explored in depth elsewhere, and therefore only a summary presentation is provided here (see D. Arnold and Bourriau 1993; Martin 2011b, 91–122; Pierce 2013, 462–529).

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[228] While both traditions were imitated in the Levant (Prag 1985), no such examples are known from Jaffa.

[229] Though there have been calls to abandon the term hybrid (Hitchcock and Maeir 2013; van Pelt 2013; Stockhammer 2013), this has been more against its utility as an explanatory term for cultural process.

[230] Identification of Egyptian imports at Jaffa was also confirmed petrographically by Mary Ownby (Forthcoming).

Figure 4: Elements of the Egyptian-style ceramic manufacturing industry at Jaffa including (A) straw tempering (**JCHP 475**, **Photo JCHP_475k**), (B) exterior scrape marks (**JCHP 561**, **Photo JCHP_561n**), (C) trimming marks and string cut bases (**JCHP 562**, **Photo JCHP_562d**), and (D) the red "lipstick rim" (**JCHP 471**, **Photo JCHP_471j**).

From a morphological, technological, and decorative standpoint, nearly every Egyptian-style vessel excavated in the Levant is rooted in the Egyptian manufacturing tradition of coarse domestic pottery from the Nile clay fabric family, resulting in several key contrasts with the Levantine ceramics tradition (see Figure 4). Notably, Egyptian-style forms contain a high density of organic temper, usually chopped straw or dung, which due to a lower firing temperature results in a high carbon-content fabric that often leaves straw rods intact (see Figure 4A). Also, vessel exteriors were commonly scraped to even the surface, resulting in characteristic parallel lines and a rougher overall surface texture (see Figure 4B). For open forms, the overall tendency within the Egyptian-style potting tradition was towards flat bases that were removed from the wheel via string cutting, the after-effects of which were generally still visible on the base in the form of a tell-tale swirl of clay that was often obscured by the equally common tendency to trim bases (see Figure 4C). One final characteristic element is decoration, with several distinct techniques being completely unique to the Egyptian ceramic tradition—namely the so-called red-splash decoration and much rarer blue pigments.[231] Even the decorative techniques shared between the Levantine and Egyptian traditions, namely the use of red slips, red-painted lines, and most importantly, the red-painted rim (the so-called "lipstick rim"), can be differentiated at Jaffa based on the quality of the red pigment and the forms to which it is applied (Figure 4D).

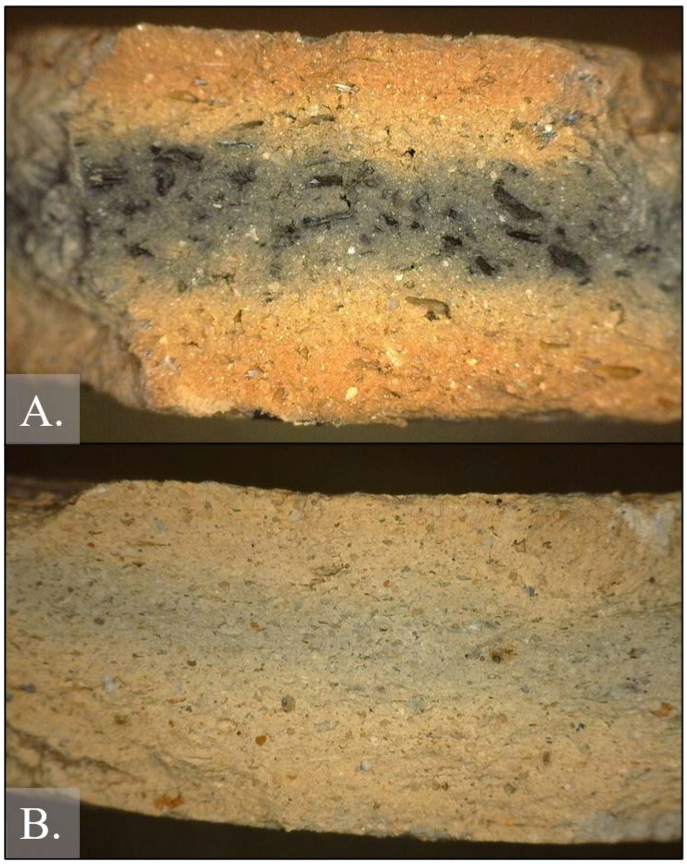

Figure 5: Comparison of typical (A) Egyptian-Style (**JCHP 531**, **Photo JCHP_531o**) and (B) Levantine (**JCHP 581**, **Photo JCHP_581c**) fabrics at Jaffa.

Individually, these characteristics do not necessarily differentiate Egyptian-style from Levantine ceramics, however the co-occurrence of several features makes the identification

[231] Blue pigment—though uniquely Egyptian as a ceramic decorative element—is extraordinarily rare in the Levant and currently unknown at Jaffa. Made famous by the so-called "Amarna Blue" vessels (Hope 1991; Budka 2013; 2015a), most examples are known from Tell el-ʿAjjul (Oren 2019, P1s. 4.1.11, 4.1.21-22, 4.1.25).

secure. For instance, organic temper became gradually more popular in the Levantine ceramic tradition during the Late Bronze Age, possibly due to interaction between potters from both traditions (Martin 2011b, 98–99). Therefore, it cannot serve as the sole diagnostic marker, especially at sites where both traditions used the same clay source. At the site of Tel Aphek, however, all Egyptian-style forms were produced from a previously unexploited clay source that was distinct from the one used in the contemporary Levantine ceramics tradition. This was hypothesized by the excavators to be a unique case of Egyptian potters seeking a clay source that was compositionally similar to their familiar Nile clays (see Martin 2011b, 102–3). A similar situation can be argued for Jaffa, where nearly all Egyptian-style forms at the site utilized a distinct clay source that can be differentiated from the contemporary products of the Levantine ceramic industry (see Figure 5).[232] There are no examples of purely Levantine forms being produced in this fabric, with all possible examples exhibiting multiple hybrid characteristics (e.g., **JCHP 303**). Consequently, in addition to the list above, this fabric group, characterized by its reddish to reddish-brown color and sand grain inclusions, forms an additional criterion for identifying vessels from the Egyptian-style corpus at Jaffa. Consequently, in all cases, the typological separation of vessels between Egyptian-style and Levantine for the purposes of the frequency analyses conducted in this dissertation was always based on the satisfaction of multiple criteria. All ambiguous forms are explicitly acknowledged in the text alongside their quantitative weighting and/or impact on the analyses presented here.

[232] This was proposed already for the material from Kaplan's excavations in the Ramesses Gate area (Pierce 2013, 465–66), and I have since confirmed it applies to all other excavation areas and phases at Jaffa.

6.3 The Dataset –The Late Bronze Age Ceramic Assemblage from Jaffa

Jaffa has a long history of excavations (see Peilstöcker 2011), though only two projects have contributed primary data for this dissertation—the excavations of Jacob Kaplan (1955 to 1981) and those of the Jaffa Cultural Heritage Project (JCHP; 2011 to 2014). The data comes from two areas that were excavated by both projects, the Ramesses Gate and Lion Temple areas, both within Kaplan's original Area A. The excavation history, contexts, and finds from these two areas are reviewed in Chapters 7 (Ramesses Gate area) and 8 (Lion Temple area), however I will discuss some characteristics of the data here. The Ramesses Gate area produced two main assemblages, the ceramics excavated by Kaplan between 1955 and 1962 (n = 144) and the material recovered by the JCHP in from 2011 to 2014 (n = 818). The assemblage from Kaplan's excavations has already been subject to a dissertation (Pierce 2013) and preliminary report (Burke, Peilstöcker, et al. 2017), and these results will be cautiously joined with my novel analysis of the material from the more recent JCHP excavations. Kaplan's collection and recording strategies were exemplary for the time (Burke 2011, 239–41; Keimer 2011), therefore the caution has nothing to do with the overall quality of these data.[233] The reason is methodological, as missing documentation and unclear object retention practices from this period of Kaplan's excavations means that his recovered finds cannot be treated as a single quantitative sample with those of the JCHP.[234] The effect is amplified since the JCHP used high resolution collection procedures such as wet sieving and flotation alongside the complete retention of all

[233] This material has been used to great effect in studies that focus on the presence/absence of certain forms and functional analyses (Burke and Lords 2010; Burke and Mandell 2011; Pierce 2013; Burke, Peilstöcker, et al. 2017)).

[234] The archive from the 1958 to 1962 excavations is incomplete, lacking for instance a complete list of all excavated pottery buckets (Burke 2011b, 240, n. 7). Moreover, the ceramic assemblage from this period of excavation is comprised almost entirely of registered objects, most of which preserve a full vessel profile. The near total lack of nondiagnostic sherds suggests selective retention practices, the parameters of which are unknown.

excavated sherds, and therefore the separate discussion of these assemblages is necessary to refrain from harmonizing incommensurate quantitative variables. Fundamentally, this study will refer to Krystal Lords Pierce's (2013) original analysis of Kaplan's materials in a more qualitative sense, whereas the forms excavated by the JCHP will be subject to direct quantitative analyses.

In contrast, the material excavated by Kaplan in the Lion Temple area, for which this dissertation constitutes the first analysis, presents fewer such variables and can be readily integrated with the assemblage from the JCHP excavations in that area. The stored assemblage includes both diagnostic and non-diagnostic sherds, with many boxes containing hundreds of non-diagnostic sherds in the 1 x 1 cm size range—indicating the full retention of sherds recovered by dry sifting. This assemblage can therefore be subject to the same types of quantitative study as the material from the 2014 JCHP excavations. Moreover, all the Late Bronze Age material excavated by the JCHP in 2014 came from loci that can be directly equated with features excavated by Kaplan, meaning that both assemblages can be discussed as a single sample (n = 1,300). Collectively, both excavation areas provide insight into the entire history of the New Kingdom garrison community at Jaffa, embracing a wide variety of activity spheres. Both areas have their own strengths. The Ramesses Gate area produced a much greater number of restorable vessels in comparison to the Lion Temple area, albeit from the very beginning and end of the occupation. In contrast, the assemblage from the Lion Temple area is much for fragmentary, yet it provides a continuous diachronic sequence of superimposed, stratified material from the entire period of the occupation. Collectively, both areas are complimentary, allowing for robust insights into practices in the garrison community.

6.3.1 OCHRE and the JCHP Recording System

This section provides a brief introduction to the nomenclature and data recording systems of the JCHP, which will enable the reader to search for all objects and contexts referenced within this dissertation using the Online Cultural and Historical Research Environment (OCHRE).[235] All searchable items have unique identifying codes within OCHRE, all of which are rendered in bold text within this document. Registered objects from Kaplan's excavations received an MHA number (e.g., **MHA 1234**), though registered objects from the JCHP excavations fall into two distinct categories. The first is the JCHP number (e.g., **JCHP 123**), which applies broadly to all objects destined for publication. The second are registered sherd numbers, which were given to all diagnostic sherds excavated by the JCHP. This number is derived from the pottery bucket number with an appended, sequentially assigned three-digit code (e.g., **Reg. Sherd 1234.001**, **Reg. Sherd 1234.002**, etc.).[236] In addition to appearing in this text, all object registration numbers serve as unique identifiers in my ceramics database (see appendices 11 and 13).[237] I also render spatial units in bold, with these items likewise being searchable within the OCHRE database. The pottery bucket (see n. 236) forms the lowest unit in the spatial hierarchy. For the JCHP it is a non-recurring sequence that began in the first year of excavations (e.g., **PB 1234**, **1235**, etc.), though for Kaplan the sequence restarted each season. Consequently, the JCHP prefixed Kaplan's original pottery bucket numbers with the excavation year to assist in the

[235] The function of OCHRE within the JCHP data recording system is published elsewhere (Burke and Peilstöcker 2011), as is a usage guide for the platform (Schloen and Schloen 2012).

[236] The term pottery bucket (Hebrew "סל") is the most basic unit of excavation. It contains all the finds collected on a specific date from a definable spatial unit between fixed vertical elevations (Dever and Lance 1978, 37–38).

[237] Since Kaplan did not register diagnostic sherds, within my database I created one by appending a letter to the pottery bucket number (e.g., **1974.001a**, **1974.001b**, etc.) where necessary.

sequential identifier (e.g., **1974.001**, **1974.002**, etc.).[238] Beyond the pottery bucket system, Kaplan and the JCHP used a largely identical system of progressively larger spatial units of loci, squares, and then excavation areas.[239] Of these, loci are the most important analytical unit within this dissertation as they form the primary unit within which ceramic assemblages are contained. The final bolded element within this text are archival resources (e.g., top plans), for which I will always provide the unique searchable identifier in bold to allow the reader to locate the original document via OCHRE or on the JCHP private server. Collectively, the bolded elements allow the reader to reference all information provided within this dissertation against the original documentation from the excavations of Kaplan or the JCHP, allowing for transparency in all calculations or interpretations.

6.3.2 The Data Recording System and the Use of R

To make my analyses both transparent and reproducible, this section describes the data collection procedures for this dissertation. I collected data for this study between 2014 and 2019, and while pottery reading of the assemblages from both Kaplan's and the JCHP excavations were conducted by other individuals prior to 2014, I reexamined all objects analyzed within this dissertation.[240] Since the JCHP conducted ceramics analysis in tandem with excavations, all data used within this dissertation was recorded directly into the OCHRE database. Similarly, due to past analytical work on the material from Kaplan's Ramesses Gate excavations (e.g., Pierce 2013), registered objects from this excavation were also already recorded in OCHRE with all

[238] This only applies to Kaplan's excavations between 1970 and 1974. His earlier excavations in the Ramesses Gate area used a more convoluted system based on the date the bucket was collected and several additional modifiers.

[239] The JCHP also used a spatial unit at the level between pottery buckets and loci—the finegrid. The finegrid represents a grid of 1 x 1 m units within the 5 x 5 m square, which allowed for a finer degree spatial recording when working above living surfaces. With respect to loci, in addition to Kaplan's originally assigned loci, any locus designations that were retroactively created for his excavations by the JCHP begins in a sequence starting at 12,000.

[240] Past pottery specialists include Aaron A. Burke, Martin Peilstöcker, George A. Pierce, and Krystal Lords Pierce.

metrical information populated. In contrast, pottery buckets from Kaplan's 1970 to 1974 Lion Temple excavations had only been subjected to preliminary reading, and therefore beginning in 2016 the JCHP began the process of comprehensively reviewing the 2,965 pottery buckets from this excavation. After this, I selected all pottery buckets of stratigraphic relevancy to the current study (n = 466), beginning with the Middle Bronze Age and concluding the late Iron Age to ensure total coverage of the period of the Egyptian garrison at Jaffa. Every diagnostic sherd from this group was examined, and these data formed the last component of the dataset for this dissertation.

I optimized the ceramics data for collective analysis by recompiling it into two Microsoft Excel spreadsheets—one for each excavation area (see appendices 11 and 13). Each sherd was given a unique identifier (see Section 6.3.1) and datapoints were captured across three main categories: contextual, typological, and metrical. Contextually, each sherd was associated with its pottery bucket number, locus number, and phase. Several fields capture typological information, which includes two generic fields for prose descriptions and columns for type family, subfamily, and subgroup (see Section 6.1.1).[241] Other recorded variables include whether a sherd is decorated, imported, as well as individual fields marking specific decorations such as the "lipstick" rim, red-splash decoration, red slip, and burnishing, as well as manufacturing techniques such as straw temper and string-cut bases. The latter group of characteristics were pre-selected as criteria differentiating Egyptian, Egyptian-style, and Levantine ceramics (see Section 6.2). No special fields were created for the characteristics of local Levantine or other common Late Bronze Age import ceramics (e.g., Cypriot), since these elements are already captured within typological designations. Finally, metrical data was recorded for each sherd,

[241] The prose elements include a generic descriptive name and a notes column for any additional characteristics.

with rim/base diameter and percent preserved being the most crucial variables necessary for the analytical procedures used within this study (see Section 6.4). Collectively, this data allows for the high-resolution characterization of assemblages from both a quantitative and qualitative standpoint, enabling diachronic analyses across the entire period of the Egyptian occupation.

The ceramics data was analyzed using R, with all coding conducted within RStudio (RStudio Team 2015). In addition to RStudio, data manipulation was assisted by three coding packages. Data manipulation and cleaning were assisted by the *plyr* and *dplyr* packages (Wickham 2011; Wickham et al. 2020), and data visualizations were produced using *ggplot2* (Wickham 2016). To ensure complete transparency and reproducibility, I provide links for downloading the R Markdown files in appendices 11, 13, and 15.[242] The R Markdown file is a plain-text formatting syntax which embeds and displays all the coding chunks used for analysis (Xie, Allaire, and Grolemund 2018), and for the sake of the reviewer, I have included in each file a prose description of each coding chunk explaining the rationale behind each coding operation. Collectively, the R Markdown files and their associated data constitute the total environment necessary for reconstructing all analytical procedures used within this dissertation. Thus, the appendices make all elements of this environment available as a single compressed file, downloadable directly from OCHRE. The reader can therefore deconstruct and critique not only my conclusions, but also the underlying methods that contributed to every single datapoint used in the articulation of those conclusions.

[242] Reproducibility here means inferential reproducibility, or "the making of knowledge claims of similar strength from a study replication or reanalysis" (Goodman, Fanelli, and Ioannidis 2016, 2). Thus, analytical procedures and data outcomes can be replicated by others, albeit allowing them to interpret those outcomes differently.

6.4 Quantitative and Analytical Methods

For a foodways analysis of ceramics, the intent is to associate the abstract quantities of forms with practices over time. This section outlines the methodological steps I took to achieve this objective across the categories of quantification procedures (Section 6.4.1), the illustration of diachronic patterning (Section 6.4.2), the integration of functional analysis (Section 6.4.3), and finally, the comparison with assemblages from other sites (Section 6.4.4). Quantification refers to two separate issues: how the ceramic assemblage is translated into a system of counts and the quantitative procedures applied to those counts after they are generated. The problem of tracking diachronic change relates to the methods by which the similarities and differences of each phase are assessed and includes the types of data visualization structures used to highlight patterning. The integration of functional studies relates to the division of vessels into analytically useful functional categories, including the issue of integrating methods such as residue analysis. Finally, the problem of comparison with other sites specifically addresses how the data from Jaffa can be compared to other regional centers, notable those wherein different methods of quantification were used in the publication of the assemblage.

6.4.1 How Many Parts Make a Whole: Quantitative Methods in Ceramics Analysis

The first consideration in any quantitative study is the principle by which a ceramic assemblage is translated into a measurable quantity. In this study, counts will be based on two procedures, simple sherd counts and Estimated Vessel Equivalencies (EVEs). The former has well-known issues of representativeness, since small fragments are weighted equally with complete pots (Nance 1987; Orton and Hughes 2013, 206–7). It will, however, be provided here as a baseline since—in addition to providing useful quantitative information about an assemblage—it also forms the basis of all other methods for quantifying sherds. While a multitude of methods have been proposed to eliminate the biases of raw sherd counts (see Orton and Hughes 2013, 203–18), I selected Estimated Vessel Equivalencies (EVEs) because they treat diagnostic elements of a vessel proportionally, meaning that fragmentary assemblages can be compared to those with a high proportion of restorable forms. With EVEs, portions of a vessel which can be rendered as a clear fraction of a whole diameter—i.e., rims and bases—are added up to reconstitute a theoretical minimum number of vessels (Orton and Hughes 2013, 210). For example, if 10 fragments of type BL1a bowl rims are recovered from a context, each preserving 10% of the rim diameter, then these equate with a minimum of one complete type BL1a bowl via EVEs (10% x 10 fragments = 100% of a whole vessel).[243] The value of one vessel is an abstraction, It does not signify the existence of only one bowl within the assemblage, but rather offers a means to differentiate complete from fragmentary objects within the system of counts.

While EVEs offer a weighted means to quantify fragmentary elements, is does not account for factors that produce an assemblage, such as the survivability of certain vessel elements over others, contextual biases against ceramic fragmentation and/or preservation, or vessel use-life—all of which affect the nature and quantity of vessel elements preserved (Rice 1987, 292–93; Baxter and Cool 1995, 90; Orton and Hughes 2013, 212).[244] Consequently, the final EVE numbers reported in this dissertation do not create a Pompeii premise for the exact contents of an assemblage at the time of deposition (following Michael B. Schiffer 1985), but rather they provide standardized mode of quantification based on reproducible procedures that

[243] In the original formulation, EVEs either used the value of rims (Egloff 1973) or the EVE value of rims and bases were added together and divided by two (Orton 1982, 164–67). In this study I retain the EVE values for bowls and bases as complimentary datasets. Thus, my method is closer to the Minimum Number of Individuals (MNI) approach in the Protocol of Beuvray (Arcelin and Tuffreau-Libre 1998). Regardless, it has been demonstrated that the traditional method of EVE calculation and the MNI method, while producing different counts, still effectively demonstrate the same general trends within ceramic assemblages (Strack 2011).

[244] EVEs do, however, address differential degrees of breakage between vessel types (Corredor and Vidal 2016).

can in turn be compared with other assemblages that were quantified by known procedures. Within this dissertation, I provide the EVE counts underlying all discussion except in cases of qualitative summary. Independently, however, all EVE values for each phase can be examined in appendices 12 and 14, which provide EVE tables and prose summaries of each assemblage.

My use of EVEs is not novel within Levantine archaeology, with similar methods being applied at other sites of comparative interest to New Kingdom Jaffa. Robert Mullins' (2007) utilized a system in his analysis of the Beth Shean materials from Area R that he called the "type-percentage quantitative seriation method," which was adapted from previous analyses developed at Tel Qasile (Mazar 1985, 21–108) and Tel Batash (Mazar and Panitz-Cohen 2001, 12–14). Like EVEs, this involves dividing diameter measurements into eighths and counting these eighths as a proportion of a hypothetical whole vessel. In contrast to my methods, this involves a substantial amount of rounding, as sherds equating to less than an eighth the vessel diameter are rounded up to represent an eighth of a preserved vessel—introducing a degree of error for speedier quantification (Mazar and Panitz-Cohen 2001, 13; Martin 2009, 470).[245] Another example comes from Mario A.S. Martin's "method 1/100"—effectively identical to my use of EVEs—that he applied to the 13th-11th century BCE strata in areas N and S at Beth Shean (Martin 2009c, 470–71). The only difference is that where Martin rounds off decimals in his results (Martin 2009c, 435), I do not. While it seems incongruous to refer to 0.78 of a bowl, the effect is meant to be heuristic. By leaving decimals intact, my attempt is to preserve the caution that EVEs do not reconstruct hypothetical assemblages, but rather provide a standardized method

[245] Martin notes that Mullins' method—there referred to as "method 1/8"—is more effective than raw sherd counts but less effective than EVEs. As can be seen from Martin's Fig. 6.9, the method 1/8 produces greater discrepancies with higher quantities of sherds (Martin 2009, 470). As an abstract example, the use of EVE calculations to quantify 20 sherds of a single type that each preserve 5% of a vessel diameter would result in an EVE equivalent of one vessel. If we were round each of these sherds up to 1/8th of a vessel—12.5% of a preserved diameter—then the method 1/8 would provide an estimate of 2.5 vessels, substantially inflating the count.

for quantifying a minimum number of preserved vessels. Consequently, I always render EVEs to three decimal places to reflect the inclusion of rim diameters below 10% preservation (e.g., 2.5% rim preserved equals 0.025 EVEs)—even in cases of whole numbers (e.g., 1.000 EVEs).[246]

Finally, there is the matter of the loci that I selected for analysis, which follows Amihai Mazar and Robert Mullins' procedure for grading loci from most to least secure. Loci are split between three grades, with Grade A defined as well-stratified secure contexts related to use-life, Grade B referring to stratified debris layers, and Grade C including all other dubious contexts that are either intermixed or disturbed (Mazar and Mullins 2006, 22). Following Mullins (2007, 391) and Martin (Martin 2009, 455), I only analyze ceramics from loci that I have graded A and B. The inclusion of grade B contexts, while raising the potential for the presence of residual materials, is necessary considering that much of the stratigraphy within the Ramesses Gate complex stems from the structural collapse from the second story of the gate. Similarly, specific levels within the Lion Temple area contain contemporary rubbish deposits and construction fills dense with finds, with one such deposit containing the only restorable Egyptian-style store jar (**MHA 4232**) from the terminal Egyptian occupation. In both cases, failure to include Grade B assemblages would exclude fully restorable vessels from the final analysis.

6.4.2 Dealing with Diachronic Change – Plotting the Ceramics at Jaffa through Time

After quantification, the next methodological concern is the demonstration of diachronic patterning. In this dissertation, I make no attempts to extrapolate from the data to reconstruct hypothetical site-level assemblages, but rather describe patterns as they appear within the assemblages of each excavation area. Effectively, my analysis is concerned specifically with the frequency of types within the traditional confines of Exploratory Data Analysis (EDA), or, as it

[246] Measuring the percent preservation of small sherds is difficult and subject to error, but practically speaking that error is likely to be expressed at the level of one hundredth to one thousandth of an EVE per sherd.

was defined by its early proponent, "looking at data to see what it seems to say" (Tukey 1977, v). Specifically, I do not attempt to model beyond the recovered assemblage of ceramics for the sake of comparison with sites elsewhere in the southern Levant, nor do I conduct confirmatory data analysis—though the patterns gleaned via exploratory analyses of the Jaffa ceramics could serve as fodder for confirmatory analyses later.[247]

After the issue of modeling, the next crucial question relates to the placement of assemblages within chronological periods. For this, I adapt the common language of phases and subphases used within Levantine archaeology, with the former centering on large-scale characterizations of architecture and chronological period (e.g., reorientation of structures along a new plan) and the latter generally indicating discernible shifts within an archaeological phase (e.g., the division of rooms within a house by the addition of a new wall). However, phases and subphases tend to subsume smaller incremental changes, as they often are not designed to capture short-term diachronic developments such as superimposed floor layers within a structure. Consequently, within this study, I introduce a third division of diachronic patterning to refine the scale further, which I refer to as the "assemblage group". Returning to the language of context gradations, assemblage groups differentiate between either superimposed Grade A contexts within a phase/subphase or contexts graded A and B within a phase/subphase. Assemblage groups therefore separate assemblages based on their chronological ordering within a phase, addressing issues such as residuality or subtle shifts in practice that might have occurred within the span of a single phase. While phases and subphases form the main unit of analysis, occasionally insights are drawn from assemblage groups to bolster interpretations. For reference,

[247] Again, following John Tukey, "Unless exploratory data analysis uncovers indications, usually quantitative ones, there is likely to be nothing for confirmatory data analysis to consider" (Tukey 1977, 3).

a full quantitative characterization of phases, subphases, and assemblage groups is provided in appendices 12 and 14.

The final issue relates to the demonstration of diachronic patterns, for which I utilize several quantitative tools. The first—and simplest—of these tools will be the use of central tendency measures such as mean, median, and mode, which will always be paired with an accurate characterization of variation (following Weisberg 1992). For this study, the primary means of demonstrating variability are standard deviation, standard error, and/or the coefficient of variation. Furthermore, any calculated value—be it an EVE value or a central tendency measure—will also include the number of objects used to make that calculation, included either in the EVE table or a parenthetical note using the format of (n = X)—a necessary figure to comment on potential issues of representativeness. In addition to central tendency measures, the proportional frequencies of types—often shown graphically—constitutes the other major method for characterizing patterns. As with EVEs more generally, these figures will not appear in qualitative summaries of the assemblages, but rather are used extensively in the quantitative analysis of patterns within both the Ramesses gate (Section 7.3) and Lion Temple (Section 8.3) areas as well as in the quantitative summaries of appendices 12 and 14.

The frequency of types can, however, be nuanced further to demonstrate the diachronic transformation of foodways at Jaffa, which I accomplish by exploring variation as it occurs across functional groups as well as by examining intra-type variation through time. For the former, I examine the co-occurrence of ceramics from the Egyptian and Levantine tradition from broad functional families: tableware, culinary wares, containers, and varia (see Section 6.4.3). Instead of comparing the simple proportion of Levantine to Egyptian-style vessels, I argue that such proportions are more useful when considered across functionally equivalent types (see also

Damm Forthcoming a). A useful concept for this is James Sackett's notion of isochrestic variation, defined as the "seemingly equally valid and feasible options we may regard as functional equivalents with respect to a given end" (Sackett 1982, 72; but see also 1985; 1986). Given the co-existence of both the Levantine and Egyptian-style ceramics industries at Jaffa, the occupants of the city were presented with an array of isochrestic variants from which to accomplish various foodways-related objectives. Even for those forms that lack an explicit functional counterpart (e.g., Egyptian "flowerpots"), it is more useful to compare them to the overall culinary assemblage rather than to Levantine forms in general. Consequently, the diachronic examination of proportional frequency within functional categories directly comments on the manifestation of elements of the Egyptian or Levantine habitus at Jaffa, as well as the existence of specific communities of practice related to the production of food or the execution of the meal.

The analytical use of intra-type variation in social analyses is relatively rare within Levantine and Egyptian archaeology due to the labor-intensive nature of data collection, however, it can shed further light on the use and appreciation of ceramics at Jaffa.[248] Patterns in intra-type variation have been used to identify feasting (Blitz 1993), explain commensality behaviors (Hawthorne 1996), explore functional interpretations (Kramer 1985), explore production systems (Gupta-Agarwal 2015), and delineate socio-economic stratification (M. Smith 1987). Regardless of interpretation, formalized size-groupings within individual types suggest socially significant processes. The quantification methods proposed thus far are insufficient to address the issue, however, as EVEs homogenizes assemblages based on type and the percent preservation, eliminating elements where variability might be expressed. Instead, I

[248] One of the rare exceptions, using the "type envelope" system (Orton, Tyers, and Vince 1993, 158–59), was in the publication of the Iron Age ceramics from Sarepta (W. Anderson 1988; Khalifeh 1988).

use rim and base diameters, which are straightforward to measure and readily differentiated between the Egyptian-style and Levantine ceramic manufacturing traditions.[249] Data visualization provides an ideal means to characterize these data, and the tool selected within this study is the violin plot. Violin plots, which combine the summary statistics of a box plots with a symmetrically plotted density trace, allows for the rapid summary data to be combined with a visual representation of the magnitude of density within certain metrical groupings (Hintze and Nelson 1998). The more formalized diversity is within a ceramic type, the narrower the peaks are at specific diameter measurements. The more random the variation, the broader the peaks will be—if they are discernible at all. From this method of rapid characterization, subtle shifts with respect to size groups can be assessed independently of broader type frequencies.

6.4.3 Integration of Functional Analyses

This section briefly outlines the functions ascribed to vessels for the sake of diachronic analysis, as the functional groupings central my quantitative analysis straddle both empirically determined functions as well as plausibly inferred functions. For the former group, the results of a forthcoming gas chromatography/mass spectrometry (GC/MS) residue analysis are applied on a type-by-type basis where relevant, as is any data derived from the visible use-alteration of vessels.[250] Lacking these data, functional categories must be inferred. If constrained definitions are avoided in favor of broader categories, it is possible to divide the assemblage without too much anxiety over exhausting the functional interpretation of a type. I loosely follow Ann Killebrew's system, which differentiates kitchen wares (subdivided between table and cooking

[249] Variation in rim thickness—while of demonstrable utility (see Kamp 2001; Gupta-Agarwal 2015)—is more complex to record systematically, with the location of measurement contributing to substantial variation.

[250] The GC/MS study will be published separately from this dissertation (Damm Forthcoming c), though preliminary results are discussed in Appendix 16. My thanks go to both Hans Barnard and Kym Faull for their mentorship, without which that study would not have been possible. For use-alteration, see James Skibo (1992).

wares), containers, and varia (1998, 80). Her last category of varia is of limited immediate use, as it mostly consists of forms that are rare or absent in the Jaffa assemblage—namely lamps, cup-and-saucer vessels, and spinning bowls. However, it is retained since it is useful for capturing forms at Jaffa that were not considered within Killebrew's system (e.g., the pot stand). I further modify Killebrew's system since it includes the type BB jar—there referred to as a "beer bottle"—under the heading of varia. In this study, this form is lumped with culinary wares since all evidence currently points to its culinary function (Martin 2011b, 54-55). Consequently, I use the following categories to separate the assemblage: tableware, culinary wares, containers, and varia.[251] While each assumes a function, the ascribed functions are sufficiently general as to not be unwarranted. Fundamentally, they serve as heuristically useful devices for categorizing the current dataset and tracking its transformation through time.

6.4.4 Comparative Analysis with Other Sites

The final methodological concern is the comparison of the assemblages from Jaffa with other Late Bronze Age sites. Given the discussion of quantification procedures in Section 6.4.1, first priority is given to sites wherein ceramics data was published using explicit quantification procedures. The highest quality datasets therefore come from the sites where Martin applied his 1/100 method —namely at Beth Shean (Martin 2006b; 2009c) and Tel Seraʿ (Martin 2011b, 221–28). Assemblages with fewer quantitative controls will not be disregarded, however, but rather they are integrated cautiously. That some assemblages are of less comparative utility is not a commentary on the quality of the studies themselves, it is rather a reflection on changes in the nature of ceramic sampling through time. Following the example of the garrison kitchen excavated by Kaplan at Jaffa (see Section 6.3), when the procedures for retaining and discarding

[251] In final form, this essentially follows the approach applied by S.T. Smith (2003c, 114).

sherds by the original excavation is completely unknown and the available collection comprises almost exclusively restorable forms, we can assume a degree of non-random—but ultimately unquantifiable—data loss. Consequently, the representativeness of what remains is difficult to establish and it cannot be assumed that this material represents an accurate sample of the excavated assemblage. It is still useful for study, but it cannot be treated as statistically comparable to an assemblage wherein every diagnostic sherd was retained.

6.5 Conclusion

The delineation of the phenomenon of locally manufactured Egyptian-style ceramics at southern Levantine sites has transformed our understanding of Egypto-Levantine interaction. Along with the local Levantine as well as other families of imported Mediterranean ceramics, the presence of Egyptian-type ceramics at Jaffa represents a complex constellation of objects and behaviors linked to the use of foodways as a method of identification. The typological delineation, contextualization, and quantitative analysis of these ceramic families and their linkage with cultural practices at Jaffa is the main objective of the following chapters 7 and 8. This chapter outlined the methodological means for accomplishing this task, including the method of data collection and recording that produced optimized datasets for the various types of quantitative analyses undertaken. This includes the thorny issue of how to render absolute counts for fragmentary objects, for which I have adapted the estimated vessel equivalency (EVE) method. The resulting data are then subjected to exploratory data analysis (EDA) using the R platform, with qualitative information such as the preliminary gas chromatography/mass spectrometry (GC/MS) being integrated on a case-by-case basis. The result is a robust dataset that can be readily integrated with other sites that were subject to known quantification procedures. Fundamentally, the explicit procedures applied here allow for reproducible results, enabling researchers to evaluate any claims of social significance through a critical reexamination of both the data and methods used to produce them.

Chapter 7 – The Ramesses Gate Area at Jaffa: Context and Ceramics

Although the Ramesses Gate area received its name from its most dominant feature, excavations there have revealed a broad array of contexts dating between the Middle Bronze Age and modern era (see Burke, Peilstöcker, et al. 2017). This chapter focuses on two contexts connected with the Egyptian imperial presence at Jaffa: a Late Bronze Age IB food preparation and ceramics manufacturing area belonging to the early Egyptian garrison (hereafter, the garrison kitchen) and a sequence of Late Bronze Age IIB – III gate complexes that represent the last stages of the Egyptian occupation. The garrison kitchen—excavated by Jacob Kaplan—has been subject to preliminary publication (Burke and Mandell 2011; Burke and Lords 2010; Burke, Peilstöcker, et al. 2017) and a dissertation (Pierce 2013), all of which clarified the functional association of this space with foodways conducted in an Egyptian fashion—namely, the production and use of Egyptian-style culinary ceramics, as well as a high proportion of Egyptian-style tableware and storage forms. This assemblage—which comprises 114 restorable forms and diagnostic sherds—is revisited in this chapter within the broader practice-based framework proposed in Chapter 2. The later gate complexes—excavated by the JCHP and subject to preliminary publication (Burke, Peilstöcker, et al. 2017)—produced a larger assemblage totaling 818 restorable forms and diagnostic sherds across three phases. In this chapter, I present the gate assemblages in full for the first time, situating them within their functional context as well as addressing broader patterns in the ceramics assemblage as they manifest diachronically across the functional categories of tableware, culinary forms, storage forms, and *varia* (see Section 6.4.3).

The garrison kitchen and gate contexts represent both the beginning and end of the Egyptian occupation, two dramatically different historical contexts for Egypto-Levantine interaction. As I will demonstrate, the garrison kitchen offers crucial insight into foodways at the earliest stages of the Egyptian empire, with the high proportion of Egyptian-style ceramics at Jaffa across multiple functional categories related to foodways being unprecedented at contemporary southern Levantine contexts.[252] For the earliest iteration of the garrison, there is an intensive, *ex novo* manifestation of ceramic production and consumption patterns following an Egyptian cultural model, with this relatively small spatial area being characterized predominantly by foodways associated with an Egyptian mode of doing. Despite the strong expression of "Egyptianness," the garrison kitchen is not free from elements of Levantine culture. Instead, this space reflects a complicated entanglement of both Egyptian and Levantine actors at Jaffa. The interplay of Egyptian and Levantine foodways is also reflected in the later gate complexes, with diachronic patterns in the ceramic assemblage suggesting dynamic—and potentially culturally significant—shifts in foodways at Jaffa during the tumultuous final decades of the empire. Given that the final three phases of the gate complex—and the two violent destructions that occurred therein—constitute a period potentially as narrow as a decade, I argue that the patterns reflect shifting priorities of identification that are closely linked to the fortunes of the garrison.

In the remainder of this chapter, I contextualize the assemblage from each context and describe the patterns visible in the ceramic assemblage. This includes a brief discussion of the history of excavations that produced these data (Section 7.1), the contextualization and qualitative description of finds from each phase (Section 7.2), and finally, a synthetic quantitative discussion of diachronic patterns visible in the assemblage (Section 7.3). Furthermore, Appendix 12 contains a detailed quantitative description of the assemblage, which

[252] A maximalist interpretation of contemporary levels from Area R at Beth Shean reconstructs somewhere between 3 and 4% pottery from the Egyptian tradition (Mullins 2007, 442), and a maximalist interpretation of Stratum XI at Tel Seraʿ would result in 10% of the local ceramics being from the Egyptian tradition (Martin 2011b, 223). In both cases, the exclusion of debatable forms brings the proportion closer to 1% (Mullins 2007, 442; Martin 2011b, 223). Compare the more than 70% of forms from the Egyptian-style and Egyptian tradition in the Level VI Late kitchen using the most conservative counting method (see Section 7.2.1).

provides the basis for all quantitative elements presented within this chapter. The final synthetic discussion in this chapter will focus on the last three phases of the gate complex as excavated by the JCHP, a methodological caution stemming from the different quantitative character of the assemblages derived from Kaplan's and the JCHP's excavations. Moreover, since a gap of almost two centuries separates the garrison kitchen from the first phase of the later gate complex (Phase RG-4a), there is little to be gained in treating patterns from both contexts as a diachronic sequence. Instead, the broader, diachronic integration of the garrison kitchen is deferred to Chapter 9 when the material from the Ramesses Gate and Lion Temple excavation areas are synthesized, since the combination of these two areas makes it possible to discuss a near-continuous sequence from the earliest to the final days of the garrison at Jaffa.

7.1 History of Excavations

This section constitutes a brief history of excavations in the Ramesses Gate area, providing key information regarding the state of the available ceramics data. The area was first opened by Kaplan, who excavated there from 1955 to 1962 (Peilstöcker 2011b, 25).[253] Kaplan excavated levels dating from the Middle Bronze Age through early modern period, though this chapter will only focus the Late Bronze Age features he encountered: the Late Bronze Age IB garrison kitchen and multiple phases of a Late Bronze Age IIB – III gate complex.[254] Kaplan's exposure of the garrison kitchen was partial, as its northeastern extent had been destroyed by the

[253] While Jaffa had been subject to limited excavations previously, the excavation of the Ramesses gate area was not possible prior to the destruction of large swaths of the modern town by the British in a counterinsurgency operation during the Mandate period (Isserlin 1950, 101; Gavish 2013). The destroyed areas were never reinhabited, and the first phase of Kaplan's excavations comprised the removal of the Mandate-era rubble, much of which is still visible in section in the Lion Temple excavation area.

[254] Kaplan's excavations encountered ephemeral features in the area that he dated to the Late Bronze Age IIA, though their limitations—both in finds and preserved excavation notes—resulted in the JCHP cautiously maintaining this assessment (Burke, Peilstöcker, et al. 2017, 98). These features are excluded from the current analysis.

construction of the later gate complex. Even still, his notes allow for the reconstruction of a robust assemblage from a discrete activity area (see Section 7.2.1).

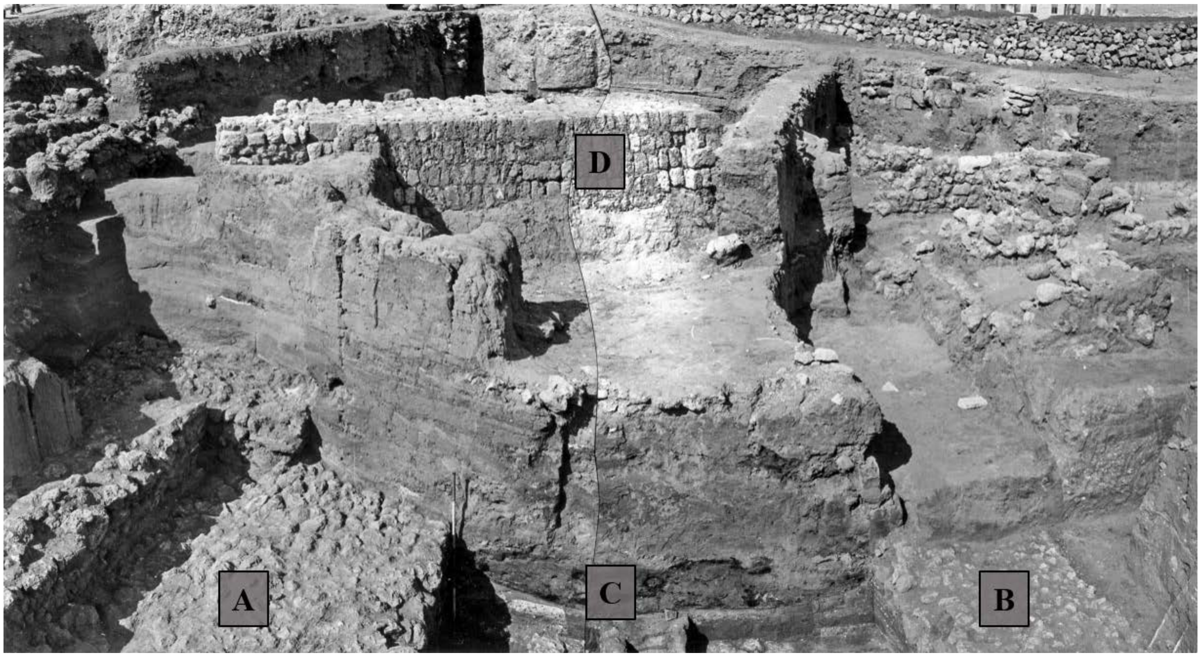

Figure 6: Kaplan's excavations in the Ramesses Gate area (view to the northwest, **Photo 32631**). Note the stone tower foundations (A and B), with their interior edges marking the boundaries of the passageway. The destruction debris (C) in the passageway corresponds with JCHP Phase RG-4a. Note the Persian-era **Wall 3** (D) that preserved the center of the gate complex until the JCHP excavations in 2011.

While Kaplan recovered numerous finds from the gate, his limited surviving notes means that only select objects can be associated with specific phases of the gate complex (Burke, Peilstöcker, et al. 2017). Consequently, these finds will not feature in my quantitative analyses. After Kaplan's work and prior to the JCHP excavations, two projects were conducted in the Ramesses Gate area: a 1985 salvage project that cleared Kaplan's backfills for the creation of an archaeological park (Y. Levy 1999) and a brief expedition in 1997 and 1999 by Tel Aviv University (TAU) that partially excavated the northwestern portion of the gate passageway (Herzog 2008, 1791). Though final publication is forthcoming, the TAU excavations are relevant here as their work created the northwestern boundary of stratified materials available for study when the JCHP returned to the area from 2011 to 2014.

Figure 7: View of Squares M10/L10 southeast through the gate passageway (**Photo 2013-P0234**). Note the diagonal line across the gate passageway separating the lowest extent of the TAU excavations (left) from the unexcavated Phase RG-4a destruction debris (right).

JCHP operations began with the removal of the Persian-era **Wall 3**, which allowed for the excavation of the central portion of the gate complex. Additionally, cleaning operations in both Kaplan's and the TAU excavation areas revealed stratified deposits related to the use-life and destruction of the gate complex (see Figure 7), extending the JCHP's exposure beyond what was preserved directly under **Wall 3**. The data from the JCHP's excavations in this area comprise the primary materials analyzed in this chapter.

7.2 Phasing and Context

The renewed excavations of the JCHP refined Kaplan's phasing for the gate complex and anchored it with an absolute chronology based on radiometric dates. These data have clinched the late date for the Egyptian occupation at the site, which ended at some point around 1125 BCE after a series of violent destructions. Table 7, which follows a previously published stratigraphic analysis (see Burke, Peilstöcker, et al. 2017, Table 4), summarizes the main phases in the Ramesses Gate area. The following discussion treats each phase that has contributed data to this dissertation: the Late Bronze Age garrison kitchen (Kaplan's Level VI Late) and the last three phases of the gate complex (JCHP phases RG-4a through RG-3a). Phases dating prior to or later than the garrison period are only treated where they comment on issues of immediate relevancy (e.g., stratigraphic intrusion), with their respective stratigraphy and finds being treated elsewhere (see especially Burke, Peilstöcker, et al. 2017; Burke and Peilstöcker Forthcoming).

Relative Period	JCHP Phase	Approximate Dates	Kaplan Level
LB III	RG-3a	? – 1125* BCE	IVA
	RG-3b	1135* – ? BCE	
LB IIB – LB III	RG-4a	1300 – 1135* BCE	IVB
LB IIA	RG-4b	1400 – 1300 BCE	V
LB IB	n/a	c. 1460‡ – 1400 BCE	VI Late
LB IA	n/a	? – 1460‡ BCE	VI Early
MB IIC	RG-5	?	VII?

Table 7: Stratigraphic and chronological summary of the Ramesses Gate area (* marks local C14-derived anchors; ‡ marks date derived from historical considerations), following Burke, Peilstöcker, et al. (2017, Table 4). Question marks are retained from the original published table and indicate areas where absolute dates could not be determined, as well instances where JCHP phases could not be linked definitively to Kaplan's original levels.

7.2.1 Level VI Late – Late Bronze Age IB (1550 – 1400 BCE; Not Encountered by the JCHP)

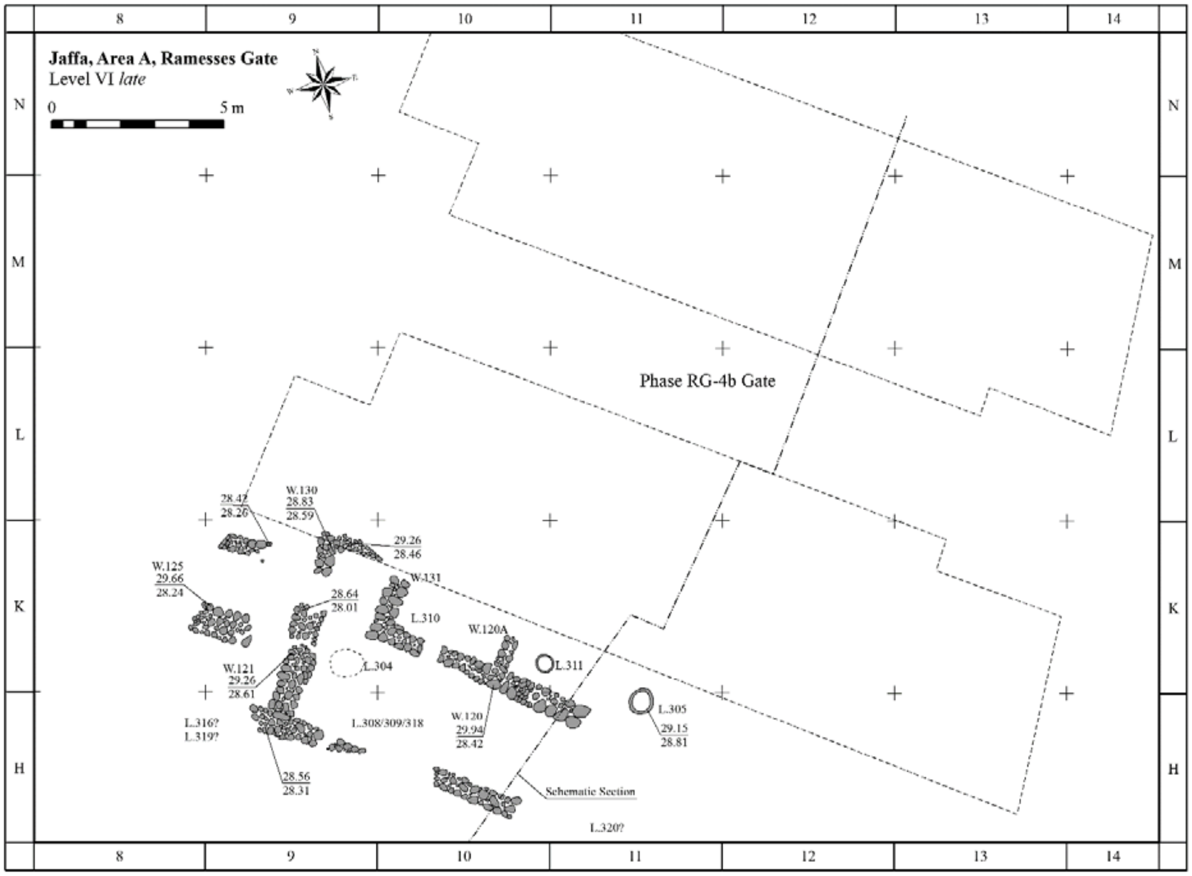

Figure 8: The Level VI Late garrison kitchen, with the later gate towers indicated as outlines (drawing by K. Kowalski). All numbers with decimals indicate elevations (masl). Image previously published (Burke, Peilstöcker, et al. 2017, 104, Fig. 6), reused with permission.

The beginning of the Late Bronze Age at Jaffa is poorly understood, as both the late Middle Bronze Age IIC and Late Bronze Age IA contexts encountered by Kaplan were disturbed, with clearly stratified transitional levels effectively nonexistent. Consequently, Kaplan's original statement the Egyptian arrival was marked by a violent destruction cannot be maintained, especially considering the JCHP's recent reanalysis of these levels.[255] In contrast, Kaplan's Level VI Late is much clearer to reconstruct (see Figure 8). Kaplan encountered this phase to the

[255] The phases in question, Kaplan's Level VII and Level VI Early (see Table 7), were reevaluated by the JCHP. Kaplan's destruction debris (see J. Kaplan 1972c, 78) was in fact a heavily disturbed burial from the Late Bronze Age IA. Furthermore, while the JCHP encountered Middle Bronze Age remains in the gate complex, they only comprised architectural features with no associated finds (Burke, Peilstöcker, et al. 2017, 92–93, 103–5).

south of the southern gate tower of the Ramesses Gate complex in a deep probe, which revealed a series of rooms delineated by stone wall foundations, all of which were cut by the construction of the later Late Bronze Age gate complex (see Figure 8; Burke, Peilstöcker, et al. 2017, Fig. 5).

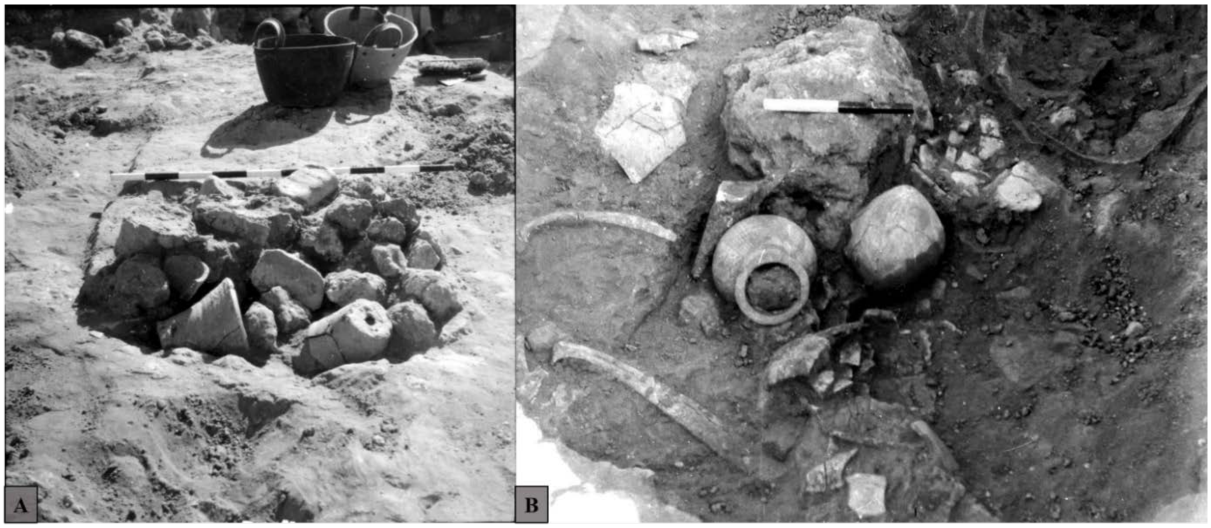

Figure 9: Photos of the garrison kitchen destruction as encountered by Kaplan, detailing (a) the open firing kiln filled with Egyptian-style "flowerpots" (**Photo 827**) and (B) a collection of large faunal elements and smashed vessels, including two imported Egyptian carinated jars, **MHAs 2297** (left) and **2216** (right, **Photo 857**).

This small area was suddenly destroyed, producing an assemblage of 114 diagnostic sherds and restorable vessels across 36 distinct types, many of which can be associated with specific findspots using the excavation photo archives (see Figure 9).[256] These photos also showcase evidence for rich faunal remains scattered among the debris (see Figure 9B), many of which were still available in the storage magazines for analysis by the JCHP's zooarchaeologist Edward Maher. In addition to the destruction debris within the rooms, an exterior space yielded an open firing pit (**Locus 304**) filled with 20 Egyptian-style "flowerpots" (see Figure 9A), seemingly abandoned in the midst of their production (Burke and Mandell 2011).[257] The

[256] Thus far, the definite loci that can be associated with this context include numbers **304**, **305**, **308**, **309**, **310**, **311**, **316**, **318**, **319**, and **320** (Burke, Peilstöcker, et al. 2017, 93, see especially Footnote 53).

[257] The popular name "flowerpot" has nothing to do with the function of the form, but rather is a colloquial designation. It will be retained within this text due to its common usage.

recovery within the same rooms of ceramic wasters, the lower socket from a potter's wheel or tournette (**MHA 2309**), and a burnishing sherd (**MHA 5152**) all further support the proximal existence of a ceramic manufacturing industry that was specifically geared towards the manufacture of Egyptian-style ceramics.

Figure 10: Socket from a potter's wheel or tournette (**MHA 2309**) found in association with the garrison kitchen assemblage (**Photo MHA_2309**). Note the reddish discoloration on the surface.

While a pottery manufacture area, wasters, and open firing pit filled with flowerpots constitutes overt evidence for the local Egyptian-style ceramics industry, further evidence from the lower socket from a potter's wheel offers a subtle clue of the depth to which Egyptian manufacturing techniques were replicated at the site (see Figure 10). The wheel bears a reddish discoloration on its working face that matches examples from Egypt stored in the British Museum (BM 32621 and BM 32622), with the color having been interpreted as stemming from the lubricants used on the wheel bearings (Nicholson and Doherty 2016, 441).[258] This

[258] While from an earlier period, the site of Askut in Nubia attests to the complete local reproduction of Egyptian ceramic manufacturing techniques at a colonial base, down to the level of the equipment used—in that case, a potter's wheelhead (S. T. Smith 2014a).

phenomenon is unknown from contemporary Levantine examples, such as the one from the pottery workshop at Lachish in Cave 4034 (Magrill and Middleton 2004, 2539–42). This suggests the depth to which an Egyptian habitus or *chaîne opératoire* manifested in the local manufacture of Egyptian-style ceramics at Jaffa, which is best understood the wholesale, local replication of the Egyptian ceramics manufacturing tradition by specialists who were either themselves Egyptian or were participants in a community of practice with direct linkages to Egyptian potters via a system of apprenticeship. Collectively, the rich array of Egyptian-style and local vessels, the bulk of which are associated with food production, were interpreted by the JCHP as representing the Late Bronze Age IB Egyptian garrison kitchen. This is further supported by the contextual association of ceramic manufacture and food production in Egypt, which are commonly linked in close spatial proximity (Burke and Lords 2010; Pierce 2013; Burke, Peilstöcker, et al. 2017, 93–94).

7.2.1.1 The Level VI Late Ceramic Assemblage

This subsection reviews the chronology and function of the Level VI Late assemblage, providing key information about the character of the assemblage prior to the diachronic synthesis presented in Chapter 9.[259] As noted in Chapter 6.3, this material been subjected to several analyses, including an in-depth characterization of the assemblage by Pierce (2013). While the overall conclusions of her work remain valid, the chronology of the area has since been reassessed (see Burke, Peilstöcker, et al. 2017), which has transformed the quantitative reconstruction of the assemblage (see Appendix 12.1).

[259] An in-depth, quantitative breakdown and description of the assemblage can be found in Appendix 12.1.

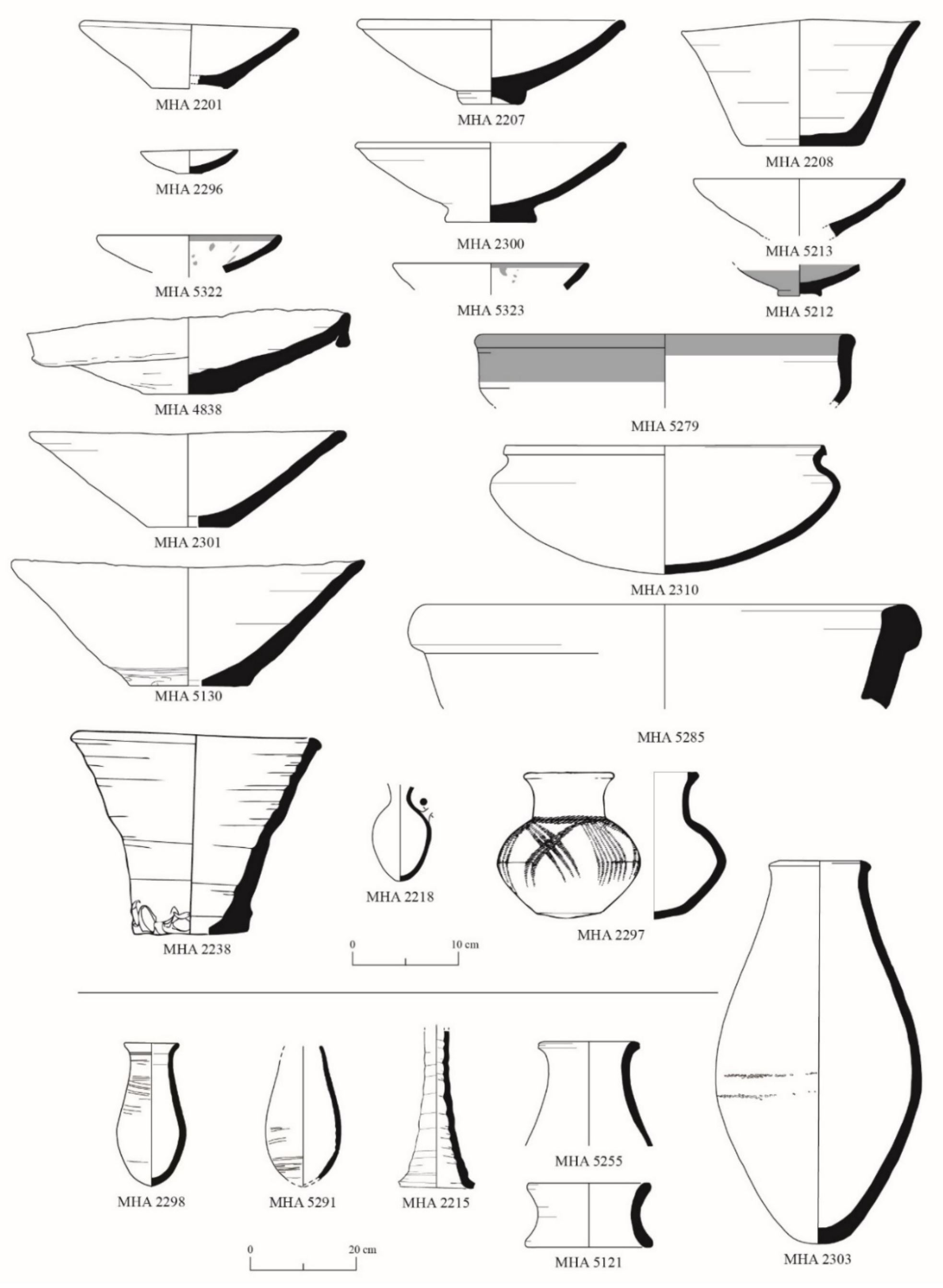

Figure 11: Summary plate of the main forms present within the Level VI Late assemblage (previously published as Burke, Peilstöcker, et al. 2017, Fig. 7). Reused with permission.

Figure 11 provides a summary overview of the key forms present within the Level VI Late assemblage, with several objects allowing for a narrow chronological date for the destruction of the kitchen. Among the locally manufactured Egyptian-style forms, the most narrowly dated types are the red-splash decorated bowls (e.g., **MHAs 5322** and **5323**) and the red-slipped bowls with a ring base (e.g., **MHA 5213**). Both seem to have gone out of use in Egypt by the mid-18th Dynasty, with the last-known examples of the former being more narrowly dated to the reign of Amenhotep II (1427-1400 BCE).[260] Other forms such as the flowerpot (e.g., **MHA 2238**) also are more common during the mid-18th Dynasty, having gone out of use by the founding of Amarna in the mid-14th century BCE (see Martin 2011b, 48 and discussion there). The remaining vessels from the Egyptian-type assemblage either date more broadly to the 18th Dynasty or are non-diagnostic chronologically, being relatively stable throughout the New Kingdom. Consequently, the Egyptian-type assemblage places the Level VI Late kitchen firmly within the Late Bronze Age IB, within decades of Thutmose III's conquest at Megiddo (c. 1460 BCE). From the Levantine tradition, one form—the triangle rim cooking pot with a slight neck and flanged rim—merits specific discussion since it was central to the previously proposed chronology for the kitchen, which cautiously placed it as late as the Late Bronze Age IIA (Burke, Peilstöcker, et al. 2017, 98). This form, which was long thought to have only begun in the Late Bronze Age II, has more recently been shown to have begun already in the Late Bronze Age IB (Mullins and Yannai 2019, 159). Consequently, while it is still possible, it is not necessary to place the destruction of the kitchen in the Late Bronze Age IIA. The Levantine assemblage is in perfect chronological accordance with the Egyptian-type forms. This in turn matches radiocarbon determinations from contemporary levels in the Lion Temple excavation area, as will be discussed in Chapter 8.

[260] Red-splash decoration was once ascribed to a very narrow date range, namely the reigns of Thutmose III and Amenhotep II (c. 1479 – 1400 BCE, see Aston 2006). Recently, it has been shown to begin perhaps as early as the reign of Ahmose (1550-1525 BCE), the first pharaoh of the New Kingdom (Aston 2018, 27–28). Regardless of the newly expanded range, there is no reason to place the appearance of this decorative style at Jaffa before the wars of Thutmose III, which offer the earliest logical placement of an Egyptian garrison at the site. For a discussion of the parallels and the dates for the red-slipped bowls with a ring base, see Martin (2011b, 50).

In contextualizing the assemblage more broadly, there are a few key metrics that are of special note, especially considering the early date of the assemblage within the imperial period. First and foremost, no matter the calculation method used, Egyptian-type forms constitute more than 70% of the overall assemblage.[261] This majority is maintained across all functional categories, with tableware forms reflecting the same general proportion as the overall assemblage, but culinary and storage forms being heavily skewed towards the Egyptian-style tradition (see Appendix 12.1).[262] In addition to an overwhelming majority of Egyptian-style ceramics, the kitchen context also produced an unusually diverse array of forms from this tradition—16 distinct types. Using a conservative EVE value, these comprise 39.200 individual vessels—though certainly the original assemblage was much larger. In contrast, the Levantine assemblage is only attested across 12 distinguishable types, with a conservative EVE value of 4.735 individual vessels. This evidences a remarkably high frequency for Egyptian-type forms in this context in comparison to other contemporary sites in the southern Levant (see n. 252). While caution dictates that this context cannot be viewed as representative of Jaffa in its entirety during the Late Bronze Age IB, contemporary levels from the Lion Temple excavation area demonstrate that similar proportions also hold there, indicating the early garrison at Jaffa was installed with both a demand for and the requisite systems in place to supply a broad array of practices related to Egyptian foodways.

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[261] By conservative raw sherd count, Egyptian-type forms comprise 73.7% of the overall assemblage (n = 84). The maximalist interpretation comes from rim EVEs, wherein Egyptian-type forms constitute 89.4% of the assemblage (39.200 of 43.600 EVEs). For more comprehensive figures, see Appendix 12.1.

[262] For culinary forms, the large corpus of flowerpots and perforated bowls (type BL5d) from the Egyptian-style tradition are weighted against the two Levantine cooking pots. With respect to storage forms however, only eight non-restorable fragments from Levantine storage forms were found in comparison with the collection of restorable vessels from the Egyptian-style type JR tradition.

Figure 12: Type BL5c ledge rimmed bowl (**MHA 4838**), demonstrating the characteristic ledge from which the name of the type derived.

The functional categories bear more attention as they demonstrate the various arenas of practice in which Egyptian and Levantine foodways were adapted. For tableware, the Egyptian-style ceramics industry produced four types of individually-sized serving bowls (types BL *varia*, BL1a, BL1b, and BL3) as well as an additional three types that could either be used for food preparation or as large, communal serving dishes (types BL5a, BL5c, and BL6).[263] Notably, the assemblage of large Egyptian-style bowls includes vessel morphologies like the type BL5c ledge rimmed bowl, which not only lacks a parallel within the Levantine tradition, but received its characteristic ledge from a formation technique wholly foreign to the Levantine manufacturing tradition. Depending on calculation method, more than 30% of these bowls bear some form of decoration, including red-slipped type BL *varia* bowls and red-splash decorated bowls, as well as the so-called "lipstick rim," the classic New Kingdom decorative motif consisting of a red band around the rim of the vessel. While red slip and red bands on the rim are both attested within the Levantine ceramic tradition as early as the Middle Bronze Age, the red-splash decoration is a

[263] For the correspondence of types with Figure 11: BL *varia* (**MHA 5212**), BL1a (**MHAs 5213**, **5322**, and **5323**), BL1b (**MHA 2296**), BL3 (not pictured, see Appendix 10), BL5a (not pictured, see Appendix 10), BL5c (**MHA 4838**), and BL6 (**MHA 5279**).

peculiar motif completely foreign to the Levantine tradition (Martin 2011b, 119–20). Indeed, when the Egyptian-style tableware assemblage from the Level VI Late kitchen is considered collectively, we see a diverse array of forms that would have allowed for a fully Egyptian ambience at mealtimes, with little to no input from the Levantine cultural tradition influencing the execution of meals. No conspicuously Levantine decorated forms are present, and the bulk of attested Levantine tableware are simple bowls from the type LB1 tradition (see **MHA 2207** in Figure 11), which are morphologically identical to their Egyptian-style counterparts (type BL1a).[264]

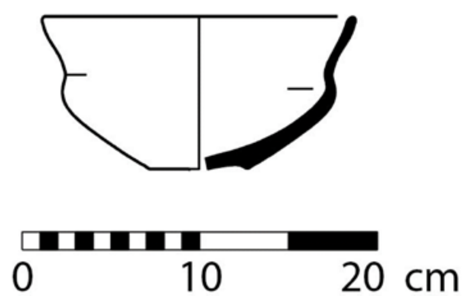

Figure 13: The type CB1 carinated bowl (**MHA 2193**) from the Level VI Late kitchen.

Apart from these, the only conspicuously Levantine bowl type that is present apart from small sherd fragments is an example of a carinated bowl (type CB1), which is from the classic terminal Middle Bronze Age/Late Bronze Age I Levantine carinated bowl tradition, being both morphologically and technologically distinct from the contemporary Egyptian carinated bowl tradition (see Figure 13). If anything, this example provides the one exception to the overwhelmingly Egyptian character of the table service present in Level VI Late, indicating that while some facet of transculturation occurred in the dining service during this period, at least in

[264] The one decorated tableware sherd form the Levantine tradition is a rim fragment from a type LB10 bowl (**MHA 5851**), which bears a red paint on the rim. However, its small size and highly degraded character renders its significance dubious (see Appendix 12.1). As for the type LB1, the main difference from the Egyptian type BL1a is in fabric and the fact that the Levantine example tends to have a disc or ring base in comparison to the Egyptian predilection for flat, string-cut bases.

this context the primary mode of identification at mealtimes followed an Egyptian cultural model.

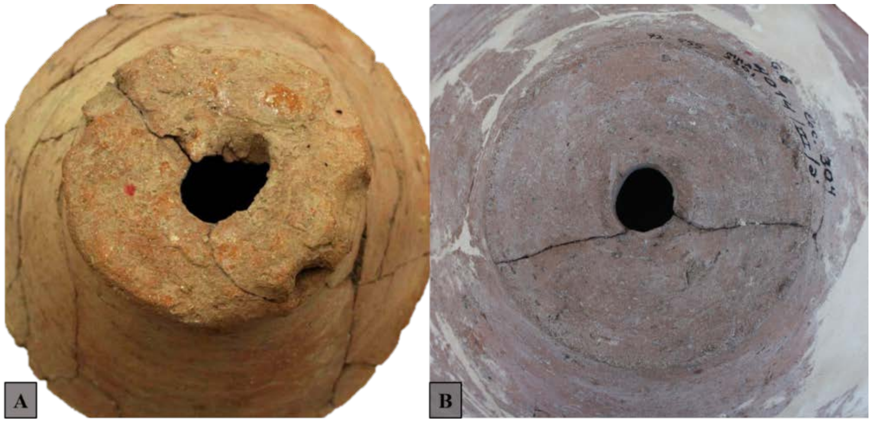

Figure 14: Detail of the pre-firing basal perforation central to identifying the culinary function of (A) flowerpots (**MHA 2234**, **Photo MHA_2234c**) and (B) perforated large bowls (**MHA 2301**, **Photo MHA_2301f**).

While culinary forms also point towards the domination of Egyptian practices, this category also shows clear evidence for entangled cultural relations. The main forms associated with the Egyptian-style culinary tradition are the flowerpots (type FP) and perforated large bowls (type BL5d), both being attested across multiple restorable examples.[265] That the forms served a culinary purpose is evidenced by the pre-firing perforation of their bases (see Figure 14), which obviously renders the vessel incapable of retaining its contents.[266] The specific function of flowerpots has been disputed, with the bulk of hypotheses centering on their role as a bread mold or sieve for the manufacture of beer (see Martin 2011b, 48-50 and citations there), with the latter having been proposed as the function of the flowerpots and type BL5d bowls at Jaffa (Burke and Lords 2010; Pierce 2013, 519–24). A forthcoming gas chromatography/mass spectrometry (GC/MS) residue analysis study of 19 samples taken from flowerpots recovered from both the

[265] With respect to the correspondences of these forms to Figure 11, the type FP flowerpot is attested in **MHA 2238** and the type BL5d perforated bowl in **MHAs 2301** and **5130**.

[266] Not all flowerpots are perforated, though most examples from the southern Levant are (Martin 2011b, 48)—a pattern reflected at Jaffa. To date, only a single non-perforated example is known from Jaffa (**MHA 5128**).

Level VI Late and Lion Temple excavation areas constitutes the first application of analytical chemistry to the form.[267] While preliminary results have yielded no definitive biomarkers that provide a one-to-one correspondence with a particular function, the uniformity of several key ratios across key fatty acid groups indicate that the forms likely were utilized for a singular culinary task. Consequently, the presence of these perforated forms, which will be returned to at greater depth in Chapter 9, can plausibly be associated with the manifestation at Jaffa of a specifically Egyptian culinary practice that can be associated with a community of practice that not only produced these vessels, but also knew how to use them and desired their final product. This can be contrasted with the situation for (in)direct heat cooking, for which the only attested forms are two near-complete Levantine triangle rimmed cooking pots (type CP1, **MHAs 2214** and **2310**). As with all other phases at Jaffa, there is no evidence that Egyptian-style cooking pots were ever manufactured or used at the site—all (in)direct heat cooking was conducted using local types. This pattern, which is important for the understanding of cultural dynamics at the site, will be returned to in greater depth in Chapter 9.

The last element of the assemblage that merits discussion are closed forms, lumped generally under the functional category of storage containers but subject to two key divisions. The first are smaller closed forms (types JR1 and JR2a) that would have functioned as part of the table service, either as decanting vessels or drinking containers, as visible throughout the banquet scene from the 18th Dynasty Tomb of Rekhmire (N. de G. Davies 1943, Pl. LXIV-LXVII).[268] As with all Egyptian-type closed forms found in the Levant, these vessels lack a flat base and

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[267] This study will be published in an upcoming final report (Damm Forthcoming c), though preliminary discussion is presented in Appendix 16.

[268] Of these, the smaller type JR1 is attested in fragmentary examples that were only partially restorable, thus they are not drawn in Figure 11 (see images in Appendix 10). With respect to type JR2a, see **MHA 2298** in Figure 11.

handles, and therefore would have required completely different bodily comportment and accoutrement at mealtimes in comparison to their functional counterparts from the Levantine table service. The introduction of just one of these vessels into a meal characterized by the Levantine table service would have been highly incongruous, requiring some form of active accommodation by those partaking in the meal (Damm Forthcoming a). Consequently, their presence in Level VI Late—especially when compared to the dearth of functional equivalents from the Levantine tradition—is highly indicative of the execution of meals in an Egyptian fashion.

The larger closed forms (types JR2b and JR10) present within the assemblage present a similar situation. These forms, which either served as fermentation vats in the brewing process (Pierce 2013, 522) or more generally as storage vessels, represent an overt effort to locally produce storage forms following an Egyptian model even though functionally equivalent possibilities existed in the local Levantine repertoire.[269] Interestingly, the type JR10 jars, also known as *zīrs*, were produced in a completely different fabric than other Egyptian-style jars at Jaffa. It is the only fabric in which these forms are attested at Jaffa, and while distinct from all other Egyptian-style pottery at Jaffa, is still from a local Levantine clay source.[270] Consequently, this form, which also possesses unusual technological features wherein a wheel-made neck is attached to a hand-built body (Martin 2011b, 70), seems to be derived from a completely separate production system. Also of note are the squat, carinated jars (type JR7, e.g., Figure 10, **MHA 2297**), confirmed petrographically to be imports (Ownby Forthcoming), which likely

[269] As with the smaller closed forms from the Egyptian tradition, the larger examples also lacked stable bases and required either partial burial or the use of pot stands for stability. The latter explains the presence of multiple pot stands within the assemblage, adding further depth to the degree of investment by the garrison to replicate familiar practices (see especially Figure 11, **MHA 5121**).

[270] This has been confirmed petrographically (Ownby Forthcoming).

served as the transport containers for precious substances imported from Egypt.[271] In providing a rare example of a true Egyptian import during this phase, these few examples indicate the degree to which the demand for Egyptian ceramics was met by the local Egyptian-style ceramics industry. The Level VI Late assemblage will be returned to again at greater depth in Chapter 9, but for now it is enough to note that the establishment of the earliest Egyptian garrison coincided with the sudden appearance of a broad array of objects, practices, and technologies associated with Egyptian foodways, all of which were supported by a major material investment in the form of local manufacturing systems that ensured their continued availability at the garrison.

[271] Examples of this type containing both honeycomb and doum fruit (*Hyphaene thebaica*) have been recovered from Nubian contexts (citing Holthoer 1977, 133), though it is unlikely this exhausts their potential contents (Martin 2011b, 253). Residue analysis on the examples from Jaffa has thus far been inconclusive, likely due intense thermal modification in the course of the fire that destroyed the Level VI Late kitchen (Damm Forthcoming c).

7.2.2 JCHP Local Phase RG-4a – Late Bronze Age IIB – III (1300 – 1135 BCE; Kaplan Level IVB)

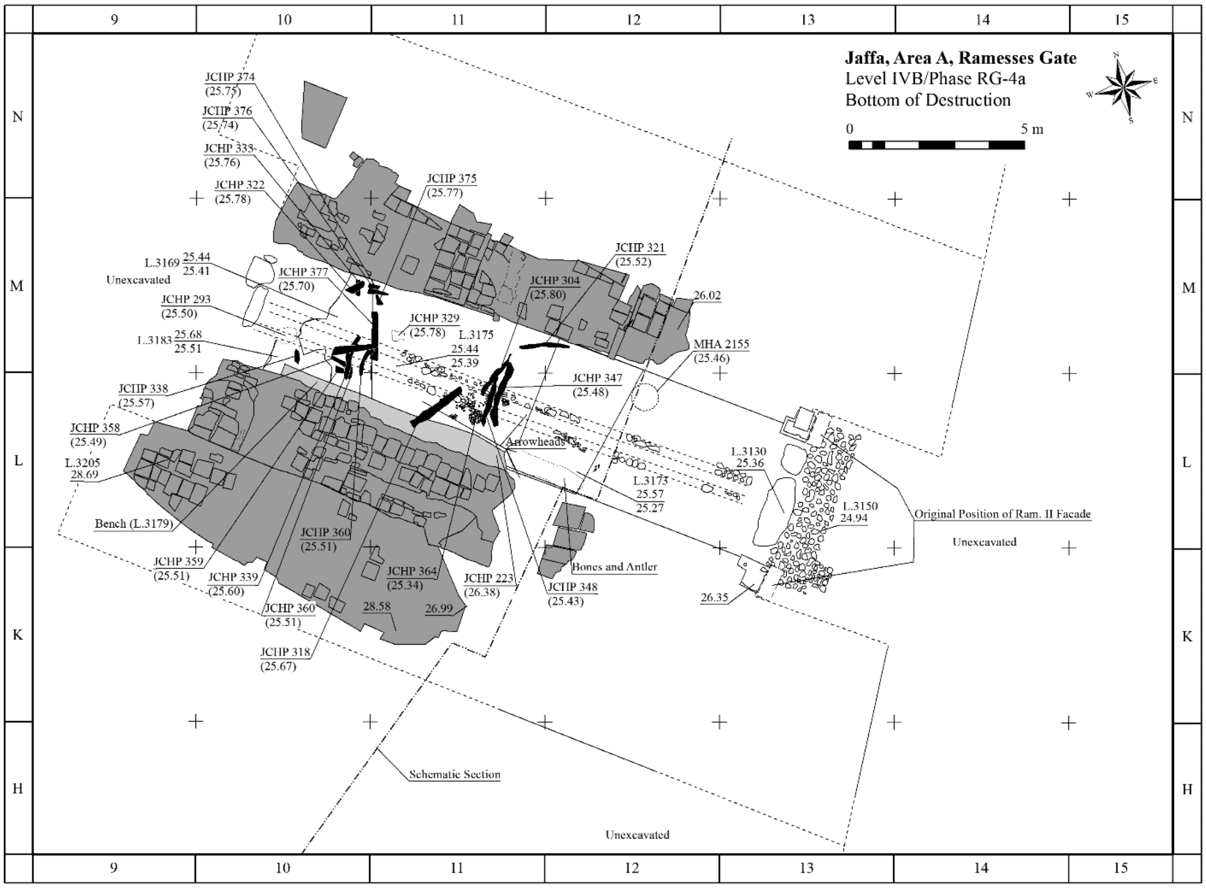

Figure 15: Plan of the Phase RG-4a gate complex, including positioning of collapsed timbers (drawing by K. Kowalski). All numbers with decimals indicate elevations (masl). Image previously published (Burke, Peilstöcker, et al. 2017, 104, Fig. 18), reused with permission.

The intervening period between Level VI Late and the last phases of the Ramesses Gate complex are less well understood since later gate constructions and renovations repeatedly cut into and removed earlier layers.[272] In contrast, Phase RG-4a is both the best-preserved phase of the gate and the earliest gate level with a coherent assemblage. The gate of this phase bore the monumental façade inscription of Ramesses II (J. Kaplan and Ritter-Kaplan 1993, 656; Kitchen

[272] This refers specifically to Kaplan's Level V and JCHP Phase RG-4b. The chronology for these phases, based on a recent stratigraphic reappraisal, is provided in Table 7 (see also Burke, Peilstöcker, et al. 2017, 98, 105–7).

1994, no. 401; Burke, Peilstöcker, et al. 2017, fig. 8), with the JHCP being able to excavate more than 10 m of its passageway (see Figure 15). The passageway, which was flanked by towers to the north and south that originally stood to a height of at least 4.5 m above the passage floor, was covered over by a series of second-story rooms. The entire complex was destroyed by a violent conflagration, resulting in the passageway being filled with a destruction debris approximately 1.5 m deep along its entire length (Burke, Peilstöcker, et al. 2017, 107–12). The destruction debris, which was rich with material both from the passageway and the collapsed rooms from above, includes 37 restorable or partially restorable vessels within a total assemblage of 451 diagnostic elements. Thousands of carbonized seeds found on the passageway floor provided a plausible absolute date for the destruction event—with C14 analysis returning a highest probability range between 1142-1125 BCE (Burke, Peilstöcker, et al. 2017, 120, fig. 33). Following Ian Shaw's chronology, this would put the destruction somewhere during the reign of the latter Ramesside kings, with Ramesses IX (1126-1108 BCE) being the latest possible candidate (Shaw 2000, 485). Consequently, this makes the Phase RG-4a assemblage one of the latest, best-dated collections of material from the final years of the New Kingdom empire, and its importance for the relative sequence of other contemporary assemblages that lack absolute chronological anchors cannot be overstated.[273]

[273] The difficulty of relative chronological dating with late New Kingdom imperial sites is best demonstrated by the controversy surrounding the dating of Deir el-Balaḥ in modern-day Gaza. In preliminary publications, the excavators adopted a historical dating scheme based on Egyptian reliefs, with the earliest occupational Stratum IX being placed in the Late Bronze Age IIA (T. Dothan 1993). However, a reanalysis of the site's stratigraphy and finds places it at least a half-century later—well into the 13th century BCE (Killebrew, Goldberg, and Rosen 2006). It should however be noted that common Egyptian-style ceramics, which make up roughly half of the assemblage, are of little use for dating due to their long-term conservatism. Consequently, the absolute chronological anchoring of assemblages such as that at Jaffa is imperative for understanding the terminus of the Egyptian empire in the region.

Figure 16: Oversized Amenhotep III scarab recovered from the second story debris of the Phase RG-4a destruction layer. (A) provides a detail of the inscription (**JCHP 223**, **Photo JCHP_223k**), and (B) shows the scarab as part of a larger ensemble of beads (**JCHPs 216**, **227**, **232**, and **234**, **Photo JCHP_216_223_227_232_234c**). The latter image is reproduced with permission (previously published as Burke, Peilstöcker, et al. 2017, 113, Fig. 24).

Another critical aspect of this assemblage relates to its context—both spatially and with respect to associated finds. A monumental gate is a locus of power and control for an imperial authority (Jütte 2013), a centralized fixture in the lives of both the conquering imperial force as a location from which their power emanates and also a conspicuous reminder to the local population of their occupied status. The Phase RG-4a assemblage showcases these properties, as the finds from the gate emphasize its multi-faceted nature as a symbol of imperial power and control (Burke, Peilstöcker, et al. 2017, 110). While the façade stones are the most conspicuous imperial symbols, other finds—especially from the rooms above the passageway—are indicative of the gate as an administrative center. The discovery in the second-story destruction debris of ivory paneling with parallels to Egyptian royal iconography (**JCHP 295**[274]), a beaded necklace

[274] The ivory panel is currently under restoration and will be subject to a report by Liat Naeh (Forthcoming), who kindly shared preliminary images and interpretations.

bearing an oversized scarab of Amenhotep III (see Figure 16[275]), as well as ceramics indicative of the provisioning and caching of goods are all suggestive of the second story of the gate serving an administrative purpose. The finds from passageway, a collection of materials that included copious amounts of dried goods ranging from several kilograms of deer antler (**JCHP 345**) to thousands of seeds originally stored in sacks, are all suggestive of a more mundane—even mercantile function—of the lower passageway (Burke, Peilstöcker, et al. 2017, 110). As such, while the second story finds are indicative of the purpose of the gate within the Egyptian command and control network, the passageway provides insight into how this aspect of Egyptian rule was part of the daily lives of the inhabitants at Jaffa.

Evidence for this destruction falls in line with models indicative of destruction via intentional, human violence (following Kreimerman 2017), which includes the presence of ranged weapon projectiles in the gate passageway (**JCHPs 300**, **325**, **327**, and **344**) and direct evidence for a complex, human-engineered destruction. This led the JCHP to suggest that the site was destroyed via local insurgent actions against the Egyptian garrison, since there was no pragmatic reason to suggest a foreign agent (Burke, Peilstöcker, et al. 2017). The absolute dates for this destruction fall at the extreme late end of traditional models for the end of Egyptian rule in the region, and yet this did not constitute the final stage of the Egyptian occupation at Jaffa. It does however signify the beginning of the end of Egyptian rule at the site and a dramatic transformation of Egypto-Levantine relations. This destruction was part of a broader phenomenon showcasing the gradual erosion of Egyptian control (contra Millek 2018), a process that continued until the disappearance of any clear evidence for an Egyptian presence in the

[275] The scarab was collected as **JCHP 223**, whereas the beads were collected in several lots and registered separately as **JCHPs 216**, **227**, **232**, and **234**.

region. Despite the relatively rapid rebuilding of the gate in the succeeding Phase RG-3b, Phase RG-4a represents one of the last phases at Jaffa where the Egyptians controlled the site from a position of strength.

In addition to the rich destruction debris, another element of the assemblage gives insight into more mundane aspects of life at Jaffa. Ground into the surface of the passageway are numerous, smaller vessel fragments. These sherds—while not part of the destruction debris proper—are still immensely useful for the discussion of life at Jaffa as they shed insight on activities within the site itself. While the Phase RG-4a gate functioned without a purpose-built drain (Burke, Peilstöcker, et al. 2017, 105–6), the gate passageway was still one of lowest points of egress from the site due to the nature of its construction (see Burke, Peilstöcker, et al. 2017, 95, fig. 5). As such, even without a formal drainage structure it would have served as the natural point where runoff exited the site. Consequently, the lowest levels of the gate passage produce not only forms to be associated with destruction assemblage of the gate, but also the garbage deposited there during daily transit and use. From a compositional standpoint, these sherds provide a greater deal of insight into the contemporary Levantine ceramics tradition than the destruction debris, which in turn sheds light on the coexistence of parallel ceramic industries that had different loci for consumption. Furthermore, some functional types from this period (e.g., the Levantine cooking pot) are only attested in the sherd material, and as a result their neglect would dramatically diminish our knowledge of lifeways at Jaffa during this phase.

7.2.2.1 The Phase RG-4a Ceramic Assemblage

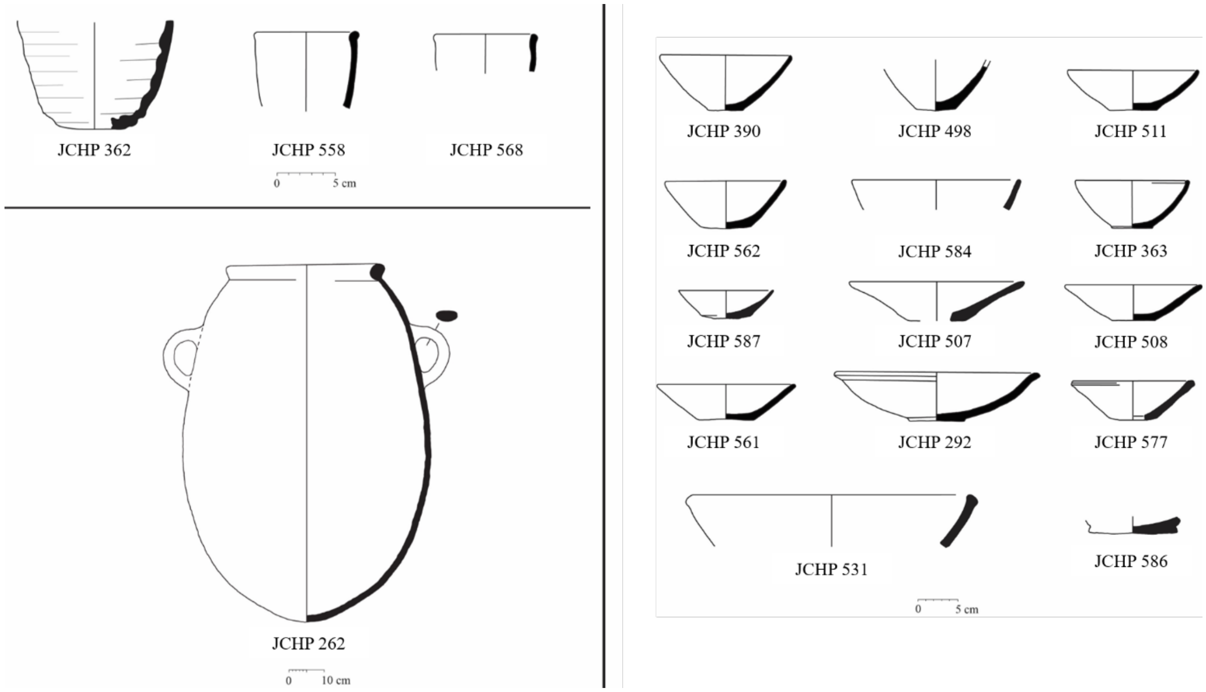

Figure 17: Select forms from the Phase RG-4a Egyptian-type ceramic assemblage.

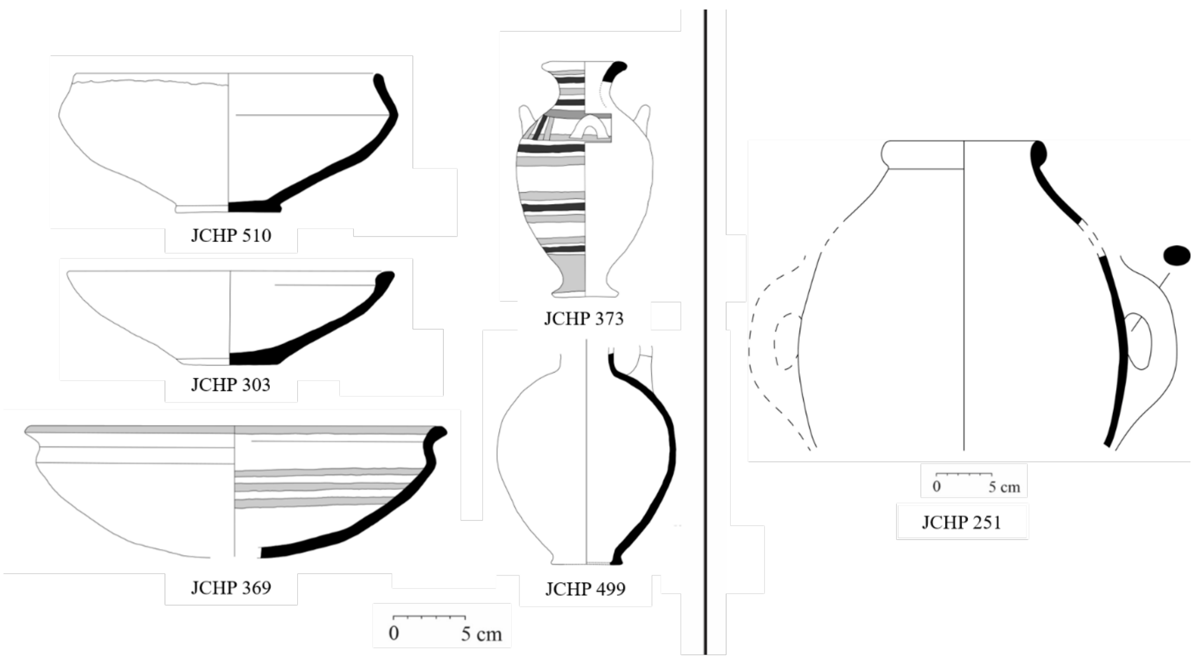

Figure 18: Select forms from the Phase RG-4a Levantine ceramic assemblage.

A brief, qualitative summary of important points pertaining to the Phase RG-4a assemblage is presented here, deferring to the more substantive synthesis conducted in Section 7.3.[276] Regarding integration with Kaplan's excavations, despite the fact that Kaplan recovered ceramics from this destruction debris, the preservation of his records has been such that only in extremely fortunate instances can objects be placed within the destruction assemblage for this phase.[277] As such, the following will only treat the ceramic finds from the JCHP excavations. Key forms from the assemblage are depicted in figures Figure 17 and Figure 18, all of which are chronologically in keeping with the late 12th-century BCE date derived from the radiocarbon determinations.[278] Consequently, there is little to suggest that either the restorable forms in the destruction assemblage or the array of forms attested in the detritus from the gate passageway substantially antedate the final destruction of the gate, providing a robust picture of practices at Jaffa during this period.

Despite its coherence, the Phase RG-4a assemblage has several peculiarities that require caution. Simple proportions reveal a majority of Egyptian-style forms in this phase; however, these metrics are heavily skewed by two forms: the Egyptian-style simple bowl (type BL1) and the ubiquitous Levantine transport amphora and storage jar, the so-called "Canaanite store jar" (types SJ1 and SJ2). For the former, its extreme abundance is the product of industrial-scale

[276] A full quantification and discussion can be found in Appendix 12.2.

[277] Notable among these is a Cypriot pithos (**MHA 2155**) that Kaplan recovered from the gate passageway. The JCHP was able to confirm its findspot from both archival images and by reopening Kaplan's original square, where the cut to remove the vessel was still visible (Burke, Peilstöcker, et al. 2017, 110).

[278] Key among these are the so-called meat jars (type JRVmj, Figure 17A, n. 4), which parallel late 20th Dynasty examples known from Qantir/Per-Ramesses in Egypt (Aston and Pusch 1999, nos. 59, 70), and even later examples from the 21st/22nd Dynasty known from Medinet Habu (Hölscher 1954, Pl. 47: C3). With respect to the Levantine forms, a number of the bowls notably express characteristics reminiscent of both the terminal Late Bronze Age and Iron Age I, such as the in-turned portion above the carination visible in Figure 18A, n. 1, which is similar to examples from nearby Tel Qasile Stratum XII (Mazar 1985, Fig. 11, n. 1, 8).

production, a condition that is matched at other Levantine garrison sites from the late imperial period (see Damm Forthcoming a). As a port site, it is unsurprising that Canaanite store jar elements are present in unusually high frequencies, especially since their thick bases and rolled rims have high survivability rates. Consequently, unlike the confined functional context that was the Level VI Late kitchen, a great deal of care is necessary in assessing this assemblage as it effectively averages ceramics from a broad array of activity areas throughout the site.

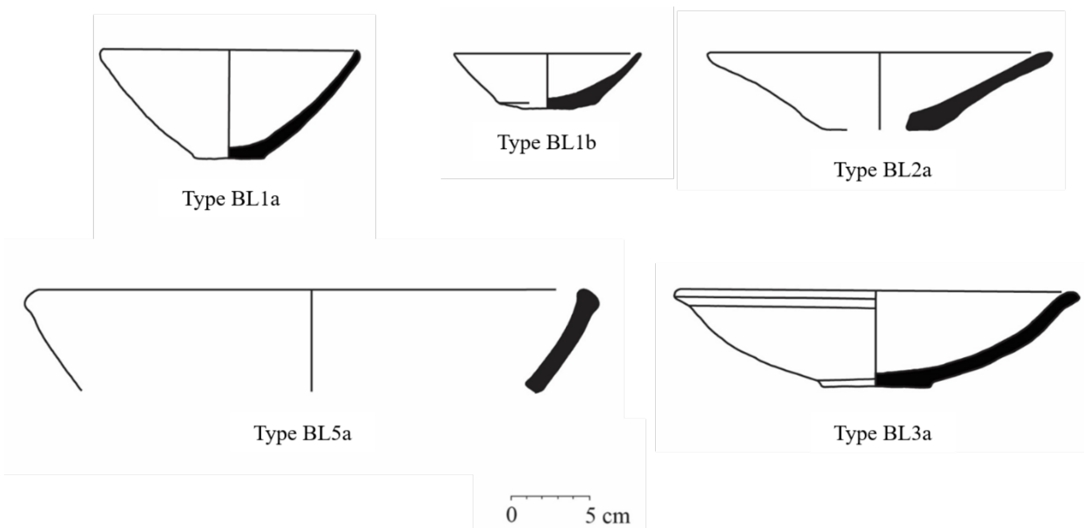

Figure 19: Reconstruction of the Egyptian-style table service as it appears in the Phase RG-4a assemblage. This includes deep, personal-sized hemispheric bowls in the type BL1a (**JCHP 390**) and BL1b (**JCHP 587**) categories, as well as shallower dishes of the type BL2a (**JCHP 507**) and BL3a (**JCHP 292**) categories. The large type BL5 bowls (**JCHP 531**) could have functioned either with respect to communal serving or food preparation.

While a more intensive quantitative discussion of this assemblage is conducted in Section 7.3 and in Appendix 12.2, a few qualitative points will be made here. The first relates to the tableware assemblage, which apart from being overwhelmingly comprised of Egyptian-style forms has a few notable characteristics reminiscent of the Level VI Late kitchen.[279] Namely, the frequency of forms and the presence of several restorable examples across multiple Egyptian-style bowl types suggests functionally distinct elements of a complex table service based on

[279] Using even the most conservative calculation method, the tableware assemblage within the Phase RG-4a gate is composed of more than 80% forms from the Egyptian tradition.

Egyptian traditions, reconstructed in Figure 19. This includes examples of various shapes of small, personal-sized serving wares (types BL1a, BL1b, BL2a, and BL3a) as well as a large, communal bowl (type BL5a).[280] Consequently, the Egyptian-style tableware assemblage, apart from being ubiquitous, is attested across a wide array of size and shape groupings that could in turn be used to conduct a complex suite of dining practices. Moreover, it even includes unusual size variants like a miniature shallow bowl with a rim diameter of only 14 cm (Type BL3, **JCHP 577**), suggesting atypical, creative local interpretations of Egyptian-style bowls.[281]

Figure 20: On the left, an offset-light image of the interior of a type BL3a bowl (**JCHP 507**) bearing deep incisions. On the right, a microscopic photograph shows gradually increasing depth towards the center of the cut, indicating a repetitive slicing motion.

Interestingly, this assemblage also provides some of the first use-alteration evidence for the function of Egyptian-style type BL3 shallow bowls, with an example bearing deep incisions

[280] Several examples of these forms are shown in Figure 17. The rounded simple bowl (type BL1a) is by far the most common, comprising **JCHPs 390**, **498**, **511**, **562**, **584**, and **511**. The miniature version of the form (type BL1b) is also attested, exemplified **JCHPs 363** and **587**. The shallower, straight-walled variant (type BL2a) can be seen in **JCHPs 507**, **508**, and **561**, and the shallow, everted-rimmed variant in **JCHPs 292** and **577**. Finally, the only restorable large bowl from the Egyptian-style tradition (type BL5a) from this phase is **JCHP 531**.

[281] Miniature forms have been variably interpreted as evidence for apprenticeship or children's toys (e.g., Kamp 2001) and as votive objects (e.g., New Kingdom 172 in Wodzińska 2010: 146). Of the two, the latter most likely in this context given the gate's function as both an administrative center and liminal portal into the city. The liminality of gates at southern Levantine sites has been discussed by Sharon Zuckerman (2007a; 2010).

indicating its use as a cutting platform—potentially for solid foods.[282] This plausibly suggests functional distinctions within the Egyptian-style table service based on vessel morphology. In contrast to the more cohesive dining set from the Egyptian-style tradition, , the rarer examples from the Levantine tableware tradition are much more erratic in character, being mostly attested across multiple rim morphologies in the detritus of the gate passageway (see discussion in Appendix 12.2). Restorable forms are confined to two types of carinated bowl (types CB2 and CB3), as well as a rare hybrid form—a simple bowl with an interior thickened rim (type LB2)—that exhibits a full suite of technological features from the Egyptian tradition (see Appendix 12.2).[283] If anything, these examples demonstrate that the use and appreciation of Levantine forms is still attested at Jaffa, even in contexts almost exclusively characterized by Egyptian-style forms.

[282] Contemporary Alalakh in modern Syria also exhibits evidence for the use of shallow bowls for the consumption of solid foods (M. T. Horowitz 2015).

[283] These forms are depicted in Figure 18. **JCHP 369** is a near complete type CB2 carinated bowl, and **JCHP 510** a complete example of the type CB3. **JCHP 303** exhibits the rim morphology of the common type LB2 bowl, however, is otherwise identical to bowls from the Egyptian-style manufacturing tradition.

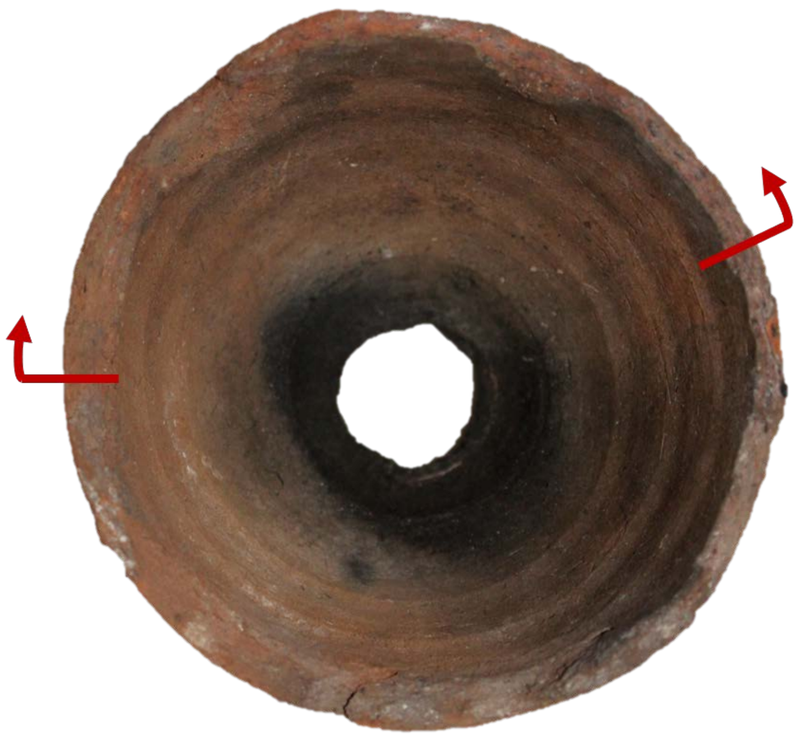

Figure 21: Detail image of the upper break of **JCHP 362** (**Photo JCHP_362i**), note the evidence for intentional beveling between the two arrows. The charring on the interior of the vessel is unrelated to its function; it is a product of the fire that destroyed the Phase RG-4a gate.

Unsurprisingly, culinary forms are only attested in secondary contexts in the gate, mostly as loose sherds in the passageway. One exception, albeit still in secondary context, is the base of an Egyptian-style beer jar (type BB, see Figure 17, **JCHP 362**), a form which is regarded as the functional successor to the Egyptian-style flowerpot.[284] The form should not be interpreted as indicating Egyptian culinary practices in the gate, but rather was in secondary use as a funnel (see Figure 21). Consequently, this can only indicate that this form was in circulation at Jaffa, which is notable considering its rarity across the site otherwise. The only other culinary forms

[284] Despite the name, the function of the form remains disputed, with the flowerpot analogy centering on shared characteristics such as basal perforation and the deep finger impressions from when the potter lifted the form from the wheel. Furthermore, the beer jar seems to have immediately replaced the flowerpot as it went out of popularity (Martin 2011b, 55). Unfortunately, only two samples from Jaffa could be tested for organic residues. One produced no evidence for any preserved residue, and the other provided no biomarkers indicative of its function. While the proportions of common fatty acids fall within the variation seen among the flowerpot samples, a larger sample of beer jars is necessary to indicate if that pattern should be considered diagnostic (see Appendix 16).

attested in this phase are a variety of types of Levantine cookpot rims seen in the sherd material from the passageway, once again suggesting the exclusive use of this type for (in)direct heat cooking at the site.

In contrast, container forms are well attested within the Phase RG-4a assemblage, both as restorable forms and in the sherd material. As with the Level VI Late kitchen, they fall across both small forms that could be more readily assigned to a tableware function and larger storage forms. In the case of the former group, the only restorable small containers come from the Levantine tradition, with one—**JCHP 499** (see Figure 18)—being one of the only Late Bronze Age jugs from the Levantine tradition recovered from a non-mortuary context at Jaffa.[285] This form possesses several key features completely absent from contemporary functional analogues in the Egyptian tradition, notably in that it possesses both a handle and a flat, stable base. As previously noted, its presence within the table service would result in completely different bodily comportment and motions by comparison to the equivalent Egyptian table service, and therefore would have had a tangible effect on the conduct of the meal. Interestingly, Egyptian-style small containers are completely absent from this phase save for an ambiguous base fragment found among the debris in the gate passageway. The rarity of locally produced Egyptian-style forms—large or small—is a pattern that continues into successive phases of the gate.

The only other Egyptian-type containers that are attested are Egyptian imports.[286] These fall across three categories, only two of which, the handled cup (type CU, see Figure 17, **JCHPs 558** and **568**) and a so-called "meat jar" (type JRVmj, see Figure 17, **JCHP 262**) were

[285] The other small Levantine container from the Phase RG-4a gate is a piriform juglet (see Figure 18, **JCHP 373**), which would have likely contained some sort of precious commodity—a perfume or oil—unrelated to foodways.

[286] Petrographic analysis confirmed these forms as Egyptian imports (Ownby Forthcoming).

restorable—the latter being first fully restorable example recovered in the Levant.[287] Of the two, name of the former is deceptive as it did not function as a drinking vessel, but rather it served as a container of some sort of precious commodity—generally assumed to be honey but more recently proposed to have been a wider variety of food and non-food related items (see discussion in Martin 2011b, 253). While the examples from Jaffa were subject to intense thermal modification, preliminary results from residue analysis supports this broader interpretation for their contents as some examples contained plant- and animal-based carrier oils suggestive of a non-foodways function. In contrast, preliminary analyses of the meat jars suggest that the Jaffa examples can be associated the importation of an animal-based foodstuff from Egypt, with several biomarkers potentially suggesting preservation agents (see Appendix 16). Thus, both forms should be understood in relation to the importation of commodities from Egypt rather than the desire for the vessels themselves. Consequently, it seems that by this phase almost all bulk storage made use of the local Canaanite store jar (types SJ1 and SJ2, e.g., Figure 18, **JCHP 251**).[288] As such, this phase—and all other subsequent and contemporary phases at Jaffa—offers little evidence for the local consumption of large, Egyptian-style storage forms.

[287] The third example—a type AM amphora rim—was among the detritus in the passageway (see Appendix 12.2). The type CU cup is variously referred to as a "mug" (Aston 1996, 65), "tankard" (Hope 1989, 55)), and "wide-mouthed juglet" (Killebrew 1998, 150), with the confusion regarding its use as a drinking vessel stemming from its broad aperture. The form, however, was a container for precious commodities (Aston 1996, 11–12; 2007). For the rarity of the meat jar in the southern Levant, a locally produced imitation was identified by Martin the Deir el-Balaḥ cemetery (2011b, 72; after Beit-Arieh 1985, Fig. 6:7), whereas probable rim fragments have been found at Ashkelon (Martin 2008, Fig. 2:8), Tell Abu Hawam (Balensi 1980, pls. 12:6, 130:27), and Akko (identified by Martin amongst the assemblage there, but unpublished, see Martin 2011b, 72). A probable base fragment is also noted from Tel Dor (Martin 2011b, Pl. 39:9).

[288] These forms, conservatively, comprise more than 80% of the container assemblage (see Appendix 12.2).

7.2.3 JCHP Local Phase RG-3b – Late Bronze Age III (1135 – ? BCE; Kaplan Level IVA)

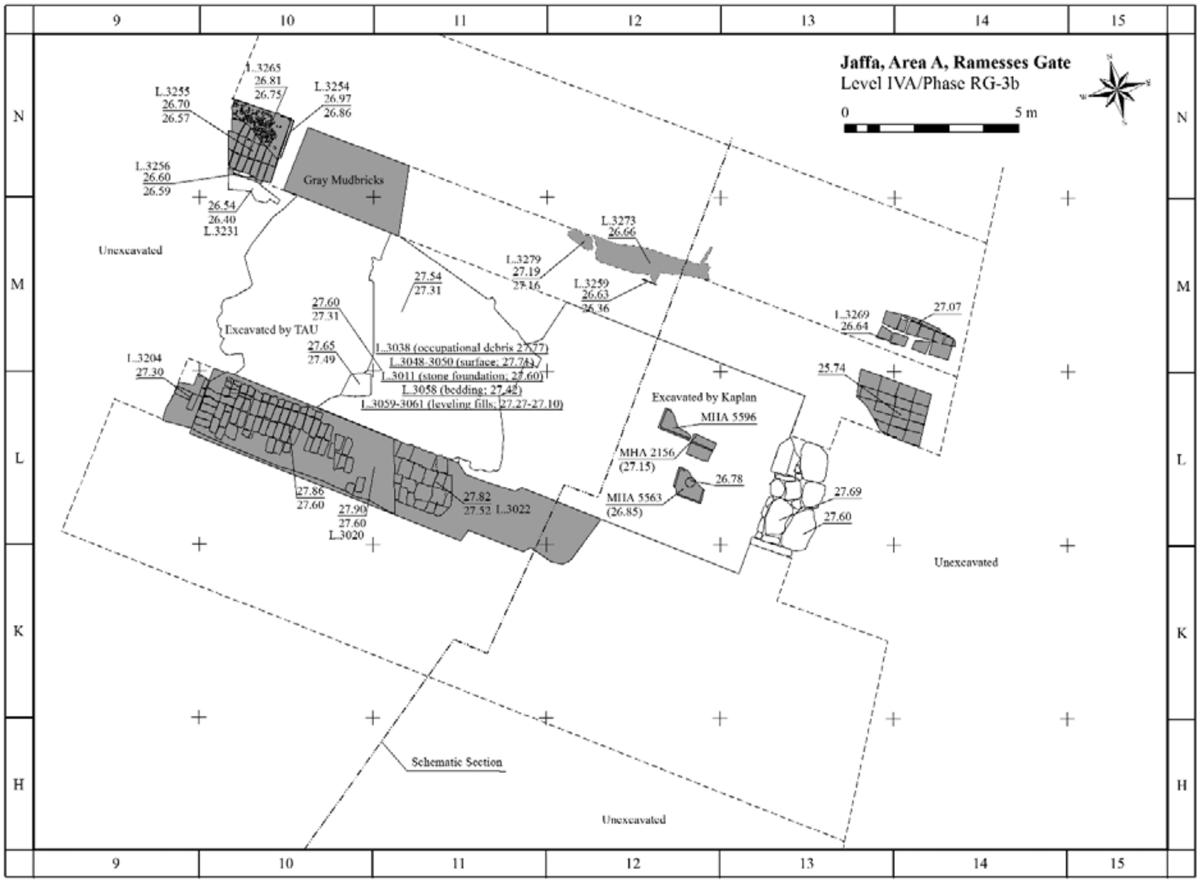

Figure 22: The Phase RG-3b gate complex, with the eastern and western excavations of Tel Aviv University and Kaplan marked (drawing by K. Kowalski). All numbers with decimals indicate elevations (masl). Image previously published (Burke, Peilstöcker, et al. 2017, 104, Fig. 25), reused with permission.

Not long after the destruction of the Phase RG-4a gate, the complex was rebuilt approximately 2 m above the Phase RG-4a passageway on the ruins of the previous gate (see Figure 22). The gate towers were incorporated into the foundations of the new Phase RG-3b gate, and the destruction debris were raked flat in preparation for the laying of a new passageway. A levelling fill of thick mud was lain directly atop the destruction debris (**Loci 3056** and **3061**), which was then capped by a cobblestone foundation layer (**Locus 3011**). This in turn was covered over by a compact layer of earth serving as the passageway floor (**Loci 3048**, **3049**, and **3050**). The discovery by Kaplan of one of the Ramesses II stone façade fragments (**MHA 2156**) in the levelling fill beneath the passageway floor indicates that the inscription was no longer on display during this phase (Burke, Peilstöcker, et al. 2017, 113–14). Lacking evidence for a clear destruction event, it is unclear exactly when this gate went out of use. However, several C14 dates from short-lived botanical samples recovered from the Phase RG-3b gate passageway and succeeding Phase RG-3a gate passageway were subjected to Bayesian modeling to bracket the final phase of the gate to a high probability range of 1134-1115 BCE (Burke, Peilstöcker, et al. 2017, 120, fig. 34).

In contrast to Phase RG-4a, the lack of a destruction event in the life of the Phase RG-3b gate, which therefore lacks material from a collapsed second story, resulted in a smaller recoverable assemblage—comprising 238 total diagnostic sherds. However, assemblage size is also a product of the smaller exposure of the gate passageway by the JCHP, as the passageway had been partially excavated already in the east by Kaplan and in the west by the Tel Aviv University (see Figure 22 and Section 7.1). Like the passageway finds from Phase RG-4a, the Phase RG-3b assemblage consists of ceramic fragments deposited in the passageway throughout its use life. It is therefore difficult to speak of the material from Phase RG-3b as representative of activities in the gate. Rather—while the potential for residuality cannot be ignored—the ceramics are more appropriately considered as representations of ceramic use/consumption patterns within the site itself.

7.2.3.1 The Phase RG-3b Ceramic Assemblage

Since the Phase RG-3b assemblage largely constitutes a reduction in the overall diversity of forms already present in the preceding Phase RG-4a assemblage, much of the qualitative discussion here will be limited to its coherence as an assemblage of fragmentary elements.[289] As will be seen in Section 7.3, there is a clear distinction between this phase and that of the preceding Phase RG-4a gate in that a limited group of Levantine types become more common in

[289] For an in-depth description of the assemblage, see Appendix 12.3.

relation to their Egyptian counterparts. The discrepancy is such that proportions between functional types of either ceramic tradition actually flips depending on the mode of calculation, which contrasts with the stable majority of Egyptian-style forms expressed in all other phases at the site. Given the overwhelming proportion of Egyptian-style ceramics across all types in preceding phases, a proportional increase in Levantine bowls runs contrary to what one would expect should the Phase RG-3b assemblage be purely the product of residuality. Indeed, even though the Phase RG-3b assemblage (n = 238) is nearly half the size of the of the preceding Phase RG-4a assemblage (n = 451), the EVE counts of several tableware forms from the Levantine tradition are almost equal between the two.[290] Consequently, despite the overall different character of the two assemblages, broad comparisons are possible and yield interesting results, as will be discussed further in Section 7.3.

[290] In the case of the Levantine type LB2 bowl, the rim EVE in Phase RG-3b is 1.075 (n = 19 sherds) compared to 1.235 (n = 22 sherds) in Phase RG-4a. For base EVEs, Levantine bowl base morphologies are more common than their Egyptian counterparts (see Appendix 12.3).

7.2.4 JCHP Local Phase RG-3a - Late Bronze Age III (? – 1125 BCE; Kaplan Level IVA)

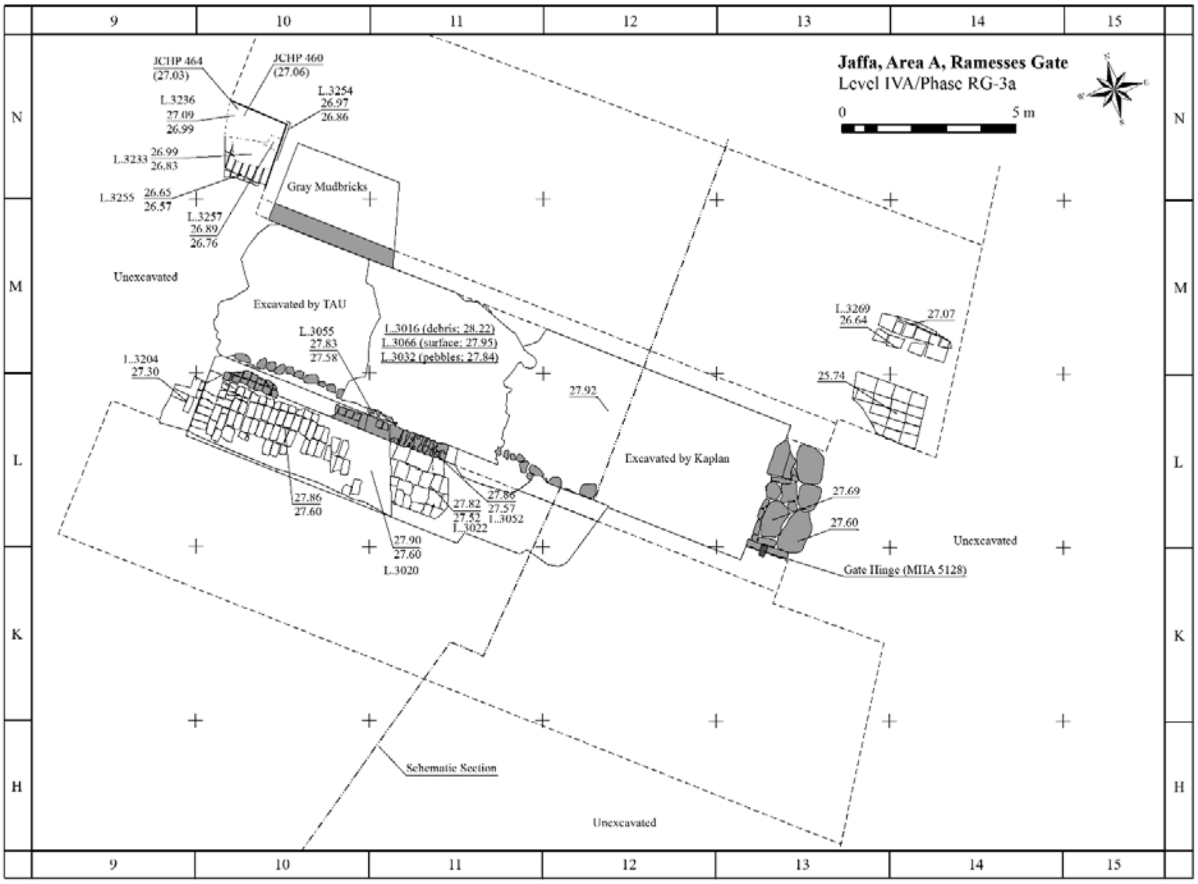

Figure 23: The Phase RG-3a of the gate complex, with the eastern and western excavations of Tel Aviv University and Kaplan marked (drawing by K. Kowalski). All numbers with decimals indicate elevations (masl). Image previously published (Burke, Peilstöcker, et al. 2017, 104, Fig. 28), reused with permission.

As previously mentioned, the preceding Phase RG-3b gate did not terminate in a destruction event, but rather was renovated (see Figure 23). The gate was modified with the addition of mudbrick superstructure (**Locus 3052**) along the interior passageway against the northern face of the southern tower (**Locus 3022**), which was bolstered with the addition of a cobblestone curb (L**oci 3031** and **3055**). Further structural integrity was lent to the passageway walls with several of the Ramesses II façade blocks being repurposed as orthostats. These blocks—found by Kaplan during his excavations in the passageway—were placed against the walls of the towers. The renovations resulted in a narrower entryway, which in turn required the laying of a new floor (**Locus 3066**).

Unlike the preceding phase, the Phase RG-3a gate came to an end suddenly, resulting in an appreciable destruction debris. Within the gate passageway, the destruction was initially evidenced through the presence of degraded, burnt timbers suspended in a matrix of brick debris, though the assemblage of restorable vessels was small in comparison with the Phase RG-4a destruction. In 2014 however, the JCHP discovered an additional portion of the destruction debris comprising several restorable vessels in a landing at the western end of the northern tower, including a store jar (**JCHP 460**) containing charred wheat seeds (Burke, Peilstöcker, et al. 2017, 114–17). From these seeds, it was possible to furnish an absolute date for the contents of the jar, and by proxy a probable date for the destruction of the Phase RG-3a gate. However, since the succeeding Phase RG-2 dates to the Persian period, it was impossible to bracket the range supplied from the C14 dating using Bayesian analysis. Consequently, the high probability date range for the conclusion of this phase is much larger than the preceding two, occurring somewhere between 1127 and 1098 BCE—though an end somewhere in the last quarter of the 12th century BCE is likely (Burke, Peilstöcker, et al. 2017, 120, fig. 35).

After the Phase RG-3a gate, there is no evidence for the continuity of an Egyptian presence at Jaffa. Given the information furnished by the absolute C14 chronology, the 129 diagnostic sherds and restorable vessels of the Phase RG-3a assemblage are the latest assemblage of Egyptian-type ceramics in the southern Levant (Burke, Peilstöcker, et al. 2017, 123). Furthermore, since this material contains Egyptian-style forms manufactured locally at Jaffa, it sheds light on the relationship between foodways and identification at the twilight of Egyptian rule. From a historical standpoint, this destruction was likely as late as the reign of Ramesses IX

(1126-1108 BCE), most famous for internal instability in Egypt that manifested in the form of royal tomb robberies, labor strikes, and foreign incursion (van Dijk 2000, 301). However, it cannot be unequivocally ruled out that it was even later. Consequently, Phase RG-3a at Jaffa represents the new, late 12th century BCE reality of Eastern Mediterranean geopolitics, where Levantine instability combined with internal Egyptian political, economic, and social strife rendered a sustained imperial presence in the southern Levant untenable. The terms “sustained” and “imperial” are intentional, since this is not meant to imply that Egyptians vanished from the southern Levant after this period. In fact, many seem to have remained and become involved in the formation of early Iron Age polities (Burke 2018). This phase simply marks the end of the officially sanctioned and institutionalized nature of the Egyptian presence, with the colonial apparatus devoted to sustaining both Egyptian garrisons and asymmetrical power relations with locals completely evaporating.

7.2.4.1 The Phase RG-3a Ceramic Assemblage

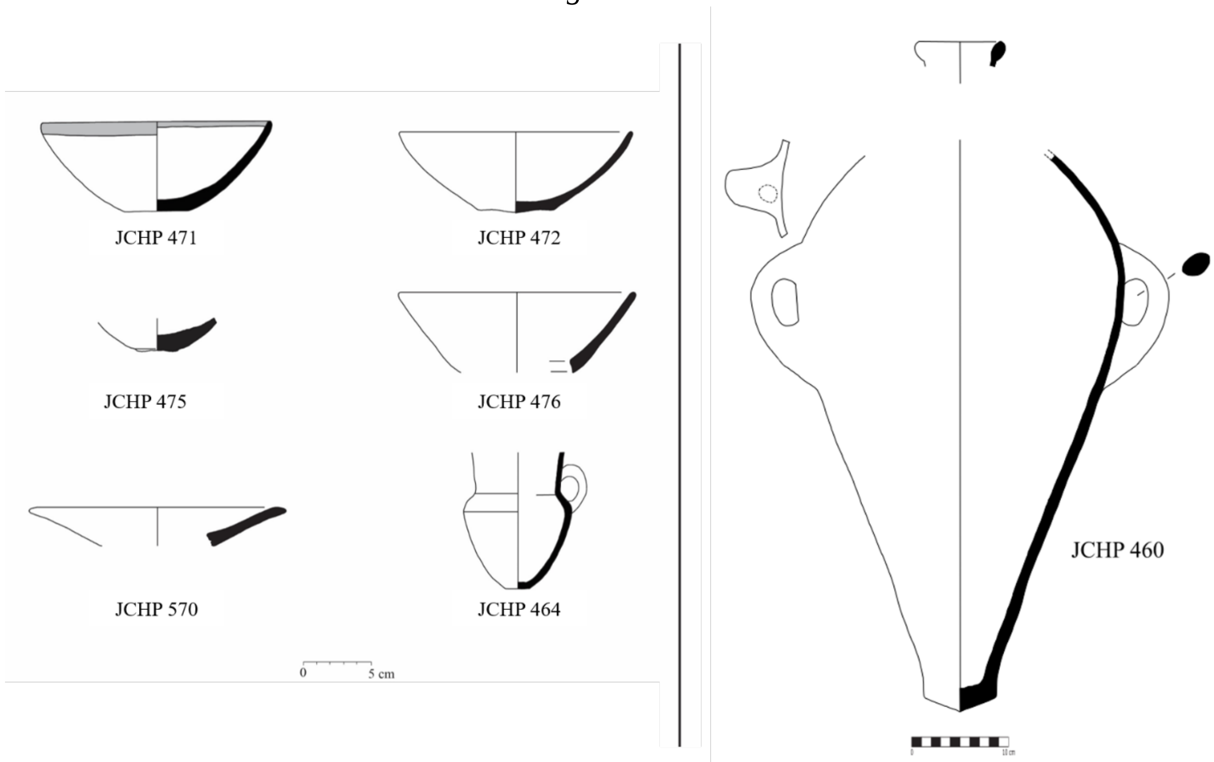

Figure 24: Select forms from the Egyptian-type ceramic assemblage from Phase RG-3a.

As with the preceding phase, the qualitive discussion of the Phase RG-3a assemblage will be brief as it comprises many of the same forms encountered in the previous phase, albeit with reduced typological variation.[291] However, given the presence of multiple restorable vessels from the destruction debris within the gate (see Figure 24), a few brief points will be made here. While the assemblage itself is the smallest of the last three phases of the gate complex at 129 sherds and restorable objects, it is still possible to argue that the proportional majority held by Egyptian-style ceramics in this phase was a genuine condition of antiquity. This is predominantly due to the presence of restorable forms from the Egyptian-style tableware tradition, which indicates the types and decorative motifs that were definitively in circulation during this

[291] For a complete discussion of the assemblage, see Appendix 12.4.

phase.[292] Additionally, the presence of a near-complete Egyptian import, a handled cup (type CU), is suggestive that maritime contacts continued with Egypt during this late phase.[293] Finally, the presence of a near-complete Canaanite store jar (type SJ1) within a collection of vessels that are otherwise only Egyptian-style offers a caveat that is characteristic of every phase at Jaffa—there was never any such thing as a purely Egyptian context.

7.3 Discussion: Diachronic Patterns in the Use and Appreciation of Foodways Ceramics within the Ramesside Gate Complex

In this section, I examine diachronic patterns visible in the ceramics from the Ramesses Gate area. As noted several times throughout this chapter, discussion is confined to the last three phases of the gate complex due to both the nature of the data and the approximately 200-year gap between the Level VI Late garrison kitchen and the Phase RG-4a destruction event. Instead, the Level VI Late materials will be incorporated into the synthetic analyses of Chapter 9. The last three phases of the Ramesses Gate, however, provide a detailed picture the final years of Egyptian rule at Jaffa, something completely missing from the Lion Temple area due to issues of stratigraphic integrity (see Chapter 8). Therefore, I present some preliminary conclusions here to highlight patterns specific to the 12th century BCE at Jaffa, which in turn will be synthesized in a narrative history for the whole site in Chapter 9.

[292] In Figure 24, the type BL1a is represented by **JCHPs 471** and **472**, whereas type BL2a is shown by **JCHPs 476** and **570**, though it should be noted that **JCHP 570** is sufficiently shallow enough to be classified as transitional between types BL2a and BL2b (see Appendix 12.4). As for decoration, the lipstick rim is shown on **JCHP 471**.

[293] Shown in Figure 24 as **JCHP 464**. While it is possible that this object was an heirloom from an earlier period, morphologically it is in keeping with variants common to the transitional period between the 20th and 21st dynasties (see Martin 2011b, 81) and therefore fits the late 12th century BCE date of the Phase RG-3a destruction. Its identification as an import from Egypt has been confirmed petrographically (Ownby Forthcoming).

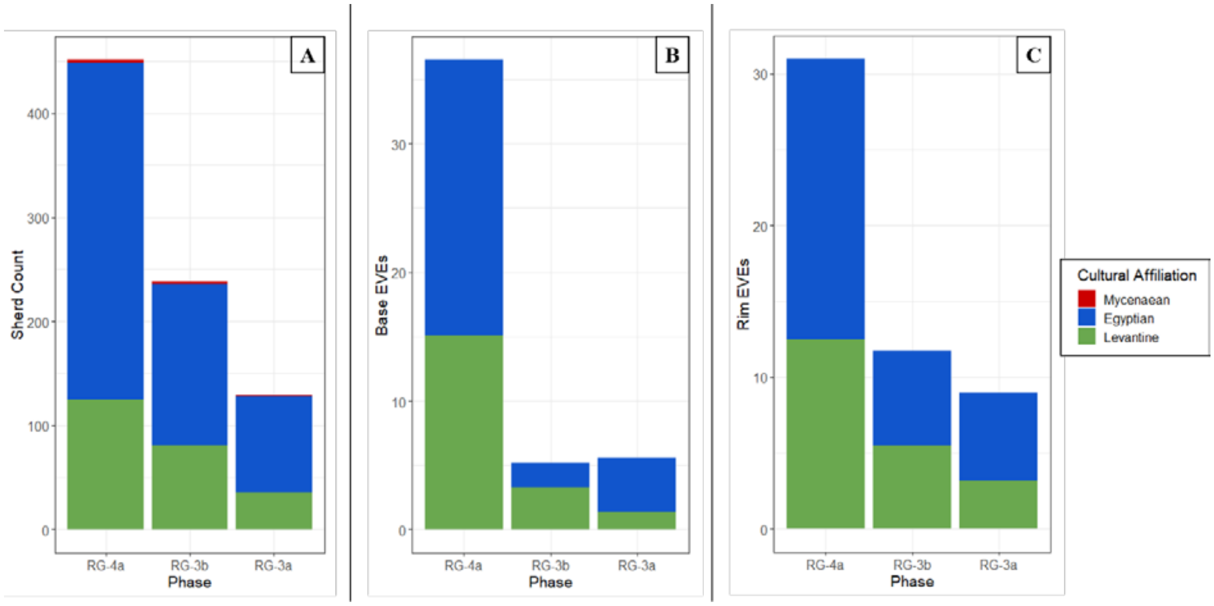

Figure 25: Proportional comparison of ceramics by cultural affiliation using (A) raw sherd count, (B) base EVEs, and (C) rim EVEs. Note the disappearance of Mycenaean forms from the (B) base EVE and (C) rim EVE graphs, as the form is only attested by body sherds. Additionally, note that the y-axes of all three graphs are in different scales for the sake of legibility.

One of the first metrics that merits discussion is the proportion of ceramics between each cultural grouping (see Figure 25), which in these three phases includes forms from the Egyptian, Levantine, and imported Mycenaean ceramics tradition.[294] As noted in Chapter 6, this cannot be the only measure for discussing cultural interaction, however it serves as a useful baseline from which to begin analyses. In all three phases of the gate, Egyptian-type ceramics comprise the majority of the assemblage, though this statement merits a few caveats. First, there is the different size of each assemblage, which the chosen visualization medium—a stacked bar plot—is designed to highlight. Phase RG-4a consists of 451 diagnostic sherds and restorable vessels, which is followed by Phase RG-3b at 238 and RG-3a at 129—unfortunately not producing the ideal of equal samples. Regardless, each is sufficiently sized as to offer several key observations.

[294] The usage of the term "cultural affiliation" here and in subsequent discussion is less than ideal, but the intent is to indicate nothing more than the origins of a given ceramic type within a culturally specific manufacturing tradition. As will be seen, the use patterns and the characteristics of each individual vessel type are more important than origins for understanding practices of identification.

The first is that we are mostly discussing a proportional breakdown of Levantine versus Egyptian-type ceramics, with the small handful of imported Mycenaean sherds being residual by this point and unrelated to activities at the site. Since they are only represented by body sherds, they do not appear in the EVE calculations, and their small numbers exert limited influence on raw sherd counts.

Another caveat is the outsized influence of Levantine store jars on the assemblage. In Phase RG-4a the Canaanite store jar (types SJ1 and SJ2) occupies 10.6% of the total raw sherd count (n = 48), but 25.1% of the base EVE assemblage (9.150 of 36.520 EVEs) and 20.4% of the rim EVE assemblage (6.300 of 30.940 EVEs). With respect to the average EVE rating per fragment, this factors out to 0.191 EVEs per base fragment and 0.131 EVEs per rim fragment. As a point of comparison, when we consider the other major component of all three assemblages, the Egyptian-style simple bowl (type BL1a), it factors out to about 0.019 EVEs per base fragment and 0.057 per rim fragment, nearly a tenth of the EVE rating per base fragment and less than half per rim fragment. This illustrates opposing ends of the problem of assemblage quantification, with the general resiliency of Canaanite store jar fragments and the high friability of Egyptian-style simple bowls ensuring that both skew proportions.[295] However, it is not unreasonable that this skew might accurately represent their high frequencies in antiquity, since the Canaanite store jar was the primary maritime transport container and Egyptian-style bowls were clearly mass-produced at the site.

As can be seen in Figure 25, the majority held by Egyptian-type ceramics is relatively constant throughout the last three phases of the Egyptian occupation. The only deviation from

[295] The term “chunky type” refers to low-friability ceramic elements with a high survival rate, thereby biasing their preservation in higher frequencies and larger sizes (Orton and Hughes 2013, 212). The thick rolled rims and heavy-walled bases of the Canaanite store jar (types SJ1 and SJ2) follow this pattern.

this pattern is in Phase RG-3b when base EVEs show a majority of Levantine forms and rim EVEs provide only a slight majority of Egyptian-style forms. As discussed in Appendix 12.3, the situation with base EVEs does not stem from the outsized influence of Canaanite store jars, but rather the largest single group of vessel bases come from Levantine bowls with a disc base (type DB2), at 35.8% of all base types (1.875 of 5.235 EVEs). This is the only phase where any form of Levantine base morphology eclipses the EVE count of flat bases from Egyptian-style bowls (type BL). Furthermore, the increase in Levantine bowl bases coincides with the largest overall proportion achieved by any Levantine bowl type for any phase at Jaffa, with 9.2% of the total rim EVE assemblage derived from bowls with an interior thickened rim (type LB2, 1.075 of 11.725 EVEs).[296] This makes it second among tableware only to the ubiquitous Egyptian-style simple bowls with plain rims (types BL1a and BL2), indicating its growing popularity against these Egyptian forms.

Consequently, the destruction of the Phase RG-4a gate complex, the monumental embodiment of Egyptian domination, is followed by an increase in the consumption of Levantine ceramic forms. Even if we were to exhibit the greatest methodological caution and combine the assemblages from the phases RG-3b and RG-3a on account of their architectural continuity and close chronological proximity, the pattern still holds. While this pattern will be returned to in Chapter 9, It is important to note that this increase in Levantine ceramics is not a signifier of a total inversion of the picture from previous phases, as Egyptian-type ceramics remain popular in Phase RG-3b and even increase in frequency in the succeeding Phase R-3a. This last pattern is perhaps the most unexpected. Rather than a slow, drawn-out disappearance of Egyptian-style

[296] This applies to every phase that produced an appreciable quantity of sherds. In the case of the Lion Temple area, some phases produced so few sherds that proportions are effectively meaningless.

ceramics at Jaffa, they achieve their highest overall proportion in the final phase of the occupation. Thus, the Egyptian ceramics industry at Jaffa was not only in demand until the end of the occupation, but it was also able to meet that demand. However, by shifting attention to functional categories, the picture becomes substantially more complicated.

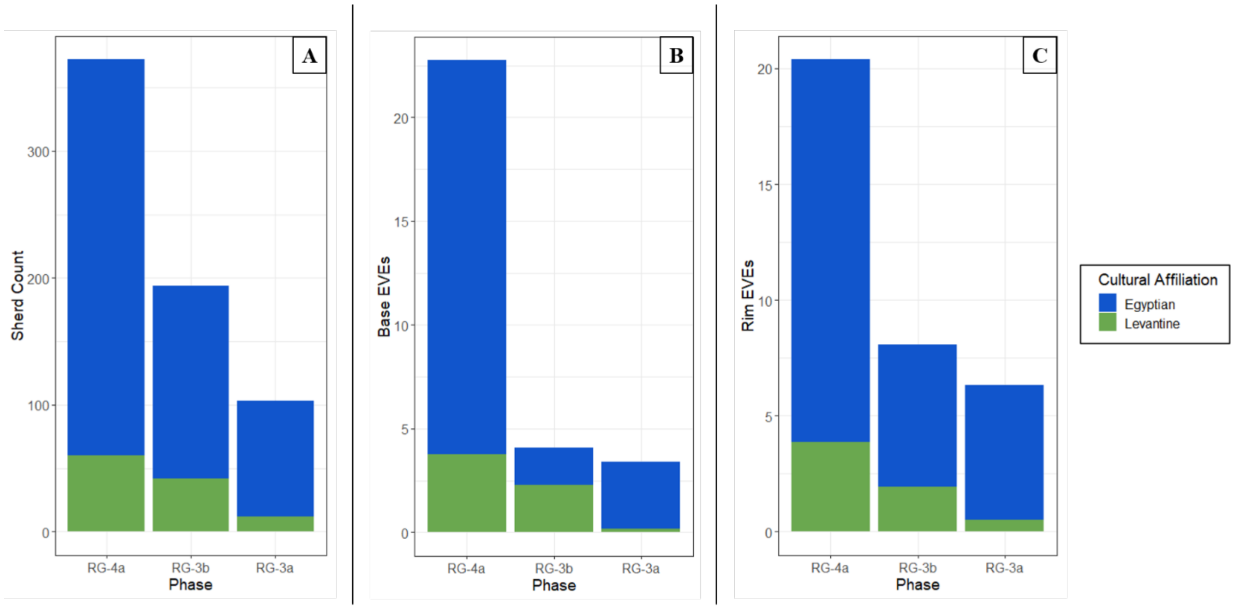

Figure 26: Proportional comparison of tableware forms by cultural affiliation using (A) raw sherd count, (B) base EVEs, and (C) rim EVEs. note that the y-axes of all three graphs are in different scales for the sake of legibility.

Figure 26 provides a diachronic breakdown of the distribution of tableware across the final three phases of the gate complex. The picture echoes—and to a certain extent magnifies—what was already visible in the general proportions across the whole assemblage (see Figure 25). This is because tableware constitutes the overwhelming majority of the assemblage in all three phases, a pattern also known from other contemporary sites.[297] Since it is the largest overall dataset, this makes it exceptionally important for elucidating meaningful patterns. While the

[297] The preponderance of open tableware forms at sites with large Egyptian-style assemblages is well-attested throughout the Late Bronze Age, where they constituted the majority of the Egyptian-style assemblage in the at Beth Shean (strata S-5 through S-3, 78-96%), Tel Aphek (Stratum X-12, 91%), and Tel Sera' (strata X-IX, 97-99%) (Martin 2011b, 249, table 114). For a discussion of the relationship between this pattern and identity negotiation specifically at Beth Shean during this period, see Damm (Forthcoming).

short use-life of tableware contributes to its high frequency, its requisite high replacement rate also makes it more likely that this large dataset reflects real-time changes in consumption preferences (Shott 1996). When coupled with the short intervals of the last three phases at Jaffa, which likely occurred within a single generation, this increases the probability that the fluctuations visible in the tableware assemblages represent real shifts in consumption patterns.

In Phase RG-4a, more than 80% of the tableware is Egyptian-style using either rim or base EVE calculations. However, it is crucial to note that 9.0% of the Levantine bowl rim EVE assemblage (0.350 of 3.870 EVEs) and 26.6% of the Levantine base EVE assemblage (1.000 of 3.755 EVEs) are derived from one vessel, a hybrid that would otherwise be indistinguishable from an Egyptian-style bowl were it not for its Levantine rim morphology (type LB2, **JCHP 303**). Consequently, this inflates the Levantine proportion with a somewhat ambiguous value. This makes the following Phase RG-3b more remarkable, when nearly a quarter of the tableware rim EVE assemblage (1.955 of 8.100 EVEs) and more than half of the base EVE assemblage (2.275 of 4.060 EVEs) are from the Levantine tradition, with the rising prominence of Levantine bowls in this phase having been discussed already. After the final renovation of the gate, the Phase RG-3a assemblage shows yet another reversal. Egyptian-style tableware achieves its highest overall proportion for any phase at Jaffa, registering at more than 90% of both the rim and base EVE assemblages. Despite this majority, there are indications that the increase does not imply a return to the earlier character of the Egyptian-style ceramic industry.

One way to demonstrate this is by examining the number of distinguishable rim morphologies present, which offers an indication of the complexity of the Egyptian-style assemblage through time. As previously mentioned, a clear hierarchy of forms existed in Phase RG-4a, such that it is possible to hypothesize an Egyptian-style table service (see Figure 19).

This was comprised of two sizes of the simple bowl with plain rim (type BL1a/b), the straight-sided bowl (type BL2), the shallow everted bowl (type BL3), and the deep bowl (type BL5), with at least one example of each being attested among restorable forms. After the destruction of the Phase RG-4a gate, these five types are reduced by as many as two, with the small bowl (type BL1b) being completely absent and the large bowl (type BL5) attested only in a single—potentially residual—rim sherd in Phase RG-3b. Finally, by the final phase of the occupation, only the simple bowl with plain rim (type BL1a), straight-sided bowl (type BL2), and shallow everted bowl (type BL3) are attested, alongside a single rim fragment from a carinated bowl (type BL6)—though the exact ties between the rare type BL6 bowl as it manifests in the southern Levant and the Egyptian ceramic tradition is hazy.[298] Regardless, large communal serving bowls and small individual bowls disappear from the assemblage potentially as early as Phase RG-3b, but certainly by Phase RG-3a. Therefore, following the destruction in Phase RG-4a, there is a relatively rapid dissolution of the package of forms that constitutes the Egyptian-style tableware tradition at Jaffa. Despite the collective high frequency of Egyptian-style tableware forms in the final phase of the Egyptian occupation, what appears is a shadow of what preceded it, a pattern that continues to other vessel classes.

[298] The southern Levantine examples cited in Martin as being representative of this type share little in common save for some degree of carination (2011, 44). The exact unity of the type and its Egyptian association are problematic.

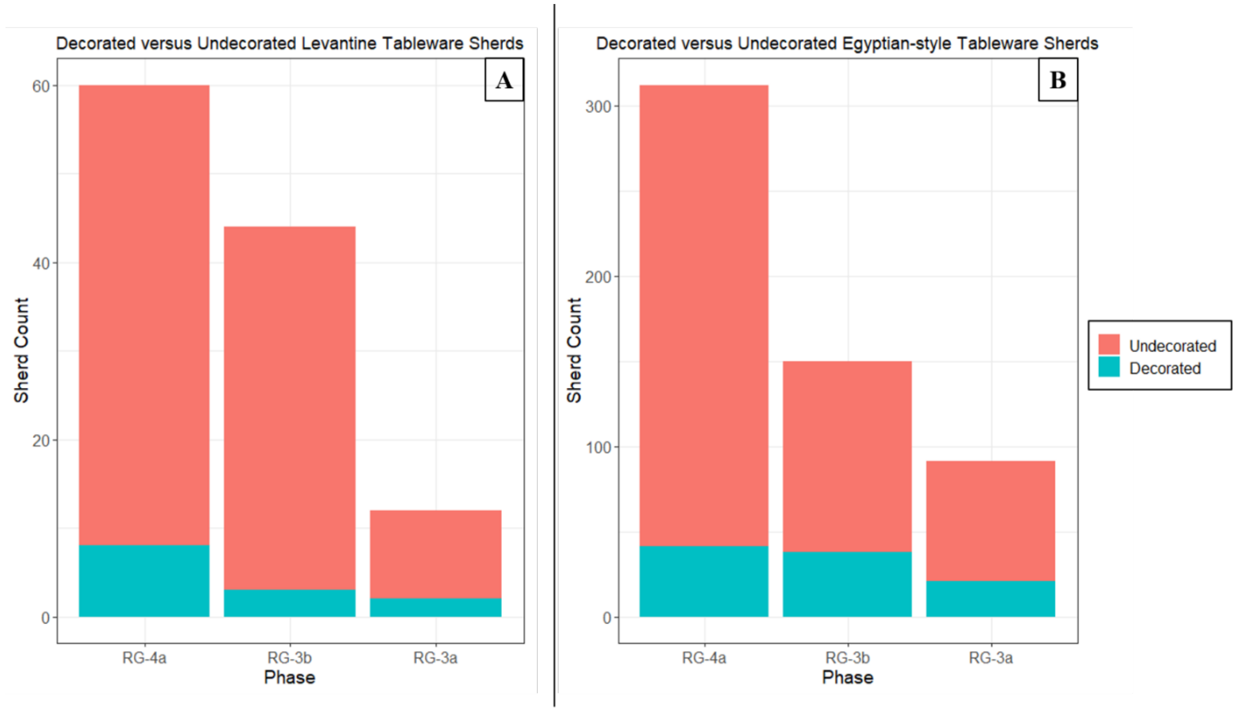

Figure 27: Comparison of the proportion of decorated versus undecorated tableware from the (A) Levantine and (B) Egyptian-style traditions by raw sherd count. Note that the y-axes are on different scales for the sake of legibility.

One final element of the tableware tradition that merits discussion is decoration, which is present on examples from both traditions in all three phases (see Figure 27). As will also be seen for the Lion Temple area in Chapter 8, decoration is much more common—and consistent—on Egyptian-style forms in all phases. In the case of Egyptian-style forms, nearly the entire decorated rim assemblage is composed of bowls with the red lipstick rim, with only a single sherd of a red-slipped bowl being attested in phases RG-4a and RG-3b. Consequently, if these sherds are not residual then this mode of decoration was exceedingly rare by the 12th century BCE at Jaffa. The frequency of lipstick rimmed bowls is only slightly modified using EVEs, where they occupy 11.2% of the RG-4a tableware assemblage (1.880 of 16.860 EVEs), 27.3% of the RG-3b assemblage (1.675 of 6.145 EVEs), and 29.6% of the RG-3a assemblage (1.725 of 5.820 EVEs). Perhaps most surprising is the exceptionally low proportion they hold in Phase RG-4a, when the Egyptian-style assemblage is at its peak diversity and the sample size is largest.

However, the fact that they occupy less than a third of the Egyptian-style tableware forms in all three phases is not overly unusual in comparison to other contemporary Egyptian centers.[299] While the low overall proportion in Phase RG-4a is anomalous, the lipstick rim was a persistent motif throughout the entire period of the Egyptian occupation.

Less can be said about the traditions of Levantine decorated tableware, since there is no phase where they are particularly common. Furthermore, the only consistent decoration seen on Levantine forms is the red painted rim, which in the case of carinated bowls is sometimes paired with red painted concentric circles on the interior of the vessel. All other motifs are attested by single examples, including a wide variety of painted styles, slips, surface treatments, and incised decorations. Despite the variety, there are no instances of traditional Levantine decorative elements such as figural depiction or abstract motifs like the so-called "tree of life"; there are only geometric motifs. Consequently, in the case of the Ramesses Gate complex the lower desire for Levantine tableware corresponds with an even lower desire for decorated forms from this tradition, with the majority of decorated Levantine tableware following the pattern of the Egyptian-style lipstick rim bowls.

Culinary wares from the Egyptian-type assemblage are extremely rare in the Ramesses Gate complex, being attested only in Phase RG-4a by a beer jar (type BB, **JCHP 326**) in secondary use (see Figure 21). The rarity of Egyptian-type culinary forms, however, likely only demonstrates the vagaries of context. Levantine culinary wares are also uncommon—1.3% of the

[299] In strata S-4 and S-3 at Beth Shean, the red lipstick rim is found on 77.0% and 87.7% of type BL1-3 bowls, respectively (Martin 2011b, 142, Fig. 79). However, the picture from Jaffa is like other nearby Egyptian administrative sites. In Stratum X-12 at Tel Aphek, only 20% of the Egyptian-type bowls were decorated—5% with an interior red slip and 15% with a red-painted rim (Martin et al. 2009, 377, Fig. 10.5). Decoration is similarly uncommon at Tel Mor Stratum VI (Martin 2011b, 192), and despite Egyptian-type bowls comprising most of the Stratum IX assemblage at Tel Sera', decorated variants are rare (Martin 2011b, 225). Of these sites, however, only Beth Shean comes close to the frequency of Egyptian-style bowls as seen at Jaffa, so the contrast is unexpected.

overall assemblage in Phase RG-4a (0.405 of 30.940 rim EVEs), 4.1% in Phase RG-3b (0.480 of 11.725 rim EVEs), and 1.8% in Phase RG-3a (0.155 of 8.960 rim EVEs).[300] As a rule, Levantine culinary wares are only attested in the sherd material from the gate passageway. This is unsurprising, since a gate is not the primary locus in which culinary activities would occur, with the recovered fragments stemming from the incidental deposition of garbage. If Egyptian-style culinary sherds had other vectors by which they reached the trash heap, they would likely not appear here. Regardless, it remains that the only attested cookpot varieties are local in character. This repeats a pattern known from elsewhere, as Egyptian-type cooking wares are rare not only in the Levant, but in other corners of the New Kingdom empire.[301] It is interesting to note that the phenomenon of carinated, slightly baggy cooking jugs in the Egyptian-style known from other contemporary, early Iron Age I sites in the southern Levant is completely unattested at Jaffa.[302] While the picture not unequivocal due to the limited assemblage, it seems that the bulk of (in)direct heat cooking done at Jaffa utilized local Levantine forms during these phases. The only exception is the use of certain Egyptian-type functional categories to achieve specific culinary objectives (e.g., the type BB beer jar), reflecting what is known from the Level VI Late kitchen as well as the Lion Temple area (see Burke and Lords 2010, Burke and Mandell 2011, Pierce 2013, and Chapter 8). Despite the contextual limitations, the rarity of any Egyptian-style culinary forms in the gate complex makes it tempting to assume that these practices had become rare by the final phase of the Egyptian occupation.

[300] The proportional increase in Phase RG-3b likely stems from the fact that the entire assemblage is comprised of sherds from the passageway, which means there is no competition with restorable forms from the destruction debris.

[301] A similar situation existed in Nubia, for although Egyptian-type culinary wares are far more common, local Nubian types still form the majority within Egyptian fortress contexts (S. T. Smith 2003c; 2003b; 2013b).

[302] This form is only known in abundance from Tel Dan in northern Israel and a few lone examples scattered at other sites in the region, and currently is poorly understood (Ilan 2019, 128–19).

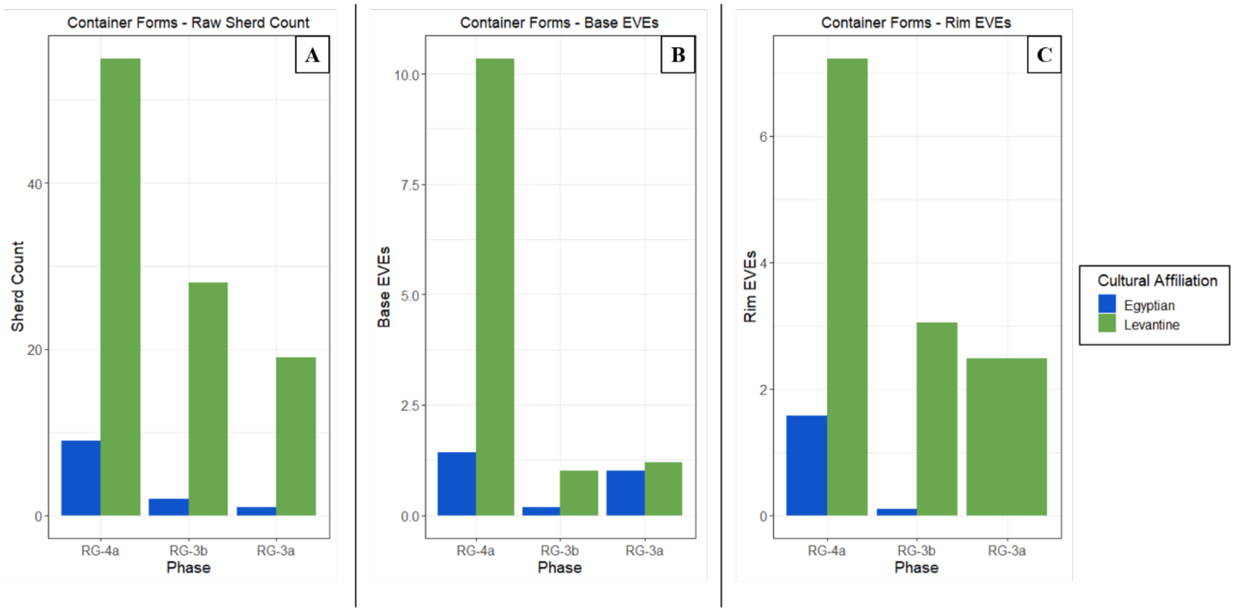

Figure 28: Proportional comparison of container forms by cultural affiliation using (A) raw sherd count, (B) base EVEs, and (C) rim EVEs. Note that the y-axes of all three graphs are in different scales for the sake of legibility.

Like culinary wares, Egyptian-style containers are also relatively uncommon across all three phases (see Figure 28). Regardless of how this frequency is calculated, most storage needs were fulfilled by Levantine forms—be it in small (type JT), medium (type JG), or large containers (types SJ and PT). Regardless of the functional application of closed forms, be it as part of the table service or for long-term storage, there is little to no overt evidence for specifically Egyptian practices. Furthermore, of the few Egyptian-type forms present, nearly every example—and all restorable examples—are imports from Egypt. Locally produced Egyptian-style containers are only attested by single fragments from phases RG-4a and RG-3b, both of which could be residual. Of the imported Egyptian vessels, which includes examples from the amphora (type AM), handled cup (type CU), and meat jar (type JRVmj) families, only the latter two are represented among restorable forms.[303] Regardless, they heavily bolster the proportional value of Egyptian container forms in comparison to their Levantine counterparts.

[303] At least two meat jars and handled cups were in among the Phase RG-4a destruction debris, and a near-complete handled cup was recovered from the Phase RG-3a destruction debris.

Whether these vessels were desired for their form or contents cannot be said with certainty. Regardless, they offer little concrete information about culturally significant choices for food storage practices in comparison to the purposeful, local manufacture of Egyptian-style closed forms.

From a contextual standpoint, it seems likely that that the meat jars were recycled as storage containers in the upper stories of the gate after being emptied of their contents, a decision that might not signify culturally meaningful behavior especially since they occupied this space with several examples of Canaanite store jars. Likely, by this point they had as much cultural significance as the large Cypriot pithos (**MHA 2155**) that Kaplan found during his excavations of the gate passageway (see n. 277). The original contents of the meat jars might have had more significance, perhaps representing an otherwise unattainable—and likely expensive—foodstuff imported from Egypt, but their final function within gate complex was probably the opportunistic reuse of a transport container. If we review this assemblage as commenting on the availability of Egyptian-style container forms at Jaffa during the final phases of Egyptian occupation, their rarity is striking. Were it not for a complete Egyptian-style jar found in Phase LT-6 of the Lion Temple area (**MHA 4232,** see Chapter 8), it would be difficult to argue that they were present at all. Consequently, this augments what was already clear from the tableware assemblage. While the Egyptian-style ceramic industry was still productive at the end of the 12th century BCE at Jaffa, its quality was altogether different.

7.4 Conclusions

As will be seen from the discussion of the Lion Temple area in the following chapter, the last three phases of the Ramesses Gate complex constitute the best-preserved evidence excavated thus far at Jaffa for the final years of the Egyptian garrison. Within the span of a generation, the

Egyptian occupation at Jaffa went from its 19th/20th Dynasty peak as a classic type-site for Ramesside era control to the complete collapse of Egyptian hegemony. The last three phases of the gate complex clarify this picture, showing that it was not as simple as the gradual cessation of Egyptian cultural practices. Instead, after the Phase RG-4a destruction several forms related to Egyptian foodways either completely cease or become extremely rare, coinciding with an increase in the frequency of their Levantine counterparts. While it is excessive to call the Phase RG-3b gate a Levantine interregnum, the shrinking repertoire of Egyptian-style forms and the higher frequency of Levantine types seems to suggest an increased desire for the performance of Levantine practices after a successful rebellion that destroyed a prominent symbol of Egyptian imperialism. If the high frequency of Egyptian-style forms in the final phase is any indication, whatever patterns that were in place in Phase RG-3b were reversed during the final phase of the Egyptian occupation. The gate was renewed, and the Egyptian-style ceramics industry seems to have resumed much as it had before, as indicated by the highest-ever proportion of Egyptian-style tableware seen in these last three phases. And yet, despite the high proportion, cooking, storing food, or setting a table in the Egyptian fashion appears to have become either progressively less desirable or constrained by disruptions in the Egyptian-style ceramic industry. While the Egyptian-style ceramic industry continued to produce familiar forms and decorative styles, others seem to have faded from use and the result was a shadow of what had previously been available. With the final destruction of the Phase RG-3a gate, more than three centuries of Egyptian rule at Jaffa came to an end, and along with it the systems supporting the perpetuation of Egyptian foodways.

Chapter 8 – The Lion Temple Area at Jaffa: Context and Ceramics

First excavated by Jacob Kaplan from 1970 to 1974, the Lion Temple area augments the ceramic assemblage from the Ramesses Gate area with a broader view of the New Kingdom garrison. Though the area was originally named for its most notable feature, Kaplan encountered multiple contexts dating across the entire period of the Egyptian occupation: two phases of superimposed structures with domestic installations dated to the Late Bronze Age IB, the Late Bronze Age IIA Lion Temple complex, and two phases of a Late Bronze Age IIB – III Egyptian administrative building. Consequently, where the Ramesses Gate area allows insight into the earliest and latest stages of Egyptian rule, the Lion Temple area both adds to these periods and provides the only coherent exposure of the Late Bronze Age IIA at Jaffa. Despite peculiarities stemming from its excavation history and stratigraphy (see Section 8.1), the assemblage is ideally suited for a diachronic analysis of foodways ceramics, especially with the new absolute chronological anchors derived from the renewed excavations of the JCHP. With these dates, it is possible to incorporate these materials into our understanding of New Kingdom Jaffa for the first time.

This chapter constitutes the first presentation of Lion Temple area assemblage, which includes the finds from Kaplan's 1970 to 1974 excavations as well as the renewed JCHP excavations of 2014. The structure of this chapter largely follows that of the preceding Chapter 7, beginning with a brief history of excavations (Section 8.1), a phase-by-phase contextualization of finds that includes a qualitative discussion of key features of the assemblage (Section 8.2), and finally, a discussion of diachronic patterning for the ceramics associated with foodways (Section 8.3). Much of sections 8.1 and 8.2 provide a summary version of the forthcoming stratigraphic report for the Lion Temple area (Burke, Peilstöcker, and Damm Forthcoming), but within this dissertation I only focus on details necessary contextualize finds and support the periodization of strata. As with the preceding chapter, a dense, quantitative summary of each assemblage is provided in Appendix 14, along with appendices devoted to the raw database of sherds and the R Markdown text for all calculations used in the analysis of the assemblage (Appendix 13). These data sharpen the patterns already noted in Chapter 7 for the Ramesses Gate area, revealing that while Egyptian-style ceramics consistently dominate the assemblage, patterns across the various functional categories of ceramics suggest shifts in cultural practice that correlate with the changing fortunes of the garrison. Collectively, they suggest a close relationship between foodways and identification as local agents navigated a dynamic cultural interaction zone.

8.1 History of Excavations

This section reviews the excavation history of the Lion Temple area, necessary for not only understanding the nature of the ceramic data analyzed in this chapter, but also for clarifying stratigraphic ambiguities created by the variable excavation strategies. The Lion Temple area was first excavated by Kaplan between 1970 and 1974, with the excavations never being fully published prior to Kaplan's untimely death. Instead, he was able to publish a series of short progress reports for each season (J. Kaplan 1970; 1971; 1972a; 1972b; 1972c; 1973; 1974a; 1974c; 1975; 1976; J. Kaplan and Kaplan 1975a) along with two summary encyclopedia articles (J. Kaplan and Kaplan 1975a; J. Kaplan and Ritter-Kaplan 1993). Consequently, the discussion here and in the following Section 8.2 is based instead on his extensive excavation notes and the finds stored within the local antiquities museum at Jaffa. This body of material is perhaps the best-preserved archive and finds collection from Kaplan's work at Jaffa, marking these excavations as being ideally situated for the types of foodways analysis outlined in Chapter 6.

The archive includes 510 plans, section drawings, and daily top plans, with the latter including extensive notes on contexts, the composition of pottery buckets, and Kaplan's day-to-day interpretations. To this can be added 2,820 original pottery bucket tags, many of which augment the information from daily plans. Of the 2,773 pottery buckets from the excavation, all have been read either by myself or other JCHP staff, though I reviewed all pottery discussed in this dissertation to confirm past readings.[304] As noted in Chapter 6, many of the boxes still contain hundreds of miniscule, non-diagnostic sherds—testimony to the retention of finds recovered via dry-sifting. To this impressive array of material can be added 1,402 registered objects, nearly all of which were either directly accessible for analysis or preserved in photographs and/or the original registration cards filed at the museum. While this archive includes an array of material outside the purview of this dissertation, it serves as testimony to Kaplan's rigorous work and provides a robust dataset for this and future analyses.

Kaplan's excavations in the Lion Temple area were complex, as the main research objective of the project—examining the Egyptian fortress—was balanced with addressing the substantial occupation levels from other phases and fulfilling various municipal cultural resource management excavations. Consequently, certain areas were exposed in part, abandoned, and returned to episodically over the course of the 1970 to 1974 excavations, with some features being excavated at least in part every season. Moreover, Kaplan was reluctant to remove standing architecture and, therefore, his exposure of earlier phases (e.g., Phase LT-10) was often in constrained probes. As will be seen in Section 8.2, this produced islands of stratigraphy that can only be linked through inferential criteria such as elevation or relative chronology. The picture will be made clearer following a description of the work of each season.

[304] Credit for identifications prior to the current study goes to either directors Aaron A. Burke and Martin Peilstöcker, or George Pierce and Krystal Lords-Pierce, the latter two working on the ceramics between 2007-2012.

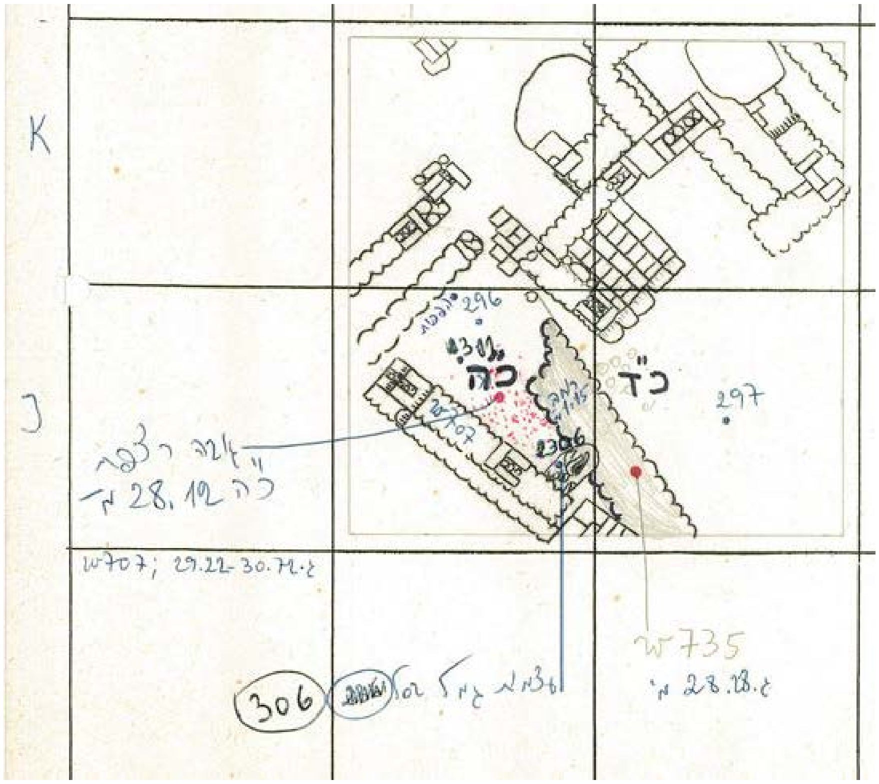

Figure 29: Detail of **Top Plan A70-DG-026**, showing the Late Bronze Age IB **Wall 735** in gray and associated floors, labelled as "כ"ד" and "כ"ה". The other structures are Persian-era or later.

For the 1970 season, Kaplan's main excavations were confined to **Squares K3**, **K4**, **J3**, and **J4**. There, directly underneath a series of late Persian period buildings (Phase LT-3b[305]), Kaplan encountered a Late Bronze Age IB wall (**Wall 735**) that he would eventually trace across the whole excavation area, providing an important stratigraphic link across several of his probes (see Figure 29).[306] The wall and its associated floors were heavily disturbed by later construction, with cleanly stratified Late Bronze Age materials recovered only along the margins of the wall (Kaplan 1972c, 83).[307] Leaving **Wall 735** in place, Kaplan excavated alongside it,

[305] Structures from the Persian period and later are published elsewhere (Tsuf 2018; Danielson et al. 2020).

[306] Kaplan originally placed **Wall 735** in the Late Bronze Age IIB with the Ramesses Gate (Kaplan 1972c, 83). This was before he excavated undisturbed, Late Bronze Age IB floors along this wall in 1974.

[307] The northern extent of the wall and its southern floor were cut by an intrusive Iron Age pit Kaplan called the "Iron Age intrusion" ("חדירה ברזל"; e.g., **Top Plan A70-DG-028**). The northern side of the wall was disturbed by a foundational pillar for an Ottoman-era structure. These pillars, which Kaplan referred to as "Arabic pillars" in his top plans ("עמוד ערבי"), are present throughout the excavation area (see **Top Plan A70-DG-028**).

encountering two walls (W**alls 736** and **738**) from a Late Bronze Age IB building complex that he would not be able to clarify until his 1972 excavation season. Generally speaking, the 1970 excavations are perhaps the most difficult to understand in Lion Temple area, with many pottery buckets unassigned to loci, and locus designations only being given to architectural features or floors—several of which were never drawn (e.g., **Top Plan A70-DG-027**). Consequently, many stratified layers—especially fills—can only be inferred from pottery bucket descriptions. Thankfully, the 1970 excavations are anomalous in this respect, and subsequent seasons are much clearer.

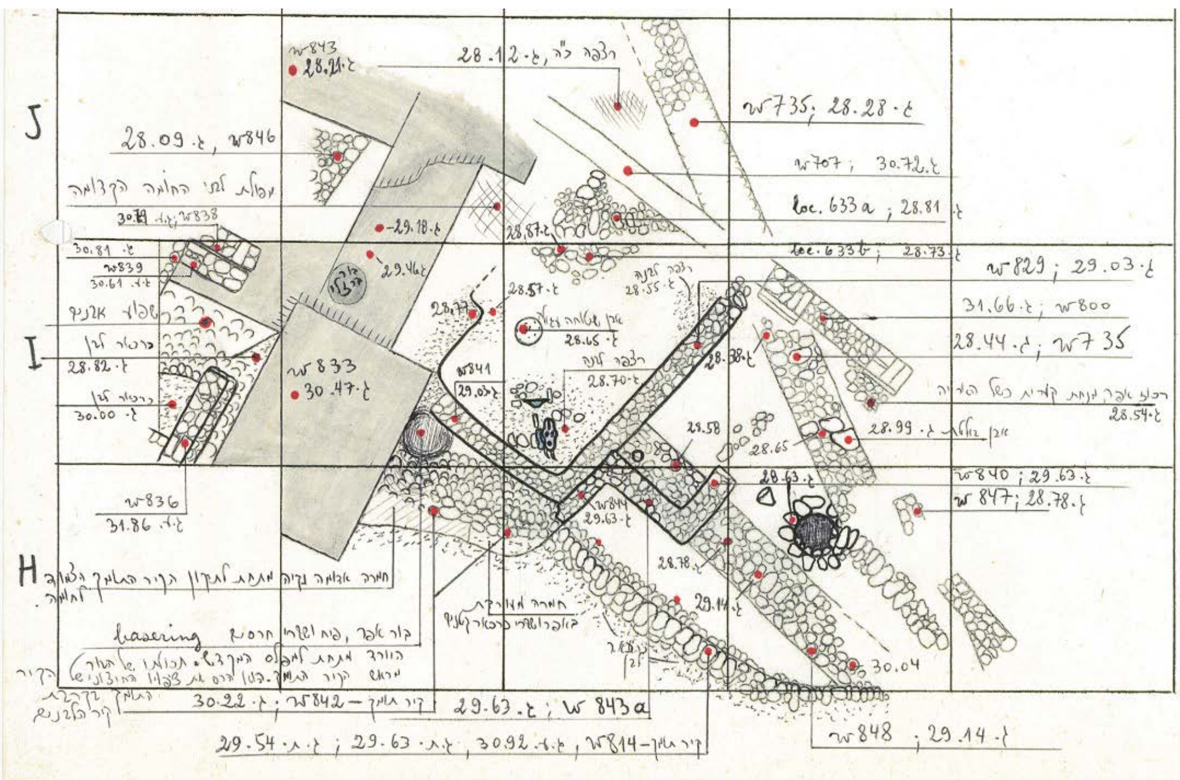

Figure 30: Detail of the final top plan from the 1971 season (**Top Plan A71-DG-052**). Note the partial plans of both the citadel (**Wall 833**) and Lion Temple (**Walls 841** and **829**).

The 1971 season began with a short attempt to excavate west of the 1970 excavations, though efforts were quickly redirected to the south and southwest. Initially encountering architecture from the Persian through Ottoman period, the excavations rapidly revealed several

Bronze Age structures that occupied Kaplan for the remainder of his work in the area (see Figure 30). This included a retaining wall built over the interior, northern face of the Middle Bronze Age glacis (**Wall 814**) in **Square H3**, which demarcated the southern boundary of the excavations. The high elevation of the Middle Bronze Age glacis along the southern edge of the area forced Kaplan to adjust his strategy to excavate thick fills to the north, especially in **Squares I2** and **I3** (see **Top Plan A71-DG-018**). There, excavations reached what he called the "white floor" ("הרצפה הלבנה") of the Lion Temple in **Square I3**, upon which rested the lion skull (**MHA 4325**) that gave the structure its name (see Figure 30). On the same day, immediately west in **Square I2**, he also encountered the top of the monumental brick wall (**Wall 833**) of a Late Bronze Age IIB – Late Bronze Age III fortress that he came to call "the citadel" in his publications.[308] As can be seen in Figure 30, over the remainder of the season he continued exposing both the Lion Temple and the citadel, as well as returning to **Wall 735** from the 1970 season. It would not be until the 1974 season, however, that he fully articulated these features.

[308] In his publications, Kaplan referred to it as a palace once (J. Kaplan 1972c), but otherwise is called a citadel or fort (J. Kaplan 1974a; J. Kaplan and Kaplan 1975b; J. Kaplan and Ritter-Kaplan 1993; Herzog 2008).

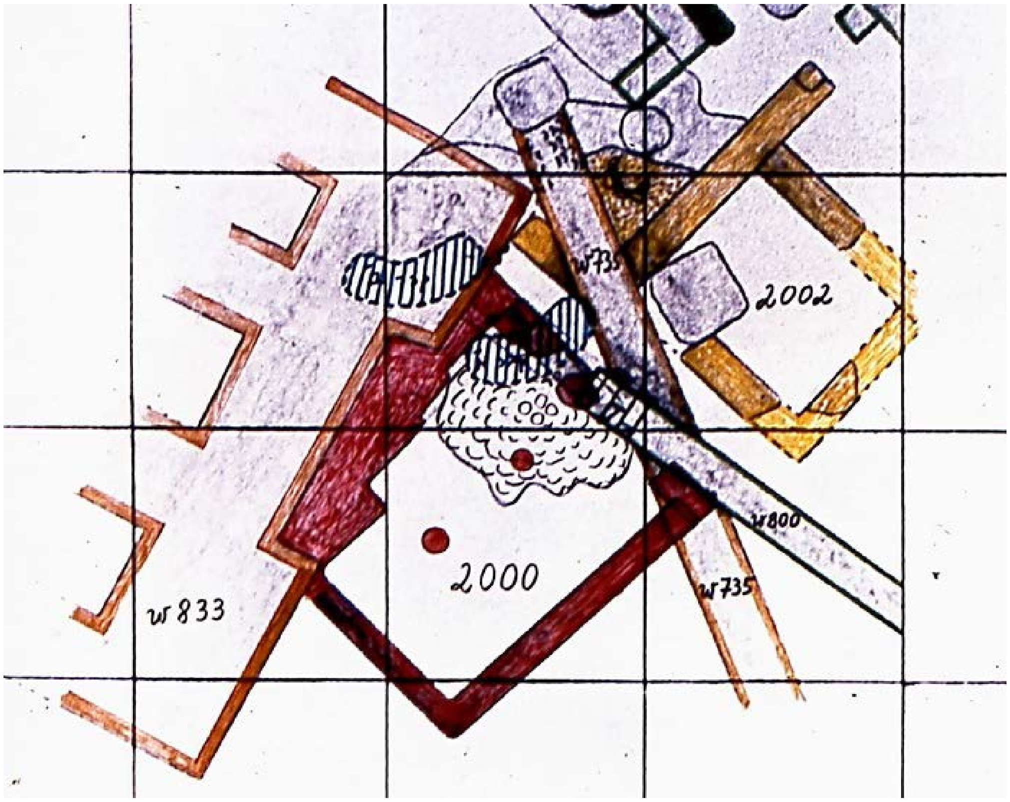

Figure 31: Final plan of the 1972 Season (**Plan A72-005**). Note the Late Bronze Age IB structures associated with **Room 2002** colored in yellow, which are covered over by the later Late Bronze Age IB **Wall 735**, which in turn is covered by the Lion Temple (here labeled as **Room 2000**), which in turn was partially destroyed by the citadel (**Wall 833**).

Most of the 1972 season was concerned with a deep sounding to the south and southwest of the main Lion Temple excavation area, visible in the sequence of plans beginning with **Top Plan A72-DG-048**. Since these excavations encountered no materials from the Late Bronze Age, they are not addressed here. Episodic excavations in the vicinity of the main Lion Temple area included a return to the 1970 excavation area, where Kaplan removed later architecture to expand his exposure of the poorly understood Late Bronze Age levels there. He traced the previously exposed **Walls 736** and **738**, revealing a structure he came to call **Room 2002** (see Figure 31). The western half of the structure was disturbed later activities, but the eastern side was intact, and Kaplan was able to excavate the preserved floor (**Locus 723**) as well as a Middle Bronze Age IIC tomb (**Locus 743**) that he encountered beneath the room. Excavations to the west of **Room 2002** revealed portions of another attached room that was heavily disturbed by later architecture, though Kaplan was still able to expose a segment of the floor (**Locus 516**) as well as two oven installations (**Loci 732** and **733**). Kaplan also removed his 1971 baulk and the Persian-era **Wall 800** covering over the northern extent of the Lion Temple, providing a complete exposure of the floor plan of the structure for the first time (see Figure 31 and detail in **Top Plan A72-DG-046**). The season was concluded with an unsuccessful attempt to find the western extent of the Late Bronze Age citadel (see **Top Plan A72-DG-072**), where the excavation predominantly encountered structures from the Persian period and later.

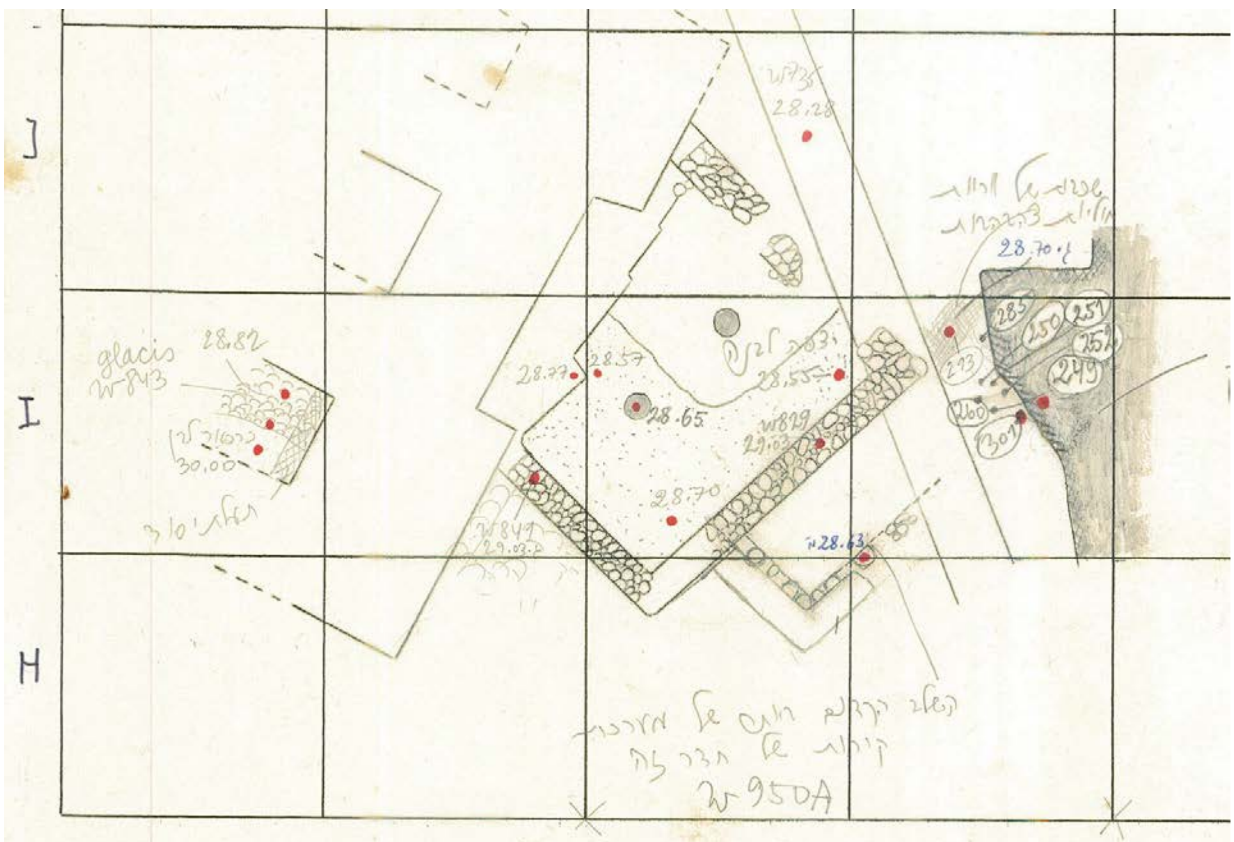

Figure 32: Detail of **Top Plan A73-DG-020**, showing excavations between the Lion Temple and the "greenish mass" ("הגוש הירקרק"), the latter shaded in gray.

The 1973 season resumed the objectives of the previous season, with the primary focus being on the areas south and southwest of the main Lion Temple area. Kaplan did occasionally return to the vicinity of the Lion Temple, including brief excavations in **Square I4** north of **Wall 735**, where he encountered the "greenish mass," an area contaminated when an Ottoman/Mandate-era sewer line leached into the surrounding soil (see Figure 32).[309] Excavations in this narrow space revealed small fragments of architecture associated with the Lion Temple structure (see **Top Plan A73-DG-031**), but Kaplan's main efforts here would not be until 1974. The season concluded much like the 1972 season, with Kaplan opening new squares (**Squares H100**, **I100**, **I101**) to locate the western extent of the Late Bronze Age citadel. He was again stymied by later architecture and abandoned the effort. Consequently, the western plan of the structure remains completely unknown to the current day.

[309] The name "greenish mass" comes from his use of the term "הגושהירקרק", the consistent designation for this feature in his notes. The meaning of the Hebrew word גוש is broad, generally implying an amorphous body of material. The feature was exposed again in 2014 and consists of intact stratigraphy that was only disturbed slightly when a—still visible—iron sewage pipe was installed laterally through it.

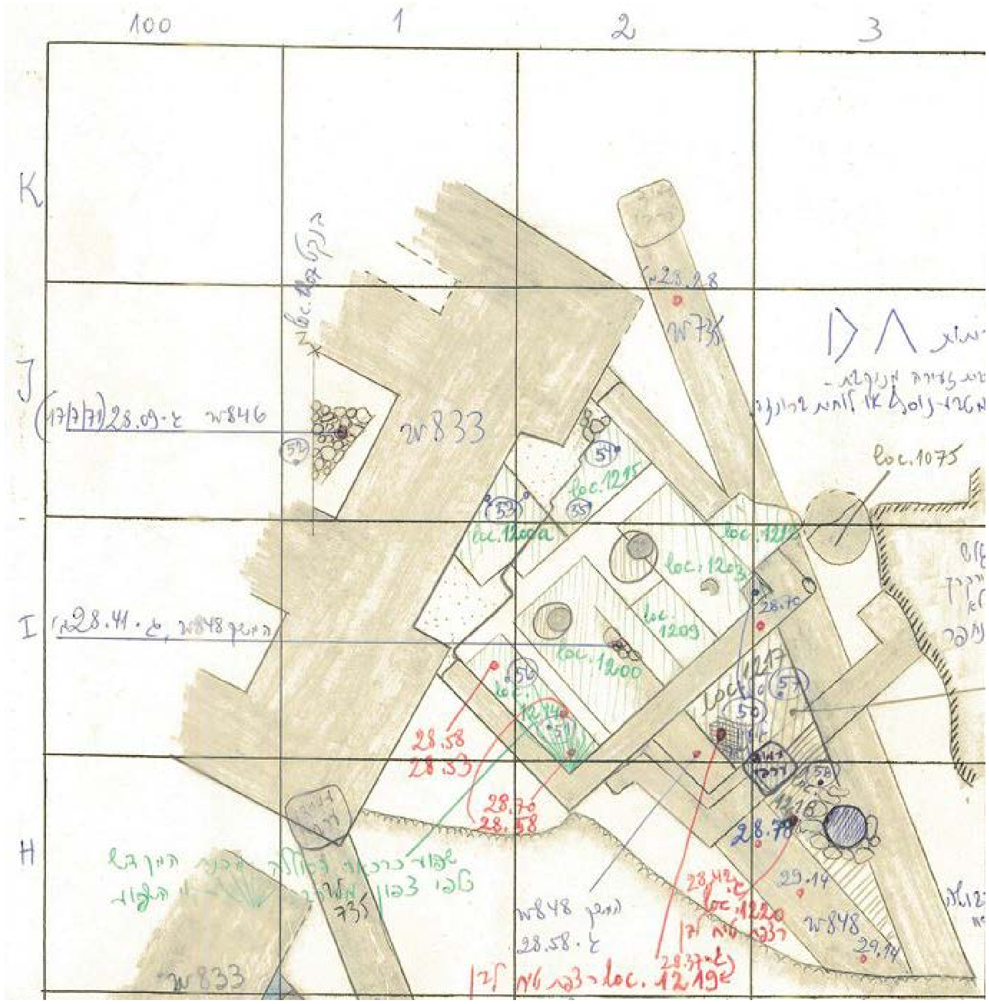

Figure 33: Detail of **Top Plan A74-DG-008**, showing Kaplan's probes through the Lion Temple floor (labeled in green). Additionally, note the deep probe between **Walls 848** and **735** and the intrusive "Arabic pillar" drawn in dark ink.

The 1974 season was by far the most consequential for Kaplan's excavation of Late Bronze Age structures in the area. Kaplan began by cutting probes through the floor of the Lion Temple (see Figure 33), which revealed multiple superimposed floors and features from structures dating to the Late Bronze Age IB. Immediately to the east of the Lion Temple, he also dug a deep probe between **Walls 848** and **735**, which—while not contiguous—broadened the exposure of the sequence of Late Bronze Age IB floors already revealed in the Lion Temple probes. The excavation was constrained by Kaplan's decision to leave all architecture intact, and therefore the earliest levels were reached in a relatively confined space, a situation further exacerbated by the presence of one of the intrusive “Arabic pillars” (see Figure 33).

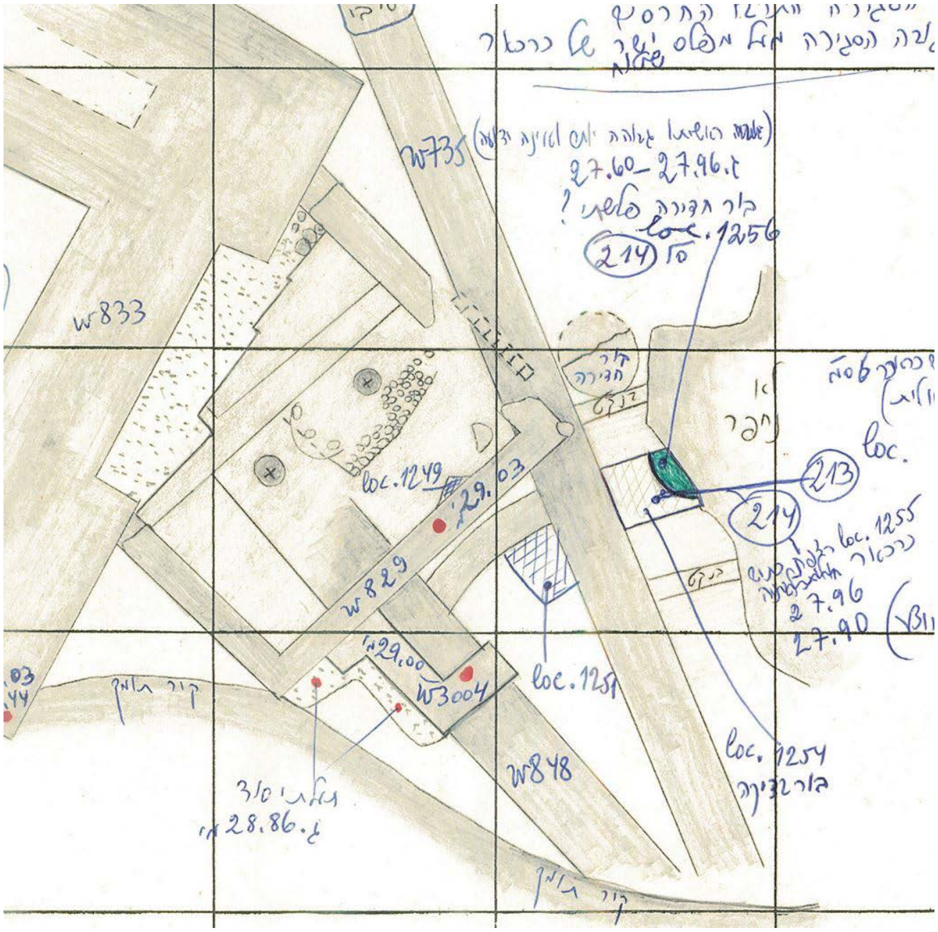

Figure 34: Detail of **Top Plan A74-DG-037**, showing **Probe 1254** (here **Locus 1254**) in the area between **Wall 735** and the “greenish mass,” the latter shaded in gray of the far right of the plan.

Kaplan cut another deep probe (**Locus 1254**) between the north face of **Wall 735** and the “greenish mass” (see Figure 34), which revealed a series of Late Bronze Age IB floors contemporary with those encountered in the probes beneath and east of the Lion Temple.

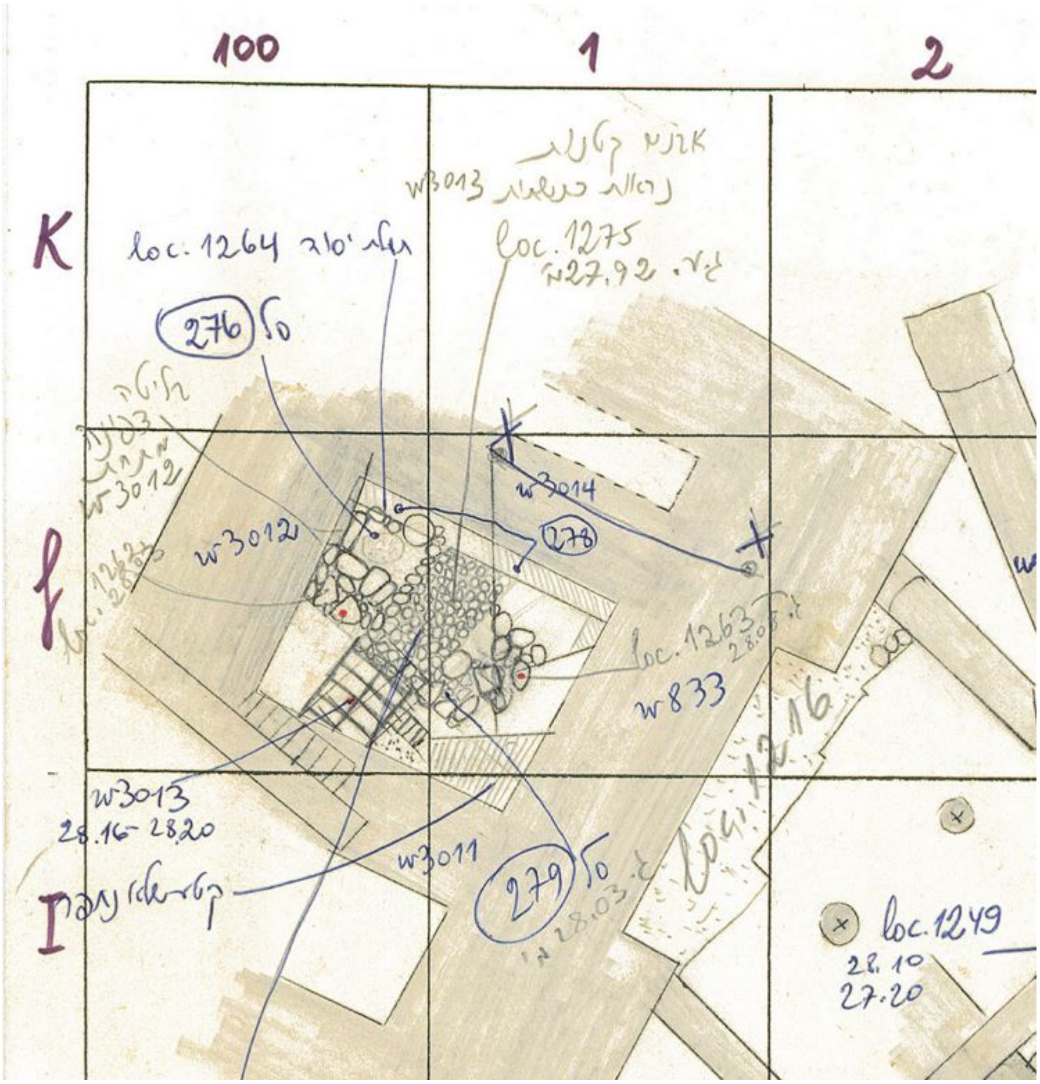

Figure 35: Detail of **Top Plan A74-DG-046**, showing both the Cell T1 probe in the middle of the Citadel and the future location of the foundation trench probe, labelled here as **Locus 1216**.

Kaplan also cut a series of probes in relation to the Late Bronze Age citadel—one through the central cell of the last phase of the fortress (referred to in his notes as Cell T1) and one into and through the foundation trench of the last phase of the fortress, which he designated **Locus 1216** (see Figure 35). The probe into Cell T1 began by removing later architecture above the citadel, after which Kaplan excavated the space alternating between its eastern and western halves, occasionally removing the baulk dividing them (**Locus 1207**). He encountered multiple superimposed floors and architectural elements contemporary with the Late Bronze Age IB floors he revealed in his other 1974 probes, concluding his excavations when he reached the corner of a large mudbrick structure (**Wall 3016**)—referred to in his notes as either "Fortress C" or the "Hyksos Wall" ("קיר חוקסוסי"; e.g., **Top Plan A74-DG-045**).[310] Much like his Cell T1 probe, his probe through the foundation trench (**Locus 1216**) offered greater clarification of the architectural history of the citadel, revealing that the superstructure of the citadel stemmed from two different structures, with the earlier (Kaplan's "Fortress B") being reused in the foundations of the later (Kaplan's "Fortress A"; see discussion and illustrations in sections 8.2.6 and 8.2.7). After clearing the foundation trench for Fortress A, the probe also cut into a Late Bronze Age IB destruction debris—though the narrow confines of the probe render these features somewhat difficult to discuss (see Section 8.2.3). The excavations in these probes represent Kaplan's final work in the 1974 season, after which the area was backfilled.

Kaplan's old excavation area was reopened for a single season in 1999 by a team from Tel Aviv University (TAU) under the direction of Ze'ev Herzog. Though new Late Bronze Age levels were encountered, the results have yet to be published fully and therefore they will not feature in my analyses, though the excavations did clarify some stratigraphic problems left over from Kaplan's excavations (see Herzog 2008 and Section 8.2 below). The excavation area remained untouched until the renewed JCHP excavations in the 2014 season, which achieved several key objectives despite being cut short by the political situation.[311]

[310] The usage is purely chronological, with Kaplan's use of the term "Hyksos" to refer to anything related to the Middle Bronze Age IIC being attested elsewhere (e.g., J. Kaplan 1967).

[311] The area was only under excavation by a full complement of field school students for eight days, after which excavations continued under a smaller crew of staff, including the author.

Figure 36: View of Kaplan's original baulk (**Locus 10055**) from the 1974 Lion Temple floor probes after cleaning in 2014 (**Field Photo 2014-P0067**).

Notably, this included the excavation of one of Kaplan's baulks (**Locus 10055**) left over from his 1974 probes through the Lion Temple floor, which was encountered after clearing modern backfills (see Figure 36).[312] The baulk allowed for the systematic reexamination of the Lion Temple floor as well as several subfloor levels, with each stratum subjected to 100% flotation and all short-lived organic samples retained for radiocarbon dating.[313] Since the levels within the baulk can be equated with Kaplan's original loci, it is now possible to provide an absolute *terminus post quem* for both the construction and use-life of the Lion Temple (see Section 8.2.5). While the JCHP excavations only contribute a small quantity of ceramics to the data used in this study, these absolute anchors are crucial for the periodization and historicization of the various assemblages discussed in this chapter.

[312] Any locus number in the 10,000 range was created during the 2014 JCHP excavations. In cases where a JCHP locus number was given to one of Kaplan's original loci, both numbers will be provided in this text.

[313] The flotation system follows that of Shelton and White (2010). The recovered macrobotanical remains were analyzed by Andrea Orendi, and the AMS analysis—presented in Appendix 17—was conducted by Brian Damiata.

Collectively, both Kaplan's and the JCHP excavations produced a ceramic assemblage comprising 1,300 restorable objects and diagnostic sherds dating to the period of the New Kingdom garrison. However, as this section has demonstrated, the complex excavation history of the Lion Temple area means that this assemblage is not equally spread between all phases. This especially affects the earliest phases reached by Kaplan, which were often disturbed by later architecture or encountered only in confined probes (e.g., Phase LT-10). Unsurprisingly, these phases produced less material than those wherein Kaplan exposed complete structures (e.g., Phase LT-8). The effects this has on analysis are addressed throughout sections 8.2 and 8.3, though as will be seen, it is still possible to draw deeper conclusions even from these noncontiguous exposures provided that the material is used cautiously.

8.2 Phasing and Context

This section comprises a qualitative discussion of each of the Lion Temple area phases that contributed data to this dissertation. Much like Chapter 7, the summary presented here does not present a complete stratigraphic report for the area, which will be published elsewhere (Burke, Peilstöcker, and Damm Forthcoming). Instead, I focus on the chronological, spatial, and functional contexts of the assemblage, which are further augmented by a qualitative treatment of key elements within the assemblage. Unlike Chapter 7, in this section I make use of the assemblage group concept detailed in Chapter 6, wherein the intra-phase assemblages are separated based on stratigraphically differentiable events (e.g., construction versus use-life). While each of these groups are discussed from a qualitative standpoint within the body of the text, the in-depth quantitative description of their respective assemblages can be found in Appendix 14. The qualitative and quantitative data presented here directly informs the diachronic analysis undertaken in Section 8.3, justifying the separation of assemblages into distinct chronological units. Furthermore, the interpretation presented in this chapter informs the historical contextualization carried out in Chapter 9, wherein the dataset from the Lion Temple and Ramesses Gate areas are combined. The section begins with a summary of past phasing schema applied to the excavation area (Section 8.2.1), after which each phase related to the New Kingdom garrison presented in sequence (sections 8.2.2 through 8.2.8).

8.2.1 Introduction: Past Stratigraphic Reconstructions of the Lion Temple Area

The stratigraphic reconstruction presented within this dissertation is novel, based on both my pottery readings and interpretations of Kapan's original notes. Previously, there has been no published phasing of the Lion Temple area that has treated all the Late Bronze Age features. Kaplan offered a truncated stratigraphic overview in his preliminary publications, but only with reference to the Lion Temple and citadel (H. Kaplan and Kaplan 1976; slightly revised in J. Kaplan and Ritter-Kaplan 1993). His central stratigraphic argument was that the Lion Temple was contemporary with and built against the eastern side of the citadel (**Wall 833**), with the whole structure dated to the end of the 13th or beginning of the 12th centuries BCE (Kaplan and Ritter-Kaplan 1993, 657–58). The renewed TAU excavations under Herzog lacked access to Kaplan's notes, however upon clearing his backfills determined that Kaplan's reconstruction lacked stratigraphic support. Herzog instead argued that the citadel post-dated the Lion Temple, with the construction of the former cutting through and destroying the western half of the latter. Instead, he argued that the most plausible date for the Lion Temple was the Late Bronze Age IIA, based on a scarab of Queen Tiy (**MHA 4327**), the wife of Amenhotep III (1390-1352 BCE), that was found on the floor of the structure by Kaplan (Herzog 2008, 1791).

Based on Kaplan's original notes, the reexamination of the area in 2014 by the JCHP, and the new C14 dates derived from Kaplan's baulk, I accept Herzog's revised interpretation (see

Section 8.2.5), which forms the lynchpin of my new stratigraphic framework for the Lion Temple area. Below, Table 8 summarizes the newly proposed phasing for the Lion Temple area as it relates to period of the New Kingdom garrison. The table conservatively incorporates elements of the absolute chronology derived from the renewed JCHP excavations, with question marks indicating ambiguities that will be addressed in the text. This table serves to orient the reader in the discussion that follows, wherein each phase will be described in greater depth prior to the diachronic ceramics analysis in Section 8.3. While the full stratigraphy of this area will be published elsewhere (Burke, Peilstöcker, and Damm Forthcoming), I address the absolute and relative chronological considerations behind the dating of each phase within each phase-level discussion, as these are critical for not only delineating assemblages, but also for historicizing the patterns visible in the ceramics data.

Relative Period	Phase	Approximate Dates
Iron Age IB	LT-5	post-1125* BCE
Late Bronze Age III	LT-6	1135* – 1125* BCE
Late Bronze Age IIB – Late Bronze Age III	LT-7	? – 1135* BCE
Late Bronze Age IIA	LT-8	1400 – 1300‡ BCE
Late Bronze Age IB	LT-9	c. 1460‡ – 1400 BCE
	LT-10	
Middle Bronze Age IIC – Late Bronze Age IA	LT-11	? – 1460‡ BCE

Table 8: Summary Table of the Lion Temple Area's Stratigraphy and Chronology (* marks absolute chronological anchors derived from the Ramesses Gate Area's C14 record; ‡ marks dates derived from probable historical and/or relative chronological considerations).

8.2.2 Phase LT-11: The Middle Bronze Age IIB/C

Phase LT-11 is discussed in brief here, and only as it relates to the immediate context of the later Late Bronze Age strata. While the entire phase can be dated to the Middle Bronze Age IIB/C (1750-1640/1540 BCE), it is comprised of two distinct subphases. The first, Phase LT-11b, consists of a massive defensive rampart/glacis structure that encircles the site.[314] The later Phase LT-11a consists of features that cut into the glacis, which includes the corner of a structure that Kaplan referred to as the "Hyksos" fortress (**Wall 3016**) and a child's tomb (**Locus 743**). The Phase LT-11b fortification system is relevant for being the single most important factor dictating the preservation of later Late Bronze Age features, as the fortifications effectively created the topography of the site. The highest elevation of the fortification system is preserved along the southern edge of the Lion Temple area, where stone retaining walls (**Walls 842** and **814**) were preserved to an elevation of 30.92 m ASL. This is more than 2 m higher than the Late Bronze Age IIA Lion Temple floor approximately 5 m to the immediate north (see **Top Plan A71-DG-052**), showing the dramatic south-to-north downward slope of the topography along the interior, northern face of the fortification system. Fundamentally, the Phase LT-11a fortifications created a bowl-shaped site wherein later construction either followed the preexisting topography or was forced to modify it. This affected the preservation of subsequent Late Bronze Age levels, in that stratified materials along the much higher, southern edge of the excavation area were much more susceptible to intrusion by later architecture.[315] As a result, Kaplan only reached earlier Late Bronze Age levels in the northern portion of the excavation area, ensuring that earlier phases always received a smaller spatial exposure than the succeeding phases that covered them over.

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[314] Kaplan's last published, most cohesive date for the fortifications was the Middle Bronze Age IIB (Kaplan and Ritter-Kaplan 1993, 657), which was left unchallenged by Herzog (2008, 1791). Later examinations opted for a more general Middle Bronze Age IIB/C date (Burke 2008, 272–73).

[315] For example, early 5th century BCE walls from Building M (Phase LT-3b) were built directly atop the ruins of Late Bronze Age structures such as **Wall 833** of the citadel (Danielson et al. 2020).

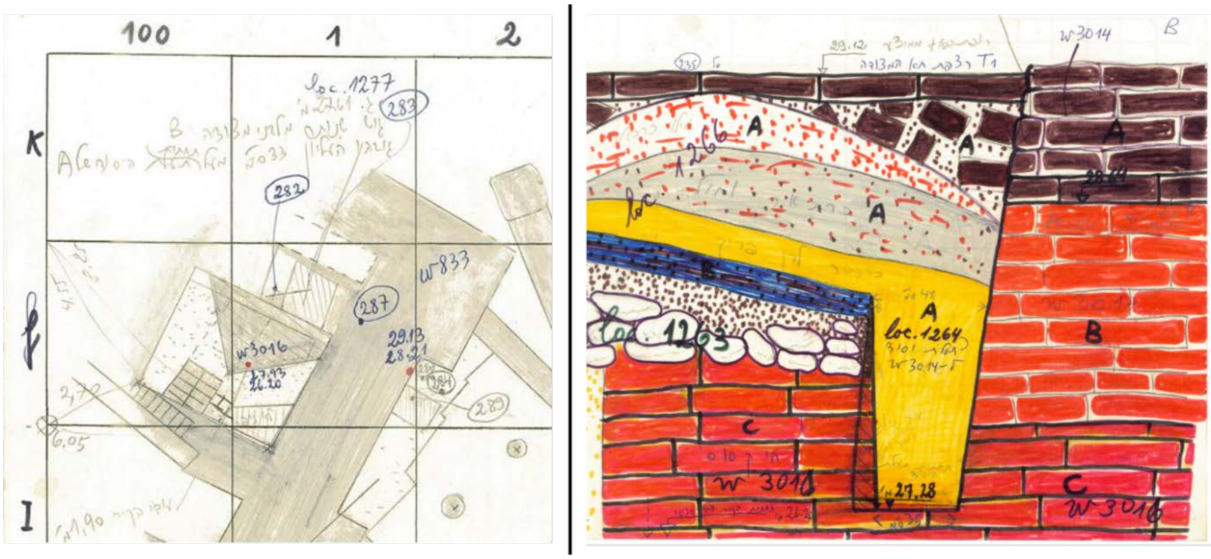

Figure 37: Composite image of plans related to Wall 3016, including (left) a top plan detailing its position within probe T1 (after Top Plan A74-DG-047) and (right) a section drawing indicating the deep cuts made into it—there referred to also as “Fortress C”—by the later phase LT-7 and LT-6 fortresses (after Plan A73-021b).

The later Phase LT-11a merits discussion in that it immediately precedes the founding of the Egyptian garrison in the Late Bronze Age IB. Little can be said of the partially exposed mudbrick structure (**Wall 3016**) since only a corner was exposed at the bottom of the Cell T1 probe (see Figure 37 and Section 8.1) and Kaplan did not excavate any surfaces associated with it.[316] It is, however, clear that the structure was monumental in scale, and that it is capped by fills containing Egyptian-style pottery (e.g., **PB 1974.236**), indicating that this building was likely out of use by the Late Bronze Age IB.

[316] In a preliminary report, Kaplan wrote that he found “a number of ‘Ajjulian sherds” around the exterior of the structure (Kaplan and Kaplan 1975a, 23), with Kaplan’s usage of the term ‘Ajjulian referring to what is commonly known as Cypriot Bichrome ware, a type characteristic of both the Middle Bronze Age IIC and Late Bronze Age I—though more common in the early Late Bronze Age I (Epstein 1966; Artzy 2019a, 339–41). These sherds could not be located among the finds from Kaplan’s excavations, however, given that they were found in fills outside of the structure, they cannot date its construction.

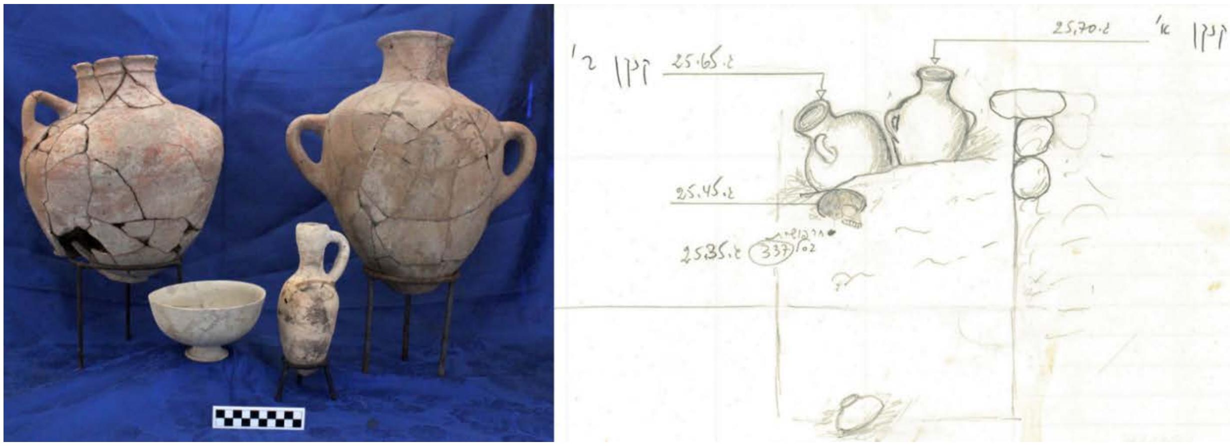

Figure 38: The (left) tomb (**Locus 743**) ceramic assemblage and (right) section drawing (**Photo Area_A_Locus_74_3c**, **Top Plan A72-DG-037**). The assemblage includes a one-handled store jar (**MHA 4454**), a two-handled store jar (**MHA 4843**), a trumpet-footed bowl (**MHA 4515**) and a dipper juglet (**MHA 4453**).

The other element of this phase is a tomb (**Locus 743**) that Kaplan encountered beneath the Late Bronze Age IB **Room 2002**. The fill (**Locus 12001**) that separates the tomb from the room above it contained an Egyptian-style type BL1a bowl (**MHA 3907**), giving **Room 2002** a *terminus post quem* of the Late Bronze Age IB (see Section 8.2.3). When this stratigraphic relationship is considered with the classic Middle Bronze Age IIB/C mortuary assemblage within the tomb (see Figure 38), we gain another small window into pre-Egyptian Jaffa. Much like the ambiguous picture from the contemporary Ramesses Gate area (see Section 7.2.1), the data offer little insight into the founding of the garrison. While there is nothing to suggest that the Egyptian arrival at the site followed a destructive event, it is interesting to note that the earliest structures that can be associated with the New Kingdom garrison (Phase LT-10) sit directly atop fills containing Egyptian-style pottery, suggesting substantive transformations at the site during the earliest stage of the garrison. While not necessarily destructive, it can certainly be said that the new garrison constituted a transformative—or, more negatively, disruptive—event for the inhabitants of Jaffa.

8.2.3 Phase LT-10: The Late Bronze Age IB

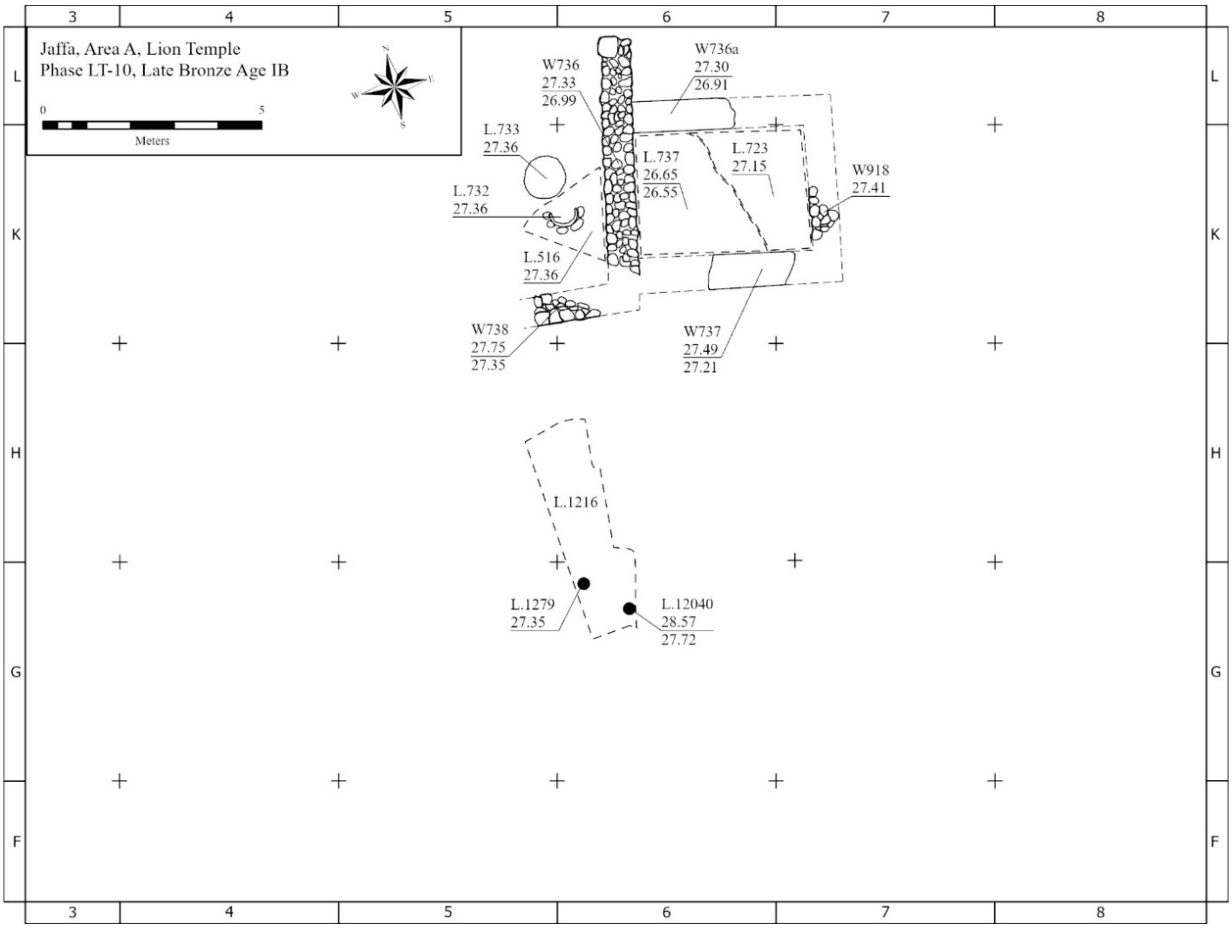

Figure 39: Plan of Phase LT-10 (prepared by K. Kowalski). Note the noncontiguous exposure within the probe (**Locus 1216**). Since Kaplan never drew either the floor (**Locus 12040**) or the *tabun* (**Locus 1279**) within the probe, they are indicated with points based on pottery buckets.

Phase LT-10 marks the first appearance in the Lion Temple area of stratified contexts containing locally manufactured Egyptian-style ceramics, which provide a *terminus post quem* of the Late Bronze Age IB and mark the earliest plausible phase for the presence of the New Kingdom garrison. As was noted in the previous section, since Kaplan's limited probes beneath Phase LT-10 structures also encountered Egyptian-style ceramics, it is likely that the structures from this phase consist of *ex novo* foundations after the installation of the garrison. The main feature of Phase LT-10 is a structure consisting of two conjoined rooms with a shared wall (**Wall 736**) running between them, as well as a non-contiguous floor (**Locus 12040**) and destruction debris

(**Locus 12039**) that Kaplan encountered at the base of a probe (**Locus 1216**) that are plausibly associated with this phase on the basis of elevation (see Figure 39). The area was heavily disturbed by later activity; however, Kaplan was able to recover coherent assemblages from several intact floors and the debris resting on them.

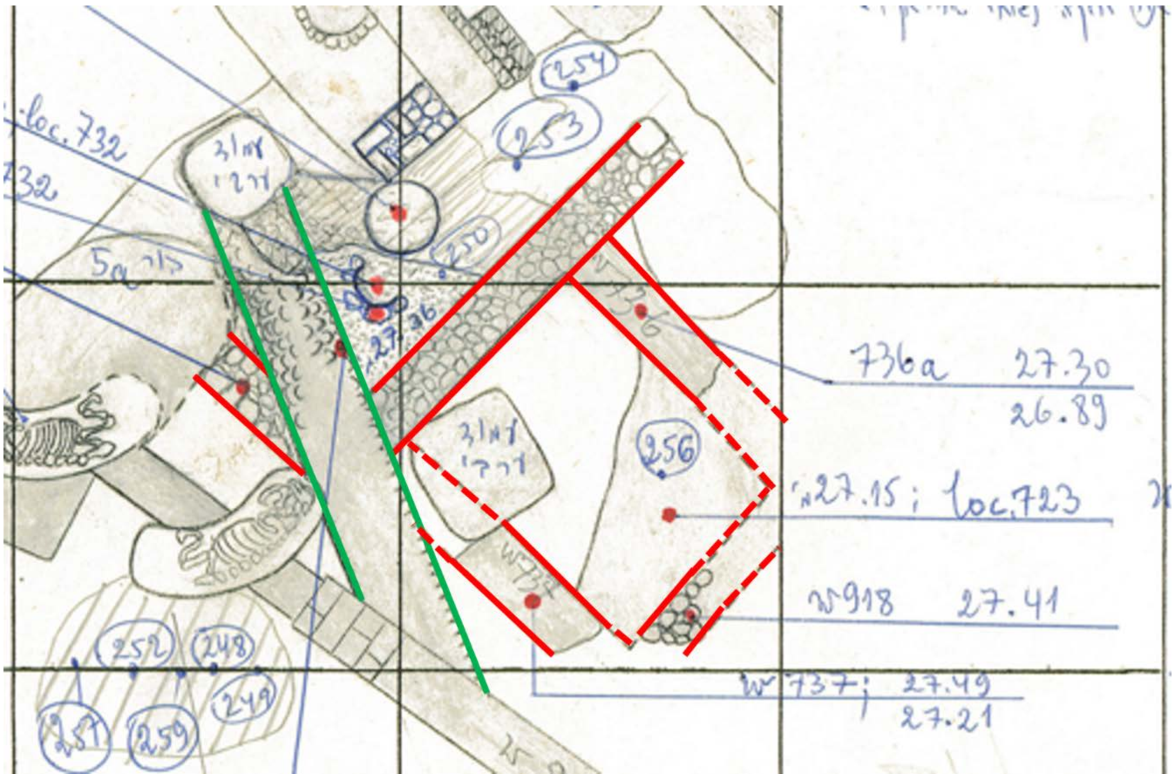

Figure 40: Detail of **Top Plan A72-DG-026** showing the spatial relationship between the Phase LT-10 structure (marked in red) and the later Phase LT-9 **Wall 735** (marked in green).

The ceramics of Phase LT-10 are separated into two assemblage groups: fills beneath structures (assemblage group LT-10.1, n = 7) and occupational/destruction debris from floors (assemblage group LT-10.2, n = 68). Neither assemblage group produced narrowly dated ceramics, with the aforementioned *terminus post quem* of the Late Bronze Age IB being the only date that can be derived from the material culture.[317] Instead, the most important detail for dating

[317] The Egyptian-style forms that are present are conservative types that were unchanged through much of the New Kingdom—for instance, the simple bowl with a plain, lipstick-decorated rim (**MHA 3907**, type BL1a). The Levantine ceramics are similarly ambiguous from a chronological standpoint.

the structures from this phase stems from their relationship to the Phase LT-9 **Wall 735**, which passes directly over them (see Figure 40). As will be discussed in Section 8.2.4, **Wall 735** has much better-preserved assemblages on floors along its entire length, including restorable examples of forms that do not postdate the Late Bronze Age IB. Therefore, the *terminus post quem* from the ceramics and the relative stratigraphy of the area means that the beginning of Phase LT-10 should likely be placed relatively early in the Late Bronze Age IB, likely not long after Thutmose III's victory at Megiddo in c. 1460 BCE since the succeeding Phase LT-9 also dates to the Late Bronze Age IB. This reconstruction is supported by an AMS date derived from a charred wheat grain (**MHA 7474/UCI AMS# 159332**) that Kaplan recovered from the destruction debris (**Locus 12040**) above the non-contiguous segment of floor (**Locus 12039**), which produced two calibrated ranges of 1426-1374 BCE (52.8%) and 1348-1303 BCE (42.6%).[318] Of these two ranges, the latter is implausible given that it falls in the second half of the Late Bronze Age IIA, which conflicts with the clear Late Bronze Age IB date of the succeeding Phase LT-9 (see Section 8.2.4) and the Late Bronze Age IIA construction of the Phase LT-8 Lion Temple (see Section 8.2.5). At the very least, the end of Phase LT-10 cannot be placed before 1426 BCE, though any date between the last quarter of the 15th and first quarter of the 14th centuries BCE could technically be equally plausible.

[318] All AMS analysis referenced in this dissertation was conducted by Brian Damiata (see Appendix 17).

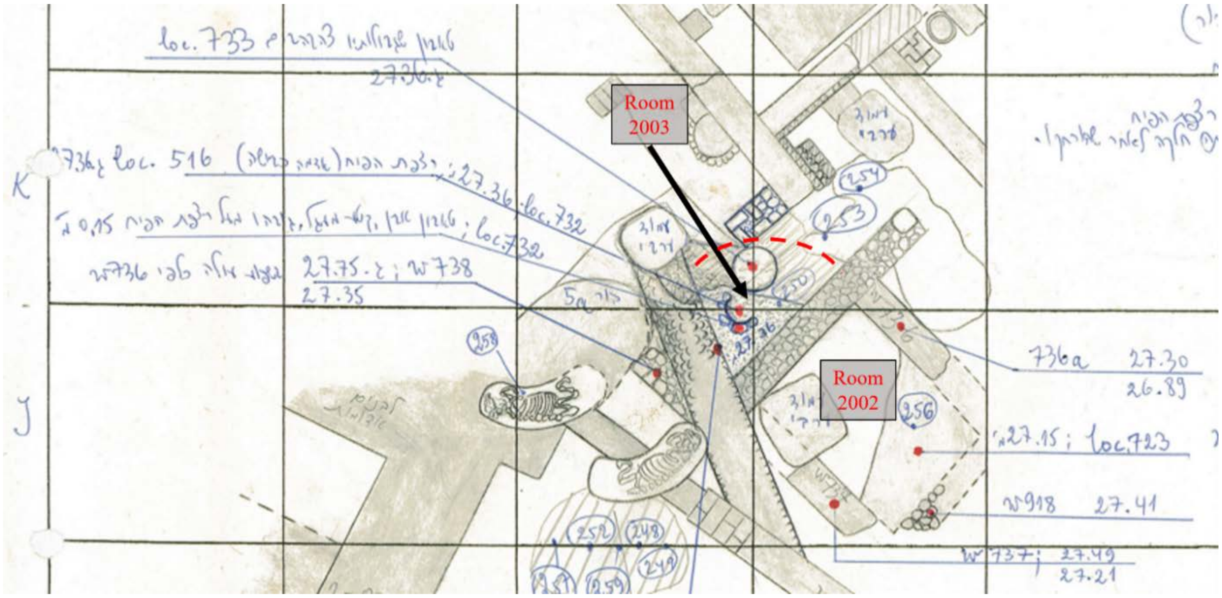

Figure 41: Detail of **Top Plan A72-DG-026** showing **Rooms 2002** and **2003**. Note the dotted arc indicating the northernmost extent to which the floor from **Room 2003** was preserved. Similarly, the gray-shaded portion in **Room 2002** shows the area wherein its floor was intact.

The primary context of finds for Phase LT-10 are two spaces that share the common **Wall 736**. The easternmost **Room 2002** was fully enclosed by **Walls 736**, **736a**, **918**, and **737**, whereas the westernmost **Room 2003** was heavily disturbed, with only the southeastern corner of **Walls 738** and **736** being preserved (see Figure 41). Consequently, it is impossible to say whether **Room 2003** was an enclosed and/or roofed space, with the presence of two clay ovens (**Loci 732** and **733**)—referred to in Kaplan's notes as *tabuns*—not precluding that the space was roofed (see Shafer-Elliott 2013, 123). At the very least, the presence of the *tabuns* indicate the occurrence of domestic activities.[319]

[319] Kaplan's differentiation between types of clay oven is unclear since his usage of several typological terms—especially *tabun* and *tannur*—are never qualified. Moreover, no plans or photos survive of these features to assist in their classification vis-à-vis one another or any of the other rarer designations that Kaplan uses for cooking/heating emplacements. This lack of distinction is common within Near Eastern archaeology, though the term *tabun* is likely a mismapping of an oven type known from ethnography but likely does not antedate the 7^{th} century CE. The term *tannur* also lacks clearly defined parameters (see Ebeling and Rogel 2015). It is impossible to know what criteria Kaplan used to distinguish the two types, and therefore his terms will be repeated in the text here.

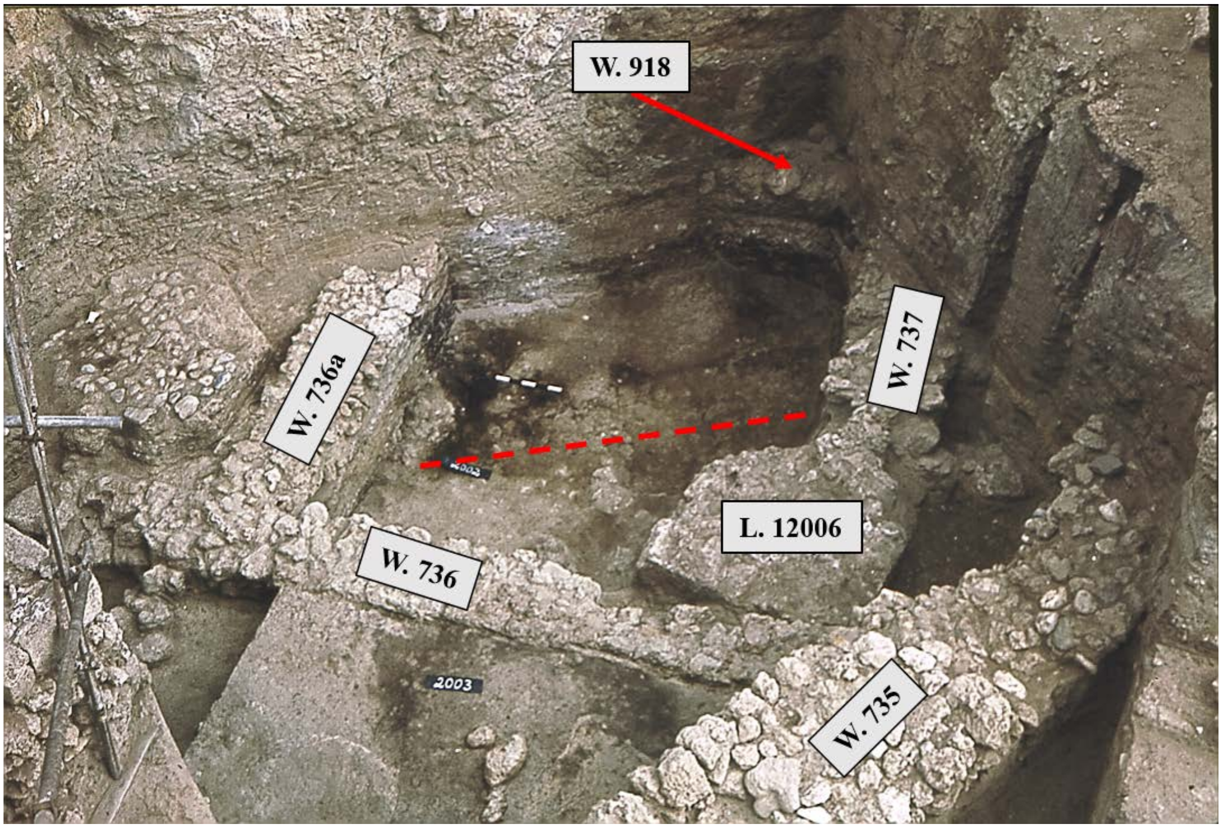

Figure 42: Annotated archival photo (**Field Photo 56**) showing **Rooms 2002** and **2003**. Note the dotted line across **Room 2002**, differentiating the undisturbed floor (where the charring is visible) from the portion of the room damaged by the intrusive, Ottoman-era support pillar (**Locus 12006**) and later Iron Age pits.

While **Room 2002** was more intact, Kaplan's exposure of its floor was limited. The floor on the western side of the room was completely destroyed by one of the so-called "Arabic pillars" (**Locus 12006**) and unclear pitting activities during the Iron Age (see Figure 42).[320] Finds from the preserved portion of floor (**Locus 723**) were sparse, save for two joining fragments of an Egyptian-style simple bowl with plain rim (type BL1a) and the complete shell of an Atlantic triton (*Charonia tritonis variegata*[321]; **MHA 4247**). This species in uncommon in archaeological contexts in the region, and while the Jaffa example is unmodified, of the few examples published from archaeological contexts in the southern Levant many were worked to produce trumpets

[320] Kaplan never drew the pits but discussed them in his notes. Notably, the eastern, disturbed portion of the room (**Locus 737**) produced an example of a so-called "debased" Philistine krater with monochromatic decoration.

[321] Identification by Inbar Ktlav.

(Bar-Yosef Mayer 2007, 278). Regardless, the find marks this context as unusual. Kaplan also noted an unclear feature from the floor that he referred to as a hearth ("אח", **Locus 728**), which is only ever vaguely drawn and not identifiable in archival photos, though it may be related to the amount of charred material visible on the floor (see Figure 42). If not, it is possible that the charred material suggests a destruction event that led to the termination of this phase, something which is also suggested by the destruction debris Kaplan encountered on the noncontiguous segment of floor (**Locus 12040**) excavated to the south.

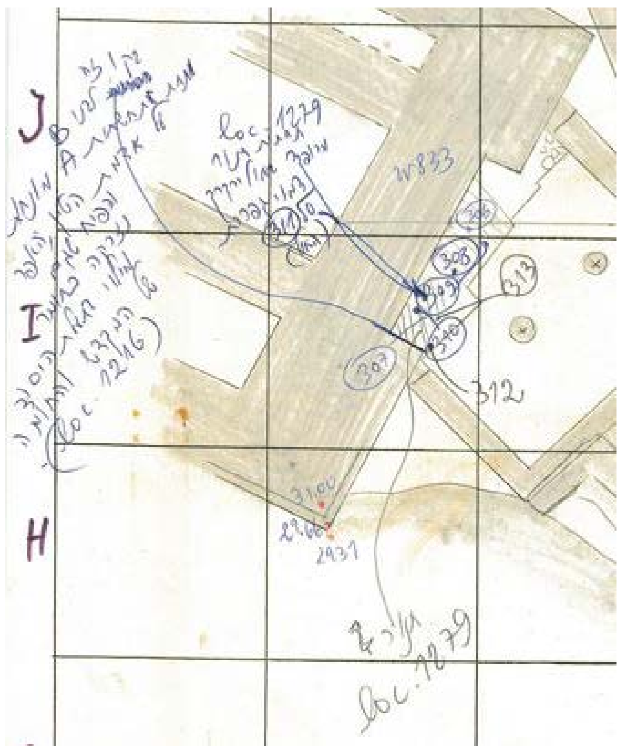

Figure 43: Detail of **Top Plan A74-DG-050**, showing Kaplan's confined probe (**Locus 1216)** into the foundation trench for **Wall 833**. The small note in pencil provides the only spatial information regarding the location of the possible *tannur* (**Locus 1279**).

Within the confines of a narrow probe (**Locus 1216**) through the foundation trench of a later structure, Kaplan encountered a thick destruction debris (**Locus 12039**) overlying a floor **(Locus 12040**) and oven feature that he referred to as a *tannur* (**Locus 1279**; see Figure 43). The elevation of the floor **Locus 12040** (27.72 m ASL) is nearly 30 cm lower than any segment of floor preserved nearby, and if the sloping topography of the site is accounted for (see Section 8.2.2), it is best associated with **Rooms 2002** and **2003** to the north. Reconstructing the assemblage is not without difficulty due to the narrow confines of the probe, with some of the pottery buckets associated with the floor (e.g., **PB 1974.312**) also including ceramics from cleaning nearly a meter of the section of the probe. Thankfully, excavation of the 20-25 cm thick destruction debris (**Locus 12039** was done in a series of clearly bounded pottery buckets.[322] Kaplan specifically notes encountering brick debris and ash, including a dense deposit of charred macrobotanical remains (see note on **Top Plan A74-DG-050**[323]) that produced the charred wheat grain (**MHA 7474/UCI AMS# 159332**) sampled for AMS dating. While little can be said about the functional nature of the space given its narrow exposure, the unusual character of the *tannur* (**Locus 1279**) suggests some sort of industrial activity. In his notes, Kaplan states that the bottom of the *tannur* was lined with greenish, sulfur-like sand[324] which, while note definitive, suggests an activity that caused a chemical transformation in the soil. Metallurgical activities are a distinct possibility, especially considering the discovery of a crucible fragment with embedded cupric prills in the debris above this feature (**PB 1974.310** in **Locus 12039**). Regardless, while the total exposure of Phase LT-10 was limited compared to later phases, the various features shed insight into diverse activity areas dating to the earliest stage of the garrison.

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[322] While the fill within the foundation trench was homogenous and relatively clean of finds, once the probe encountered the destruction debris the density of finds increases dramatically beginning at approximately 27.95 m ASL and continuing all the way down to the floor level at 27.72 m ASL.

[323] The note in question comes from the description of **PB 1974.307** on **Top Plan A74-DG-050**, which specifically refers to a layer of ash and mudbrick debris which, when sifted, produced a quantity of grape pips and wheat grains ("מן האפר ושבריהטין של הלבנים [...] בניפוי הקרקע מאזור זה נתגלו באפר ובפיח גרעיני חטה וחרצני ענבים.").

[324] The note comes from **Top Plan A74-DG-050** ("תחתית תנור מרופד בחול ירקרק דמוי גפרות").

8.2.3.1 The Phase LT-10 Assemblage

The small assemblage from secure Phase LT-10 contexts merits a brief qualitative discussion, with a more detailed quantitative treatment provided in Appendix 14.1. Despite the fragmentary assemblage, the presence of Egyptian-style ceramics across several forms and functional categories indicates not only that this phase must postdate the installation of the garrison, but also that in this early stage the local manufacture of Egyptian-style ceramics already included a complex array of types across the tableware, culinary, and container families.[325] While not as robust as other Late Bronze Age IB assemblages from Jaffa, the presence of several varieties of Egyptian-style bowl—including examples decorated with the lipstick rim—indicates the early presence at Jaffa of a complex table service following the Egyptian model. The assemblage of Levantine forms, while not chronologically diagnostic, comprises broad functional counterparts to the attested Egyptian-style assemblage, indicating that the inhabitants of the garrison could choose between vessels of either tradition.[326] Several fragments from imported Mycenaean and Cypriot vessels round out the assemblage, highlighting yet another option available for local consumers. As with every phase, however, their overall low frequency means that with respect to foodways, consumer choice was largely between Levantine and Egyptian-style vessels.

[325] This includes three variations on the bowl (types BL1a, BL1b, and BL3), the flowerpot (type FP), and a fragment of a large storage jar (generic type JR).

[326] With respect to tableware forms, the Levantine assemblage attests to two variations on the carinated bowl (types CB1 and CB2) alongside one of the more common Levantine bowl types, the simple bowl with interior-thickened rim (type LB2). Container forms are attested across small juglets (type JT), medium jugs (type JG), and large storage jars (type SJ1), indicating a variety of closed form options for both the table service and long-term storage. Finally, the only culinary form present are rim fragments from triangle rim cookpots (type CP1).

8.2.4 Phase LT-9: The Late Bronze Age IB

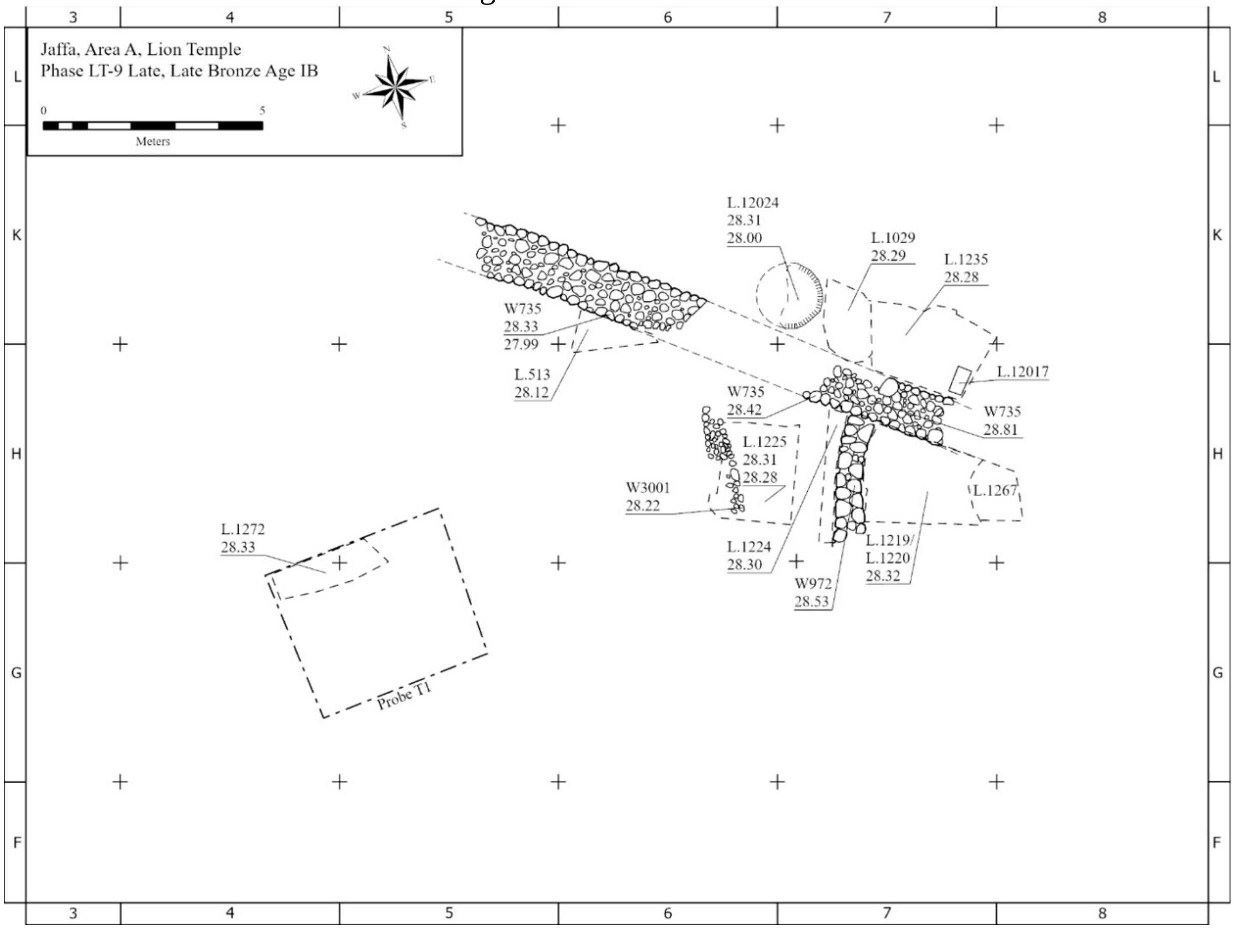

Figure 44: The main features of Phase LT-9 (prepared by K. Kowalski) during the last iteration of floors. Note the non-contiguous exposure of the floor **(Locus 1272)** from the Cell T1 probe.

Phase LT-9 is complex, constituting a complete renewal of the site plan in the Lion Temple area as well as a series of more minor, internal changes as structures were modified and new floors laid. Consequently, this phase presents several distinct assemblage groups: a series of fills beneath the earliest Phase LT-9 floors (assemblage group LT-9.1), several floors that—while unconnected to Phase LT-9 architecture—overlay Phase LT-10 features (assemblage group LT-9.2), fills that underly the main Phase LT-9 architectural features (assemblage group LT-9.3), the earliest floors associated with **Wall 735** (assemblage group LT-9.4), and finally, a higher lamination of floors associated with **Wall 735** that correspond with the construction of the new transverse **Wall 972** (assemblage group LT-9.5). As with the preceding phase, the stratigraphic picture is complicated by Kaplan's extensive use of probes, however, the analysis of the Phase LT-9 assemblage is greatly assisted by shared architectural features (especially **Wall 735**) and the congruent elevations of the various surfaces encountered by Kaplan (see Figure 44). While the plan of the Phase LT-9 structures is not complete, the presence of domestic installations and substantial, functionally diverse ceramic assemblage shed important light on life at Jaffa during an early phase of the garrison.

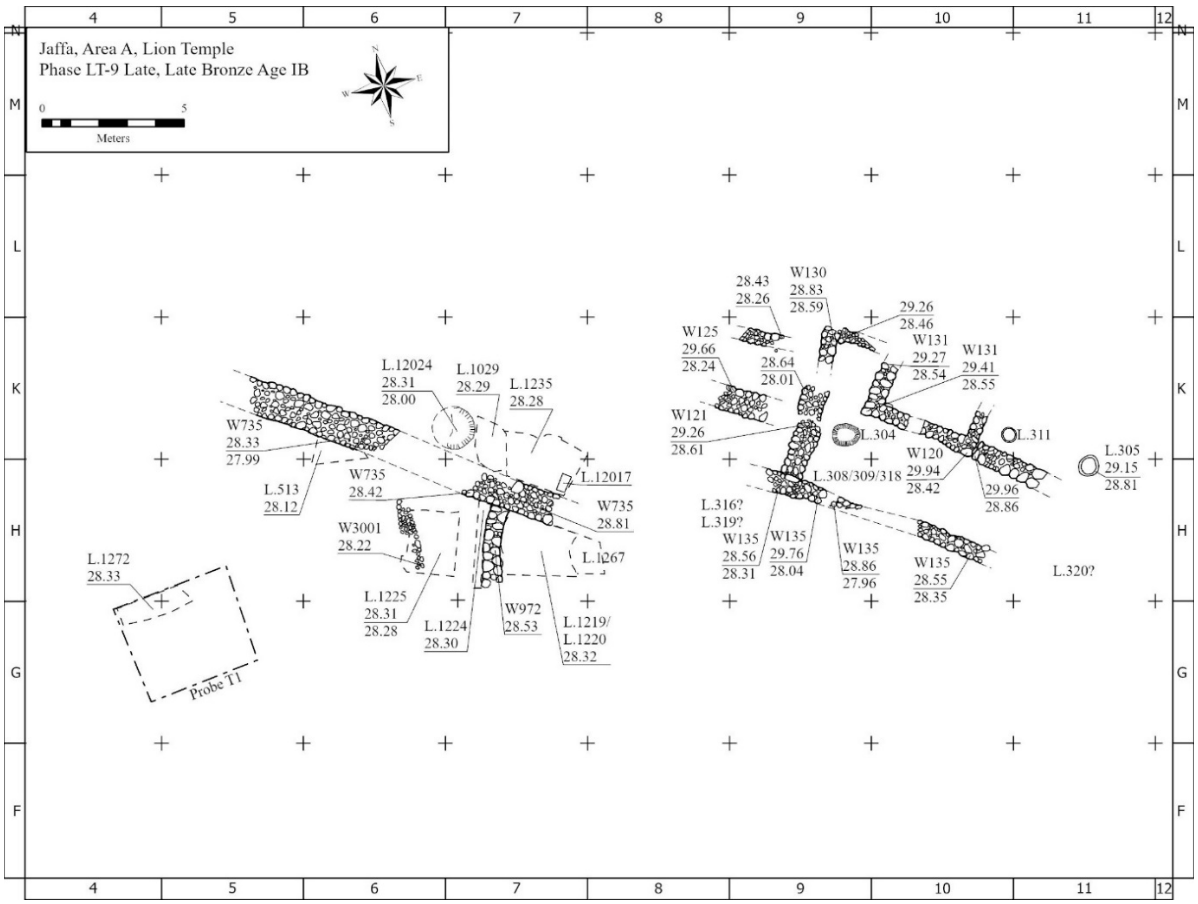

Figure 45: Plan showing the shared alignment between Phase LT-9 architecture and the Level VI Late garrison kitchen (prepared by K. Kowalski).

Phase LT-9 is dated based on several criteria. The assemblage from the earliest series of floors associated with **Wall 735** (assemblage group LT-9.4) includes restorable forms dating narrowly within the Late Bronze Age IB, notably an Egyptian-style bowl with red-splash decoration (**MHA 4775**) found smashed on a floor (**Locus 1226**). Moreover, the more fragmentary elements of the collective Phase LT-9 assemblage contain a high frequency of types congruent with a Late Bronze Age IB date.[327] In character, the Phase LT-9 assemblage perfectly parallels that of the better-preserved Level VI Late garrison kitchen (see Section 7.2.1), with which it also shares an architectural alignment (see Figure 45). Based on these considerations, these two levels are almost certainly contemporary, likely dated to the latter part of the Late Bronze Age IB—perhaps on the boundary of the 15th/14th centuries BCE. This is supported by a charred olive pit (**MHA 7473/UCI AMS# 159332**) that Kaplan recovered from a Phase LT-9 floor (**Locus 1226**) that produced two calibrated date ranges of 1440-1387 BCE (86.0%) and 1339-1321 BCE (9.4%). As with the Phase LT-10 AMS sample, the latter range is highly unlikely considering the composition of the Phase LT-9 ceramic assemblage, relative stratigraphy, and the successive sequence of AMS samples derived from Phase LT-8 contexts. Consequently, this phase represents an early iteration of the garrison during a period in which the Egyptian New Kingdom was not only consolidating the physical territory of its empire but was also settling into a clearer conception of how to govern it.

[327] From the Egyptian-style tradition, this includes numerous fragments of red-splash decorated bowls, fragments of bowls with a red slip and ring base (type BL *varia*), *zīr* fragments (type JR10), and a high density of flowerpot elements (type FP). In the case of the latter, while the flowerpot is technically known as late as the Late Bronze Age IIA in the southern Levant, it is only found in high frequencies in levels dating to the Late Bronze Age IB (Martin 2011b, 47–49).

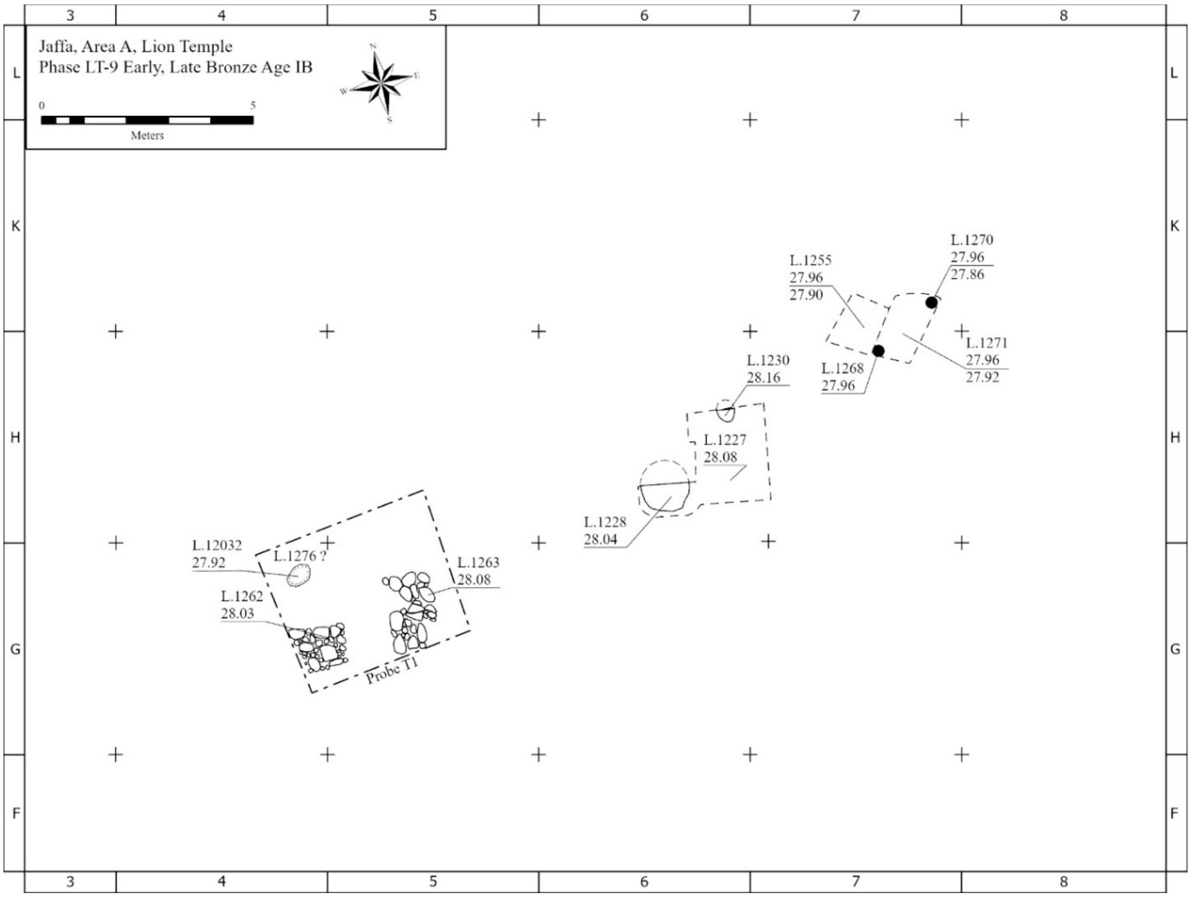

Figure 46: Phase plan of features associated with Assemblage Group LT-9.2, with all features having been encountered separately in probes (plan by K. Kowalski).

Given the partial exposure of the major architectural features from Phase LT-9, the delineation of functional contexts can only be so precise. This is especially true of the earliest series of floors encountered by Kaplan (assemblage group LT-9.2), which were only encountered at the lower levels of probes (see Figure 46). Based on elevation and relative stratigraphy, however, they clearly are contemporary with one another and postdate Phase LT-10. The northeastern segment of floor (**Locus 1271**) was associated with a shallow pit (**Locus 1270**) and a hearth (**Locus 1268**), and while Kaplan was able to articulate it farther to the west, this portion of the floor (**Locus 1255**) was disturbed by a later pit.[328] To the southwest, Kaplan encountered

[328] It is not entirely clear if the pit existed, since Kaplan's notes only say "signs of an intrusive pit" ("סימני בור חדירה"; see **Top Plan A74-DG-044**). His reasoning behind declaring the pit intrusive is also unclear, as its top elevation was flush with that of the floor (27.96 m ASL) and the associated pottery is identical that on the floor (**PB 1974.255**). As

another segment of floor (**Locus 1227**) and small silo (**Locus 1228**), with a flat stone (**Locus 1230**) resting on the floor possibly serving as a pillar base. The space related to this phase was encountered in the Cell T1 probe, which included a stone-paved floor (**Locus 1262** and **1263**[329]), a *tannur* (**Locus 1273**), a pit (**Locus 12032**) through the base of the *tannur*, and a small pit or silo (**Locus 1262**). **Locus 1262** contained a near-complete, mid- to late-18th dynasty imported Egyptian amphora (type AM4), a type known from only two other examples in the southern Levant (Martin 2011b, 79–80).[330] As with the preceding Phase LT-10, while this early iteration of Phase LT-9 floors was only exposed within a narrow spatial window, they attest to a diverse array of functional contexts.

for the hearth (**Locus 1268**), its elevation on **Top Plan A74-DG-043** (29.96 m ASL) is nearly two meters higher than any of the nearby features under excavation—clearly a clerical error.

[329] The separate numbers indicate the western (**Locus 1262**) and eastern (**Locus 1263**) halves of the floor, which were severed by a later, intrusive wall (**Wall 3013**).

[330] Petrographic analysis confirmed that the vessel was an Egyptian import (Ownby Forthcoming). The slight flattened disc base on the example from Jaffa marks it as an earlier iteration, with later 18th and earlier 19th dynasty variations predominantly having round bases (see Appendix 14.2.2). For a comparison of earlier versus later forms, compare Wodzińska's New Kingdom 37 with her New Kingdom 34 and 35 (Wodzińska 2010c, 79–81). Hieratic documents on examples from Egypt indicate that it could have carried a variety of contents including honey, moringa oil, olive oil, *mrht*-oil, and ritually significant, geographically sourced water (Aston 2007, fig. 2), though not all of the translations indicating these potential contents are secure (Serpico and White 2000, 395, 399). Unfortunately, the Jaffa example was unsuitable for residue analysis.

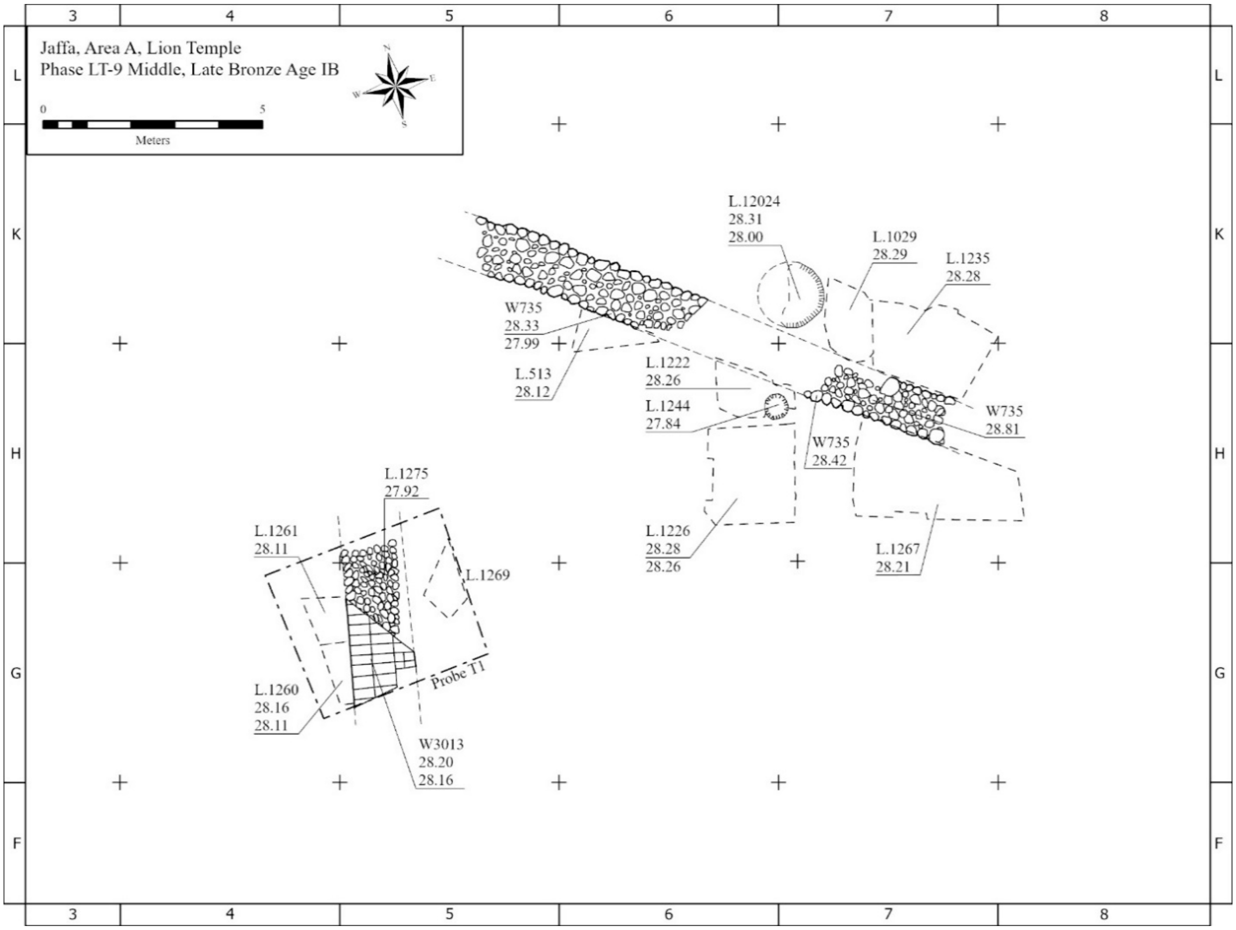

Figure 47: Plan of the features associated with Assemblage Group LT-9.4, the first series of floors associated with **Wall 735** (plan by K. Kowalski). Note the non-contiguous exposure of floors and architecture within the Cell T1 probe.

These floors were covered over by a series of fills (assemblage group LT-9.3), after which the first clear sequence of Phase LT-9 architecture was constructed. This includes the broad fieldstone **Wall 735** that runs west-northwest to east-southeast across the entire excavation area, as well as a mudbrick wall (**Wall 3013**) with a cobble foundation (**Locus 1275**) that Kaplan encountered in the Cell T1 probe. The earliest floors associated with these walls, all of which were revealed within probes, comprise assemblage group LT-9.4. This includes two segments of floor (**Loci 513** and **1029**) along **Wall 735** that were heavily disturbed by later activities, only producing clean Late Bronze Age ceramics right along the margin of the wall. Further to the southeast along **Wall 735**, however, Kaplan managed larger exposures of contemporary undisturbed floors both north (**Locus 1235**) and south (**Loci 1222**, **1226**, and **1267**) of **Wall 735**. In addition to the ceramic assemblage, the floor (**Locus 1235**) on the northern side of **Wall 735** also produced an unusual find—the jawbone of a hyaena.[331] While hyaena remains are not unknown from southern Levantine sites they are rare (Croft 2004, 2298), though the animal featured commonly in the Egyptian bestiary and butchered hyaena remains are known from New Kingdom sites such as Tell el-Amarna (Legge 2011). While the presence of this unusual taxon cannot be associated with Egyptian or Levantine practices with certainty, the jawbone certainly marks the context as unusual, potentially showing an affinity to the ritualistic use of predatory animal remains akin to the Phase LT-8 Lion Temple that was built directly over this context. The floors on the southern side of **Wall 735**, which likely represent separate exposures of the same floor, produced finds of a much more mundane character, including a *tabun* (**Locus 1223**), a shallow pit (**Locus 1244**), as well as fragments of culinary ceramics such as Egyptian-style flowerpots (e.g., **MHAs 7612** and **7616** from within the *tabun*). The floor **Locus 1226** also produced the restorable, Egyptian-style red-splash decorated bowl (**MHA 4775**) and charred olive pit (**MHA 7473/UCI AMS# 159332**) that help narrow the date of Phase LT-9 to the Late Bronze Age IB. Within Cell T1, in addition to **Wall 3013** Kaplan also exposed an associated floor (**Locus 1260**) and a stone feature that Kaplan interpreted as some sort of cooktop (**Locus 1261**), using a term that he never applies to fire installations excavated elsewhere ("כִּירַיִים"). Unfortunately, the feature cannot be clarified further as there are no drawings or photographs to insist in the interpretation. Regardless, while elements such as the hyaena jawbone point to unusual activities, the collection of more mundane and/or domestic elements point towards the types of day-to-day activities useful for reconstructing life within the early garrison community.

[331] Identification by Ed Maher.

Assemblage group LT-9.5 consists of the final phase in the evolution of this area and is attested only to the south of **Wall 735** with the construction of the new transverse **Wall 972** directly above **Floors 1222/1226** and the laying new floor laminations to either side of **Wall 972** (see Figure 44). The new floors and wall directly interface with **Wall 735**, which remained the key architectural feature after the new construction. Kaplan exposed two segments of the floor (**Loci 1224** and **1225**) to the west of **Wall 972**, and while his excavations to the east were disrupted by an intrusive foundational pillar (**Locus 12024**), undisturbed segments of the same floor were excavated to the east and west of the pillar (**Loci 1219** and **1220**). Much like the lower lamination of floors, the ceramics from assemblage group LT-9.5 suggest contexts wherein practices where of a more mundane character. Interestingly, this floor also provides one of the earliest examples at Jaffa—and possibly in the southern Levant—of a Type BL3a bowl with a lipstick rim, a type that only just begins to become popular towards the latter part of the 18th Dynasty in Egypt (Martin 2011b, 37). This is suggestive this late Phase LT-9 floor could be viewed as falling at the very end of the Late Bronze Age IB, either at the extreme end of the 15th century BCE or the very beginning of the 14th century BCE.

Figure 48: Superimposed Phase LT-9 floor laminations underneath the Lion Temple, with (A) comprising a one of Kaplan's original sections from along the northern edge of the Lion temple, cleaned and photographed during the 2014 excavation season (**Photo 2014_P0098**). Note the multiple bands of charcoal and burnt mudbrick, corresponding with Kaplan's LT-9 floors south of **Wall 735**. (B) is a section drawing from **Top Plan A74-DG-031** showing these same floors underneath the eastern wall of the Lion Temple (**Wall 929**).

Kaplan's notes do not provide sufficient information to interpret the end of Phase LT-9. However, the 2014 cleaning of one of his original sections beneath the Lion Temple revealed at least one major burning event that affected the series of superimposed floors beneath the Lion Temple (see Figure 48), an event that might correlate with the presence of a small quantity of smashed restorable vessels from Kaplan's excavations. While these elements by themselves would be unsatisfactory for demonstrating a violent end to Phase LT-9, the probable contemporaneity of Phase LT-9 with the Level VI Late garrison kitchen makes this reconstruction more likely given the sudden, intense destruction that occurred in the latter context. Regardless, Phase LT-9 is the last phase clearly associated with the Late Bronze Age IB before a complete reorganization of the area during the Late Bronze Age IIA Phase LT-8.

8.2.4.1 Qualitative Discussion of the Phase LT-9 Assemblage

The Phase LT-9 assemblage is notable for its close affinities with the—likely contemporary—Level VI Late assemblage from the Ramesses Gate area, albeit with the caveat that pottery from Phase LT-9 is much more fragmentary.[332] Notable congruities include Late Bronze Age IB types from the Egyptian-style tradition such as simple bowls with red-splash decoration (type BL1a), red-slipped bowls with ring bases (type BL *varia*), *zīr* jar fragments (type JR10), the high frequency of flowerpot elements (type FP), and a rare, near-complete imported Egyptian amphora (type AM4). Furthermore, each assemblage group associated with a floor (LT-9.2, 9.4, and 9.5) produced at least four types of Egyptian-style bowl across both small (types BL1-3) and large (type BL5 family) variants, suggesting the existence of the Egyptian-style table service also known from the Level VI Late kitchen. The attestation of Levantine forms is constant but erratic, with only large storage forms (type SJ family) and cooking pots (type CP family) being a consistent presence in each assemblage group. Levantine bowl morphologies such as the common interior-thickened rim bowl (type LB2) and carinated bowl (type CB family) are also present in almost every context, albeit at a substantially lower frequency than their Egyptian-style counterparts. Much like the Level VI Late kitchen, there seems to be a preference for Egyptian-style forms across most functional variants, however for culinary forms used in (in)direct heat cooking the only options present were from the Levantine tradition (type CP family). The only Egyptian-style culinary vessel present, the flowerpot, likely fulfilled a specific culinary task outside of the capabilities of forms from the Levantine repertoire. One final notable pattern relates to decoration, as this is the final phase in which certain Egyptian modes of decoration—red-splash decorated bowls and the red-slipped ring-based bowl—are clearly

[332] For a more complete discussion of each assemblage group from Phase LT-9, see Appendix 14.2.

attested. Notably, their frequency seems to reduce through higher laminations in superimposed floors of this phase. Given that this phase likely ended at the very end of the Late Bronze Age IB, the patterns in the decoration of Egyptian-style bowls seem to correspond with their chronology in Egypt, suggesting frequent exogenous inputs into the Egyptian-style ceramic industry at Jaffa from the imperial core—possibly through the rotation of resident potters.

8.2.5 Phase LT-8: The Late Bronze Age IIA

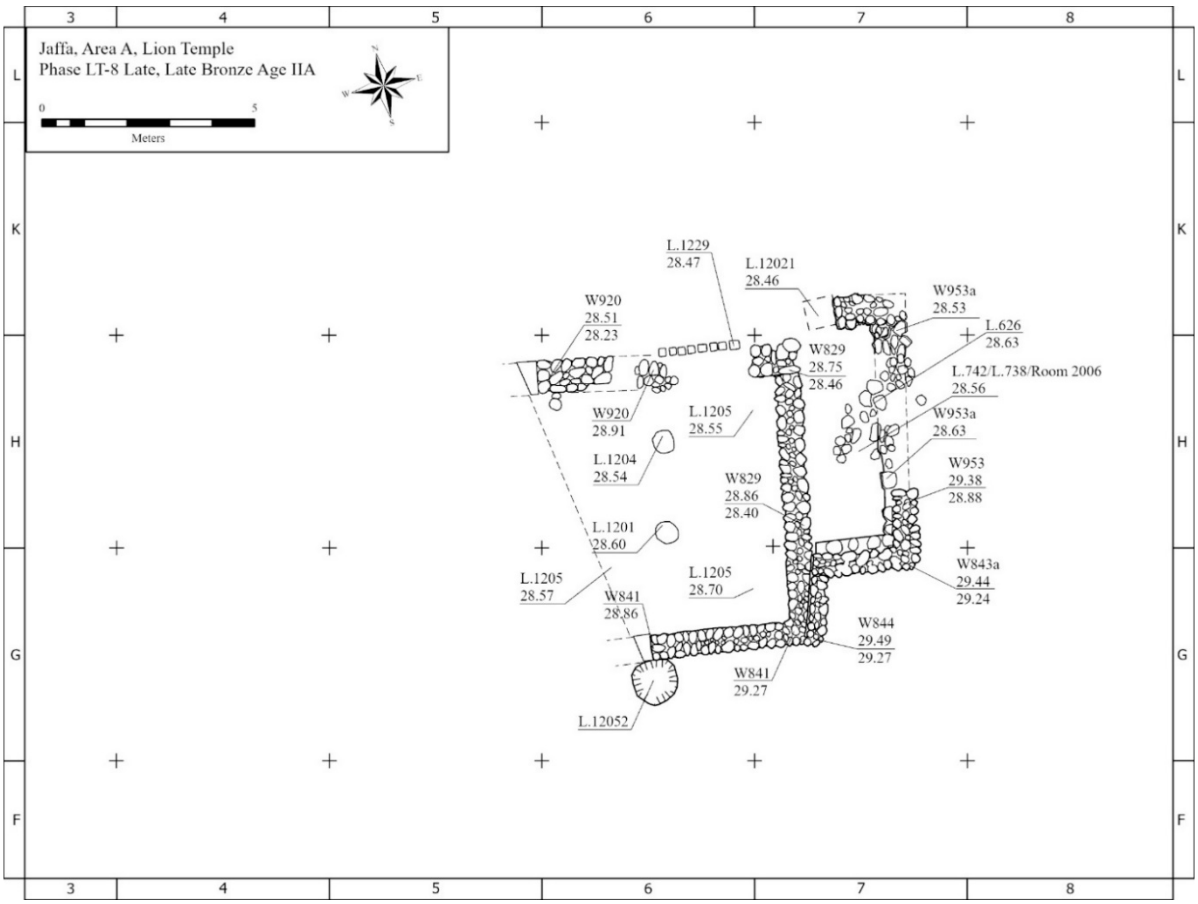

Figure 49: Plan of Phase LT-8 showing the Lion Temple and its eastern outbuilding (prepared by K. Kowalski). The dotted line indicates where later construction cut through the temple.

Phase LT-8 comprises Kaplan's most cohesive exposure of Late Bronze Age materials in the Lion Temple area, producing both the largest overall assemblage of any phase (n = 446) and one of the more coherent architectural plans for a Late Bronze Age structure at Jaffa. The structure in question, the Lion Temple, was fully excavated except for its western side, which was destroyed by the construction of the later citadels of Phase LT-7 and LT-6 (Figure 49). Moreover, in his probes beneath the Lion Temple, Kaplan encountered evidence for its complex construction history, which entailed a complete transformation of the character and topography of the area.

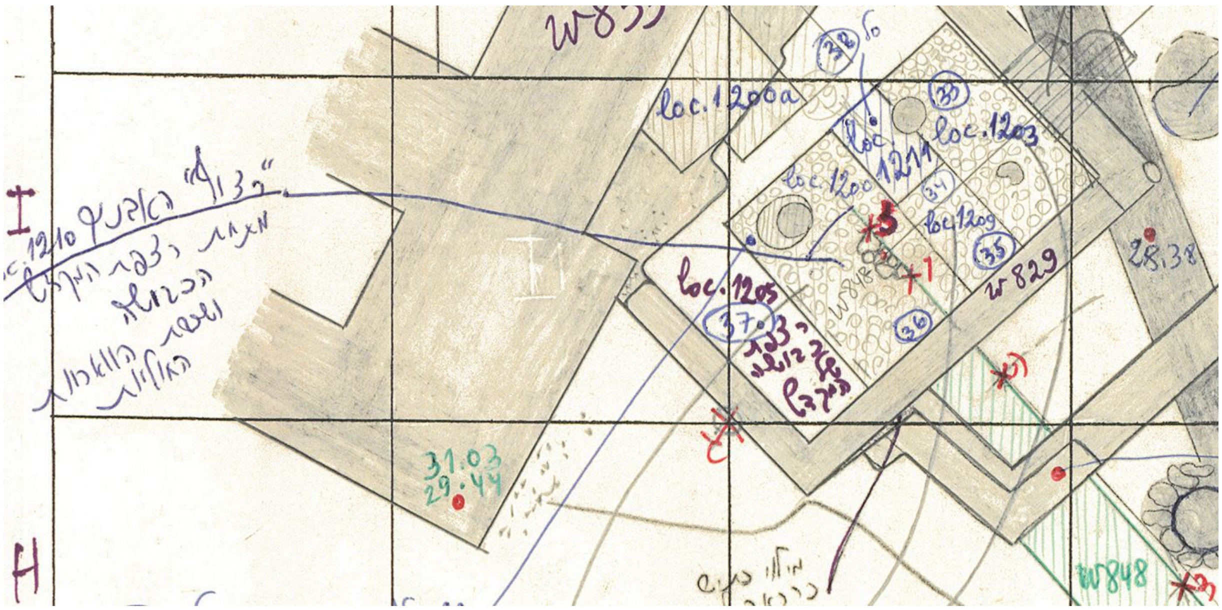

Figure 50: Detail of **Top Plan A74-DG-006** showing the interface of the retaining **Wall 848** with the stone subfloor of the Lion Temple (**Locus 1210**), drawn as a continuous layer of stones extending north from the face of **Wall 848**.

First, a stone retaining wall (**Wall 848**) was built into the Middle Bronze Age glacis, after which a series of prepared construction fills—notable a thick layer of cobbles (**Locus 1210**)—were deposited, creating an artificial building platform atop which the Lion Temple was constructed (see Figure 50). The assemblage from this construction phase (assemblage group LT-8.1) includes an enormous quantity of large body sherds from storage and transport vessels across a wide variety of fabric groups, likely indicating the use of material from dumps as part of the levelling operation. After this platform was constructed, a series of foundation trenches and pits were cut for the walls (**Locus 1237**) and column bases (**Loci 1202 and 1203**), the assemblage of which is represented within assemblage group LT-9.2. Finally, the main space of the Lion

Temple was constructed along with a single room along its eastern wall (see Figure 49), with the assemblage from their floors making up the material for assemblage group LT-9.3.

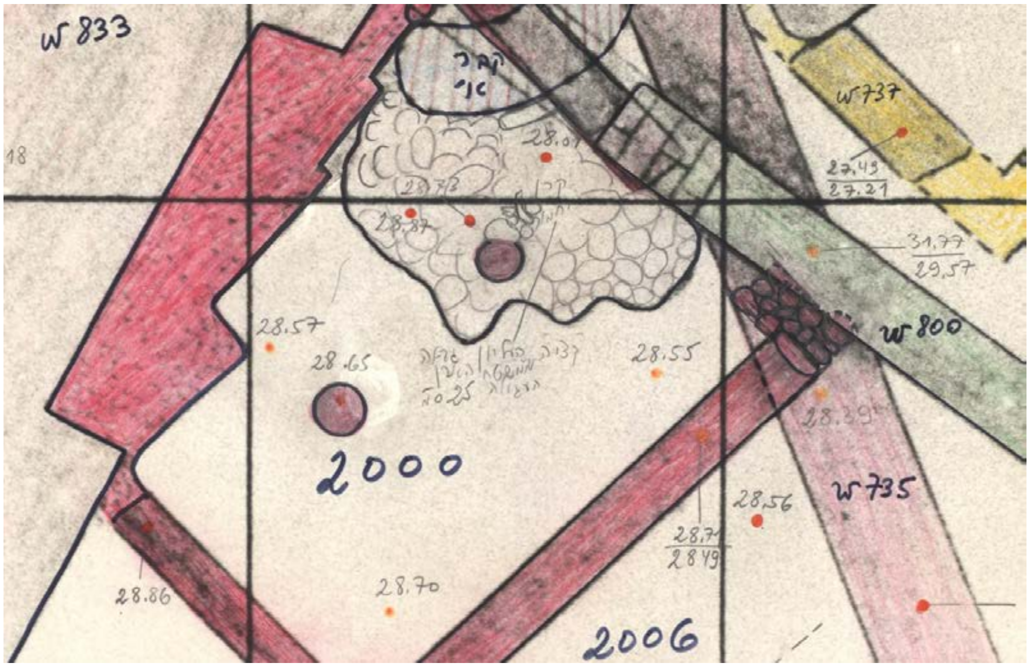

Figure 51: Detail of **Plan A72-006** showing where the Lion Temple (dark red) overlays the Phase LT-9 **Wall 735** (pink). The unrelated **Wall 800** dates to the Persian Period (Phase LT-3).

As noted in Section 8.2.1, Phase LT-8 is dated to the Late Bronze Age IIA in agreement with Herzog's (2008, 1791) assessment, albeit with the support of new evidence since his earlier work.[333] First, the construction of the Lion Temple is clearly separated from the preceding Phase LT-9, with the corner of the temple falling directly over the top of **Wall 735** (see Figure 51). Also, the ceramic assemblage contains little to no material common to Late Bronze Age IB strata at Jaffa. Even if the assemblage groups related to construction of the temple are included (n = 446), wherein the potential for residuality would be high, no examples of the Egyptian-style red slipped bowls with ring bases (type BL *varia*) or *zīr* jars (type JR10) were found, and bowls with

[333] Herzog based his date on relative stratigraphy and Kaplan's recovery of the Queen Tiy scarab (**MHA 4327**) from the Lion Temple floor. Kaplan dated the structure to the late-13th or early-12th century BCE (J. Kaplan and Ritter-Kaplan 1993, 658), which was cautiously maintained by the JCHP in a preliminary publication (Burke, Peilstöcker, et al. 2017, 126, n. 120) prior to the reexamination of the ceramics and stratigraphy of the Lion Temple.

red-splash decoration are only attested in a single base fragment. Moreover, the assemblage associated with the use-life of the temple (n = 229) only contains five fragments of flowerpots, which corresponds with the waning popularity of this form in Egypt during the late-18th Dynasty/Late Bronze Age IIA (see Martin 2011b, 48; Rose 2007). More importantly, Phase LT-8 contexts also produced the earliest Egyptian-style beer jar (type BB) fragment known at Jaffa, the form which replaced the flowerpot.[334] The beer jar fragment provides a *terminus post quem* of the Late Bronze Age IIA for Phase LT-8, which is further reflected in the higher frequency of Cypriot imports such as White Slip II and Base Ring II vessels.[335] While the greater abundance of these forms indicate that the assemblage likely cannot predate the Late Bronze Age IIA, the near-total absence of the Egyptian-style straight-sided simple bowl (type BL2) means that Phase LT-8 cannot be easily placed in the Late Bronze Age IIB, when this form became immensely popular not only in Egypt and the southern Levant more broadly (Martin 2011b, 35).[336] However, these frequencies are not definitive for placing Phase LT-8 in the Late Bronze Age IIA, which requires further stratigraphic and radiometric support.

The main stratigraphic support for a Late Bronze Age IIA date comes from the relationship between the Lion Temple and the Phase LT-7 and LT-6 fortresses, with the construction of both structures cutting through the western side of the Lion Temple. Of these two fortresses, the earlier cannot postdate Phase RG-4a of the Ramesses Gate and therefore was likely constructed in the 13th century BCE (see Section 8.2.6), meaning that the Lion Temple had

[334] The Jaffa example also follows the morphometric pattern for late-18th Dynasty/Late Bronze Age IIA beer jars in that it possesses a larger base diameter (8 cm) than the variant common to the Late Bronze Age IIB (Aston 1996, 68, 89; Martin 2011b, 53).

[335] Lone examples of these forms are not chronologically diagnostic, as they known from well-dated Late Bronze Age I contexts (e.g., Höflmayer et al. 2021). However, they are not attested in high frequencies until the Late Bronze Age II (Artzy 2019a, 343).

[336] Also compare its popularity in the Late Bronze Age III levels of the Ramesses Gate at Jaffa (see Chapter 7).

to be out of use by this period. This is further supported by a sequence of radiometric dates derived from charred seeds recovered from both the construction levels beneath the Lion Temple as well as its floor (see Appendix 17). All the samples from the construction fills (**Loci 10097** and **10098**) provided date ranges between the mid-15th to late 14th centuries BCE, as did two samples taken from a low lamination of the temple floor (**Locus 10095**). One sample recovered by Kaplan from a high lamination of the Lion Temple floor (**Locus 1205**), produced later, broader ranges: 1387-1340 BCE (32.5%) and 1310-1230 BCE (62.9%).[337] While technically the life of the Lion Temple could have extended into the Late Bronze Age IIB, the confluence of evidence suggests placing both the construction and use-life mostly in the 14th century BCE.

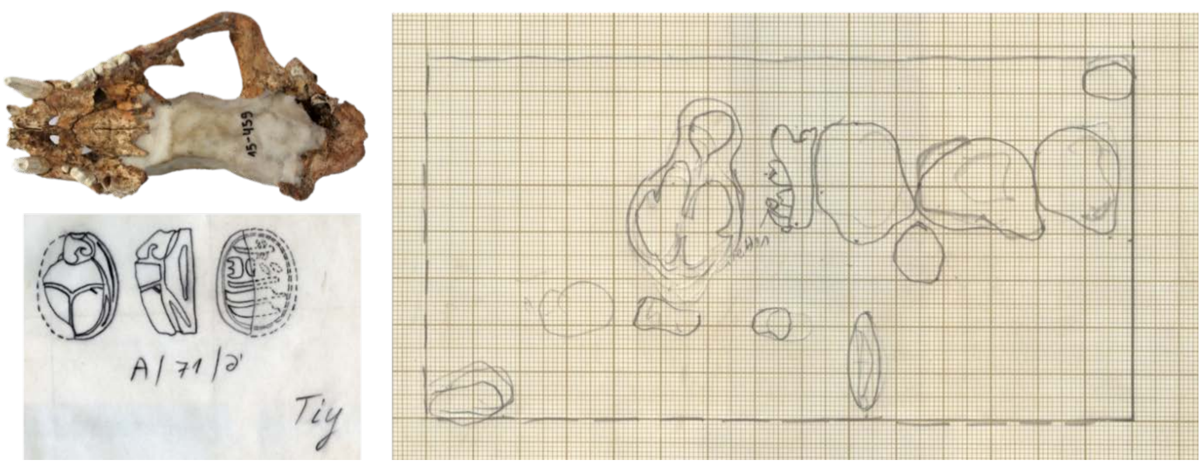

Figure 52: The lion skull recovered by Kaplan (**MHA 4325**, **Photo MHA_4325l**) alongside the original line drawing of the Queen Tiy scarab (**MHA 4327**, **DR-MHA_4327_orig**), shown with the sketch of their original findspot (**Plan A71-014**).

Thus far, Kaplan's original designation of the structure as a temple has been repeated without commentary, though his interpretation is supported by several pieces of evidence. The first relates to its architectural plan, with its unusual off-center access point and north-south axis

[337] This excludes an obvious outlier sample taken from an unidentified seed recovered by Kaplan (**JLT-23.2/UCI AMS# 159333**). This sample produced a calibrated date of 1660-1530 BCE (95.4%). Since the low end of its 2σ range is a century earlier than the highest possible date of the samples from preceding phases, it must be residual. Moreover, this date is completely at odds with the material culture of this phase.

along a row of pillars (see Figure 49) being reminiscent of Phase II of the Fosse Temple at Lachish (Tufnell, Inge, and Harding 1940, Pl. LXVI). Typologically, this would mark the Lion Temple as being part of Amihai Mazar's category of "Temples with Indirect Entrances and Irregular Plans" (Mazar 1992, 177). The most important indications for its ritual function, however, relate to the unusual finds recovered from the floor of the structure. The most obvious is the lion skull (**MHA 4325**) that Kaplan found in association with a broken scarab of Queen Tiy (**MHA 4327**) and an Egyptian-style bowl (**MHA 4233**, see Figure 52). The skull and lower jaw had been defleshed in antiquity, and several modifications to the bone indicate its ritual display or use.[338] Leonine imagery was common to both Levantine and Egyptian cult during this period (see Cornelius 2004; Osborn and Osbornová 1998, 113–19), and therefore the lion skull need not preclude specifically Egyptian or Levantine practices. Another find, however, points towards ritual activities in the space that were specifically rooted within Egyptian traditions.

[338] All analyses of the lion skull have been conducted by Ed Maher and will be subject to future publication (Maher Forthcoming). My thanks to Ed for sharing his preliminary results with me.

Figure 53: Egyptian-style bowl with incised pot mark (**MHA 7703**, **Photo MHA_7703t**).

The object is partially restorable Egyptian-style simple bowl with a plain rim (**MHA 7703**, type BL1a). The example in question bears a post-firing incised mark on its exterior surface (see Figure 53), which is wholly unique to Egyptian-style vessels in the southern Levant but relatively common in New Kingdom Egypt.[339] The sign on the Jaffa bowl is not derived from either Egyptian hieroglyphics or hieratic, but rather matches pot marks from Middle Kingdom Kahun (Gallorini 2009, no. 3.9.2) and an abstract mark identifying an individual on a papyrus work roster at New Kingdom Deir el-Medina (Haring 2000, Table 3, no. 24). Some of the Deir el-Medina symbols have been matched to incised marks on ceramic sets found in the vicinity of Deir el-Medina and in the Valley of the Kings, and it has been proposed that the post-firing pot

[339] The study of pot marks has a complex history in both Egypt and the Levant (Hirschfeld 2008, 120). They are well attested on Late Bronze Age closed forms in the southern Levant, especially the much-studied Cypro-Minoan marks (Yasur-Landau and Goren 2004; Cross and Stager 2006; Yasur-Landau 2017). Pre-firing marks are also well known and have been interpreted as a means for specialists to differentiate their pots in communal production facilities (Wood 1990, 46–48). No examples are known from Egyptian-style ceramics.

marks functioned as symbols of ownership among the workmen (Haring 2000; Aston 2009). However, this does not exhaust the functional possibilities for pot marks in Egypt, since their high density at several New Kingdom sacred sites such as Umm el-Qaab at Abydos, Karnak, and Malkata have led both Colin Hope and Julia Budka to suggest that in some cases the marks relate to the separation of forms dedicated for ritual purposes (Hope 1999; Budka 2015b). Given that the practice of personalized marks on Egyptian-style vessels is completely unattested in the Levant despite tens of thousands of Egyptian-style bowl sherds being excavated, it seems unlikely that the Jaffa example should be associated with the tradition of ownership marks. Rather, given the context of the vessel, Budka and Hope's theory is more attractive. It is possible then that this bowl is evidence for an unequivocally Egyptian ritual in a small cultic building or shrine at Jaffa.

The attestation of an unusual Egyptian ritual practice alongside leonine imagery is suggestive of the ritual significance of the structure. Given the Late Bronze Age IIA date of the Lion Temple, there is a possibility that the shrine can be associated with the cult of Amenhotep III (1390-1352 BCE) or his wife Tiy. Both were divinized in their lifetime and associated with leonine imagery, most notably at Soleb and Sedeinga in Nubia, where both the king and queen were presented as the lunar eye of Re that must be calmed from its violent, leonine form and transformed into the placated full moon.[340] The leonine imagery is especially notable in the lion statues commissioned by Amenhotep III at Soleb (British Museum EA2), which also bear inscriptions proclaiming the king as a lion (Kozloff and Bryan 1992, 104–11). When the Queen Tiy (**MHA 4327**) scarab and lion skull are considered in tandem with the large Amenhotep III

[340] In the case of Tiy, after calming she transforms into Hathor to serve as the king's consort (Kozloff and Bryan 1992, 110).

lion hunt scarab recovered by the TAU expedition from the gate complex (Sweeney 2003), the dense collection of finds related to this pharaoh is suggestive of the same type of deification that he instituted in colonial Nubia at Soleb. While this interpretation must remain hypothetical, Late Bronze Age IIA Jaffa was clearly entangled in a complex web of imperial, colonial, and local institutions, with the collective stage being negotiated using foodways ceramics from both the Levantine and Egyptian traditions.

The end of Phase LT-8 is unclear, with the evidence hardly being conducive of a violent destruction. However, the presence of the lion skull, the scarab, and several restorable vessels on the floor of the Lion Temple is suggestive of something other than an extended period of disuse or abandonment. Furthermore, the first feature that post-dates the use-life of the Lion Temple is a thick layer of stone cobbles (**Locus 633**) covering over the northern portion of its floor—including one of its pillar bases (**Locus 1204**).[341] Since this layer could only have been deposited after the removal of the wooden pillar that rested on this base (see already J. Kaplan 1974b, 135), it seems likely that the building was purposefully decommissioned rather than destroyed. The ceramics within this stone layer suggest a *terminus post quem* of the Late Bronze Age IIB, however this only dates the period after the Lion Temple had already gone out of use.[342] Regardless, a date just prior to or early in the Late Bronze Age IIB remains most plausible, especially since the Lion Temple had to be out of use prior to the construction of the Phase LT-7

[341] Kaplan refers to the stones offhand as collapse ("מפולת") (e.g., in the note for **PB 1972.259**), though it is unclear from where they would have fallen.

[342] The bulk of the ceramics from **Locus 633** are nondiagnostic chronologically, however, one carinated bowl fragment (**MHA 7631**, type CB1) preserved enough of a profile to suggest a Late Bronze Age IIB date. Far from definitive, the rim orientation on this example is simply more common in the Late Bronze Age IIB than earlier. The fact that lone examples with similar morphology are known from earlier strata such as Late Bronze Age I Level XI at Megiddo (Loud 1948, Pl. 38:12) is enough to merit caution. At Jaffa, however, this orientation is unknown prior to the Phase RG-4a assemblage.

fortress (see Section 8.2.6). Even if the use-life of the Lion Temple extended into the Late Bronze Age IIB, it currently provides the only clear window into the Late Bronze Age IIA garrison at Jaffa.

8.2.5.1 Qualitative Discussion of the Phase LT-8 Assemblage

Perhaps the most remarkable characteristic of the Phase LT-8 assemblage is the preponderance of Egyptian-style ceramics, which form more than 70% of the total assemblage no matter the calculation method—a ratio that is completely unattested at contemporary southern Levantine sites.[343] Furthermore, the Egyptian-style assemblage—and especially the tableware assemblage (see Appendix 14.3)—is composed of a variety of types that indicate not only the capacity for the local ceramics industry to produce a diverse array of Egyptian-style forms, but also a demand for their consumption. While the presence of Levantine and imported Cypriot ceramics indicate the continued prospect of consumer choice between a variety of broad functional equivalents from different ceramic traditions, the overwhelming frequency of Egyptian-style vessels indicates that—at least in this area—the use and appreciation of foodways ceramics largely followed a model inspired by Egyptian traditions. While a temple or shrine does not readily indicate mundane foodways, when actors in this area sought to make use of foodways ceramics it is notable that Egyptian-style ceramics almost exclusively met that need. Rather than being confined to the quotidian sphere, by this point in the history of Jaffa the consumption of Egyptian-style ceramics was socially acceptable across a diverse array of functional contexts.

[343] This figure applies specifically to the use-life of the Lion Temple (assemblage group LT-8.3, n = 223). During this period, Beth Shean has one of the highest overall proportions of Egyptian-style ceramics, however in the three strata straddling the Late Bronze Age IB through Late Bronze Age IIA Egyptian-style ceramics never achieve more than 3-4% of the total assemblage (Mullins 2007, 442).

8.2.6 Phase LT-7: The Late Bronze Age IIB

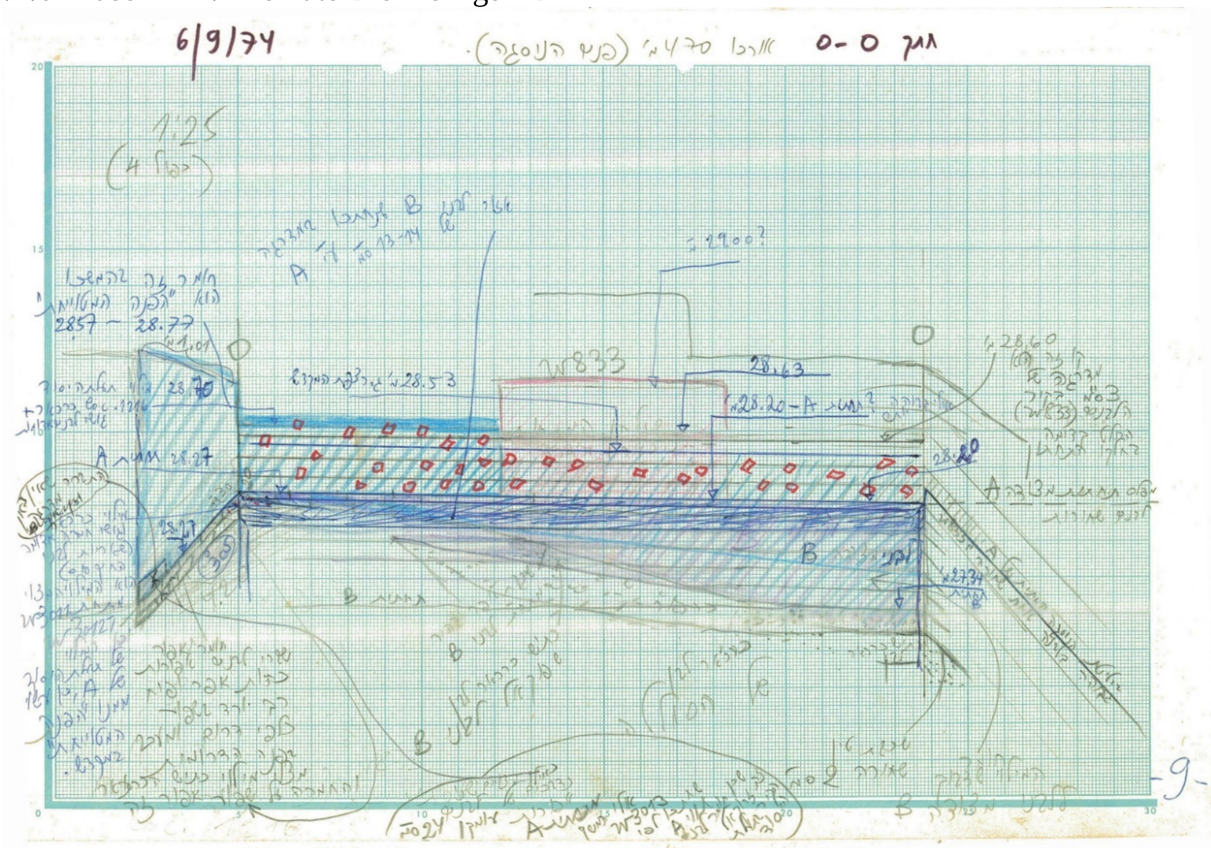

Figure 54: Drawing relating the phase LT-7 and LT-6 fortresses (**Plan A74-008**). The view is from within the foundation trench probe (**Locus 1216**), facing west. Note the poorly preserved slope of the LT-7 fortress (labelled B) above the Middle Bronze Age glacis. On the left, the Phase LT-6 fortress rests on the glacis without the Phase LT-7 fortress preserved beneath.

Phase LT-7 is purely architectural, contributing little in the way of ceramic data to this study. However, its dating and character are of immediately relevance to understanding the context of Egypto-Levantine interaction at Jaffa. The main feature of Phase LT-7 is a poorly preserved mudbrick fortress that Kaplan referred to as “Fortress B”, the construction of which partially destroyed the western side of the Lion Temple. Little can be said about this structure as its two preserved walls (**Walls 3017** and **12037**) were incorporated into the foundations of the later Phase LT-6 fortress, Kaplan’s “Fortress A.” The limited exposure, however, indicated that the thick walls of the Phase LT-7 fortress largely followed the plan of the later, better-preserved Phase LT-6 fortress (see Figure 54). The few ceramics from the foundation trenches of the Phase

LT-7 fortress offer little assistance for dating (see Appendix 14.4), however, other evidence suggests that it was contemporary with the Phase RG-4a Ramesses Gate complex.

First, and most importantly, the construction of the Phase LT-6 fortress, which incorporated the Phase LT-7 fortress in its foundations, must postdate the destruction of the Phase RG-4a Ramesses Gate. This is clear from the identical brick color and dimensions used in the construction of the Phase LT-6 fortress and Phase RG-3b gate complex (see Section 8.2.7). While the color of the brick used in the construction of the Phase LT-7 fortress and Phase RG-4a gates are identical, the brick dimensions are not.[344] There is, therefore, no need to assume that the Phase LT-7 fortress and Phase RG-4a gate were built during the same construction effort. The construction and use of the Phase LT-7 fortress, however, certainly falls within the c. 1300 – 1135 BCE span allotted for the use-life of the Phase RG-4a gate (see Burke, Peilstöcker, et al. 2017, 104, Table 4) in that it must postdate the Late Bronze Age IIA Lion Temple and predate the 1135 BCE destruction of the Ramesses gate complex. Since the foundation trenches of the Phase LT-6 fortress stripped away nearly all stratigraphic information regarding the earlier Phase LT-7 fortress, little can be said about its use-life or end. Since the succeeding Phase LT-6 fortress must postdate the destruction of the Phase RG-4a gate complex, it is plausible that Phase LT-7 was also destroyed in c. 1135 BCE. While Phase LT-7 offers little information regarding the material culture of daily life at Jaffa during the Late Bronze Age IIB, the fortress and its plausible destruction sheds further light on the imperial domain at Jaffa during the classic phase of Ramesside intensification in the southern Levant.

[344] Kaplan records that the bricks of the Phase LT-7 fortress as being 46 x 24 x 10 cm and brown-gray and reddish-brown in color in **Plan A74-010** (“חומות-אפורות ואדמדמות-חומות”). Compare with the Phase RG-4a bricks, which were 40 x 37 x 12 cm and red with “brown to black clay fills” (Burke, Peilstöcker, et al. 2017, 107).

8.2.7 Phase LT-6: The Late Bronze Age III

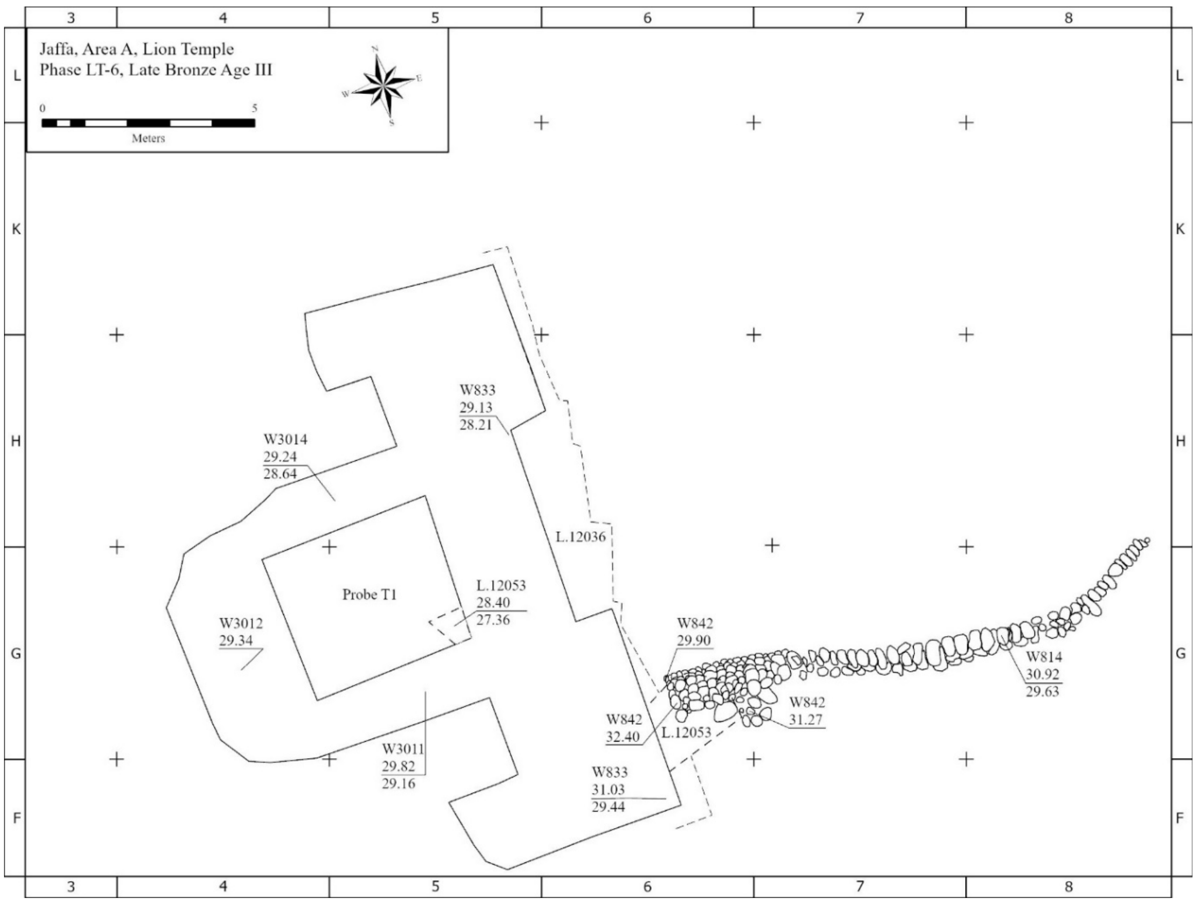

Figure 55: Plan of Phase LT-6 (prepared by K. Kowalski) showing the exposed extent of Kaplan's Fortress A. Note Cell T1, the only interior cell that Kaplan was able to fully articulate.

Phase LT-6 is the last clear Late Bronze Age level in the Lion Temple Area, with its sole feature being a buttressed mudbrick fortress, Kaplan's Fortress A (see Figure 55). The main wall of the fortress (**Wall 833)** is the only element Kaplan exposed in full, though its northern extent was partially disturbed by later architecture. At more than 13 m in length and 2.5 m thick at its narrowest, the fortress was an imposing structure. As discussed in Section 8.2.6, the Phase LT-6 fortress constituted a renewal of the earlier Phase LT-7 structure, which was incorporated into its foundations. Unlike the fortress of the preceding phase, enough of the Phase LT-6 fortress is preserved to associate it with architectural parallels, with its buttresses following a paradigm set by Egyptian administrative buildings excavated elsewhere in the southern Levant (see

Higginbotham 2000, 284–90, Type 3: Administrative Buildings). Additionally, the use of sand foundations for those sections of the wall not incorporating the Phase LT-7 fortress is also a common feature of Egyptian architecture (Kemp 2000, 88) that can be contrasted with the Levantine tendency towards stone foundations—the latter being better suited to the wetter climate in the southern Levant.[345] Unfortunately, Kaplan never encountered stratified deposits associated with the use-life of the fortress, recovering only ceramics from foundation trenches (assemblage group LT-6.1) and within the bricks from the structure (assemblage group LT-6.2). Neither of these groups allow for a more refined dating than a general *terminus post quem* of the Late Bronze Age II, and therefore other evidence must be drawn upon to date this phase.

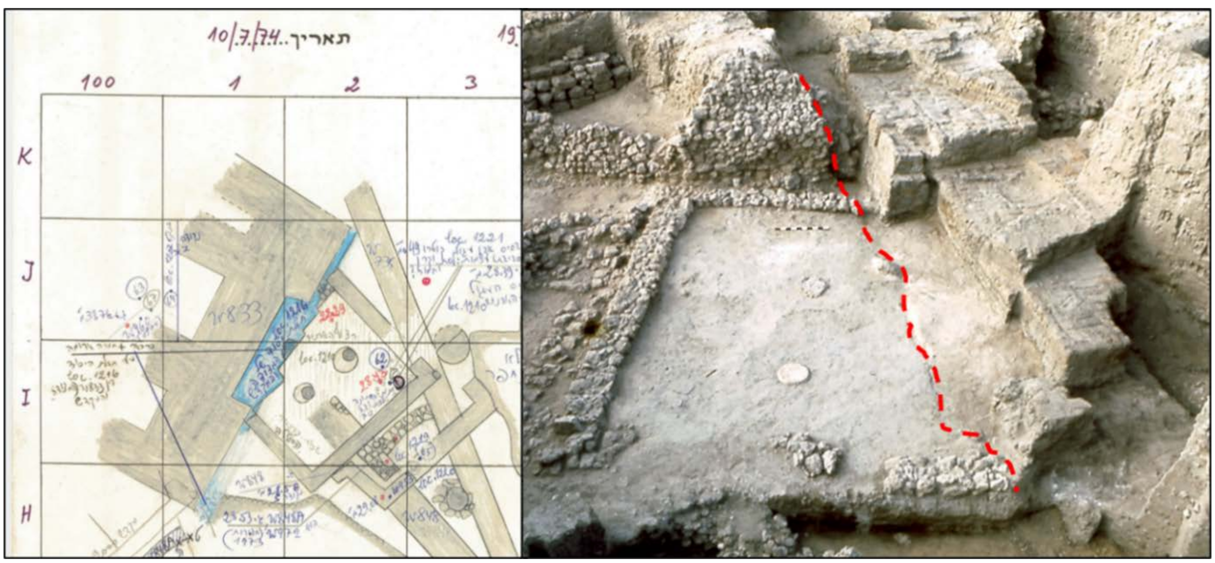

Figure 56: Composite image of **Top Plan A74-DG-009** and **Photo 40**. On the left, the foundation trench for the Citadel is marked in Blue, on the right it is traced by the red dotted line.

[345] The immediate association of mudbrick structures lacking stone foundations with Egyptian building practices has been rightfully questioned (e.g., DePietro 2012, 113). However, it is a common feature of Egyptian administrative structures in the southern Levant such as Wall 1080 in Phase 21 at Ashkelon (Stager et al. 2008, 256), Fortress 350 in Stratum VIII at Deir el-Balaḥ (Brandl 2010, 79–80), and Building B in Stratum VIII at Tel Mor (Barako 2007b, 20), all of which are reinforced administrative structures built in the Late Bronze Age IIB. Note however that Building 1500 at Beth Shean was built on a foundation of basalt cobbles despite being regarded as one of the most Egyptianized structures in the southern Levant and a probable governor's residency (Mazar 2006a, 66).

As has been mentioned several times previously, the foundation trench for the main wall of the Phase LT-6 fortress (**Wall 833**) cut through both the walls and floor of the Phase LT-8 Lion Temple (see Figure 56). This foundation trench, Kaplan's **Locus 1216** (JCHP **Locus 12036**) was the source of Kaplan's original stratigraphic confusion wherein he treated the Lion Temple and fortress as contemporary.[346] It was filled almost exclusively with yellow sand/crushed kurkar, which by the time Kaplan had excavated it had solidified into a concreted mass, a phenomenon witnessed in modern times with respect to kurkar creation. This concretion is what Kaplan came to call a "cella" in his publications, which he specifically notes was "leaned on the north wall of the palace" (Kaplan 1972c, 83). In short, Kaplan logically assumed that a raised mass of kurkar must represent an ancient stone feature, however, this antedates the scientific understanding of the rapidity with which kurkar can form. Kurkar is a local term for a type of sandstone that can broadly be classified as a cemented, carbonate-rich aeolianite, which naturally forms when windblown sands from the Mediterranean beaches accumulate in dunes. Subsequent leaching dissolves the carbonates, which eventually reform and cement the sand grains together—a process that only takes thousands of years (Porat, Wintle, and Ritte 2003). The carbonate rich Mediterranean sand that was used to fill the Phase LT-6 foundation trenches did not require a long period of natural accumulation, and consequently in the more than 3,000 years since their deposition it achieved a level of concretion to appear solid by the time of Kaplan's excavation.[347] Consequently, there is no need to assume that the kurkar mass connects

[346] Kaplan treated the entire probe he cut into this initial foundation as a unified locus (**Locus 1216**), however as the discussion of Phases LT-10, LT-7, and LT-8 show, this probe encountered elements predating the final cutting of the Phase LT-6 foundation trench. Consequently, **Locus 12036** is the designation for elements of the foundation trench dating solely to the construction of the Phase LT-6 fortress.

[347] Similarly, the Middle Bronze Age fortifications—once comprised of loose sand—also have the consistency of poorly consolidated sandstone, a fact noted when they were re-exposed in 2014.

the two structures, allowing for the Phase LT-6 fortress to be placed in is appropriate chronological context.

As mentioned in the previous section, it is possible to associate the Phase LT-6 fortress with the Phase RG-3 gate complex from the Ramesses Gate area based on the bricks used to build both structures, which were identical in color, composition, and dimensions.[348] The well-dated sequence of gates narrows down both the construction and use-life of the Phase LT-6 fortress to a narrow period, with its construction falling after 1135 BCE and its destruction and/or abandonment occurring at or before c. 1125 BCE (Burke, Peilstöcker, et al. 2017, 104, Table 4). Unlike the gate complex, however, there is no evidence that the Phase LT-6 fortress was destroyed. Several layers excavated by Kaplan suggest the slow degradation of the structure after a period of exposure, notably a layer of mudbrick detritus (**Locus 12047**) sloping to the east away from **Wall 833**.[349] Regardless of how the phase ended, the Phase LT-6 fortress—along with the Phase RG-3 gate complex—characterizes one of the final attempts by the Egyptians to project power at the site prior to the collapse of the New Kingdom empire. After Phase LT-6, there is no evidence in the Lion Temple area for the continued production of Egyptian-style ceramics, the expression of foodways from the Egyptian tradition, or any evidence generally for identification using elements of Egyptian culture. As with the Ramesses gate area, these elements seem to have been intrinsically tied to the presence of the garrison, the dissolution of which causing them to vanish from daily life at Jaffa.

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[348] In **Plan A74-010**, Kaplan notes that the dimensions of the bricks within **Wall 3014** are 44 x 20 x 13 cm. In comparison, the Phase RG-3b bricks were 44 x 20 x 12 cm (Burke, Peilstöcker, et al. 2017, 113), a slight margin of error with respect to height that is altogether acceptable given the known variability that can occur in mudbrick height (see Kemp 2000, 84–85). The color in both cases consists of dark, ashy material, likely indicating the use of ashy debris in the manufacture of the bricks (see Burke, Peilstöcker, et al. 2017, 113).

[349] **Locus 12047** equates with Layer 11 in Kaplan's section drawing from **Plan A72-001a**.

8.2.7.1 Qualitative Discussion of the Phase LT-6 Assemblage

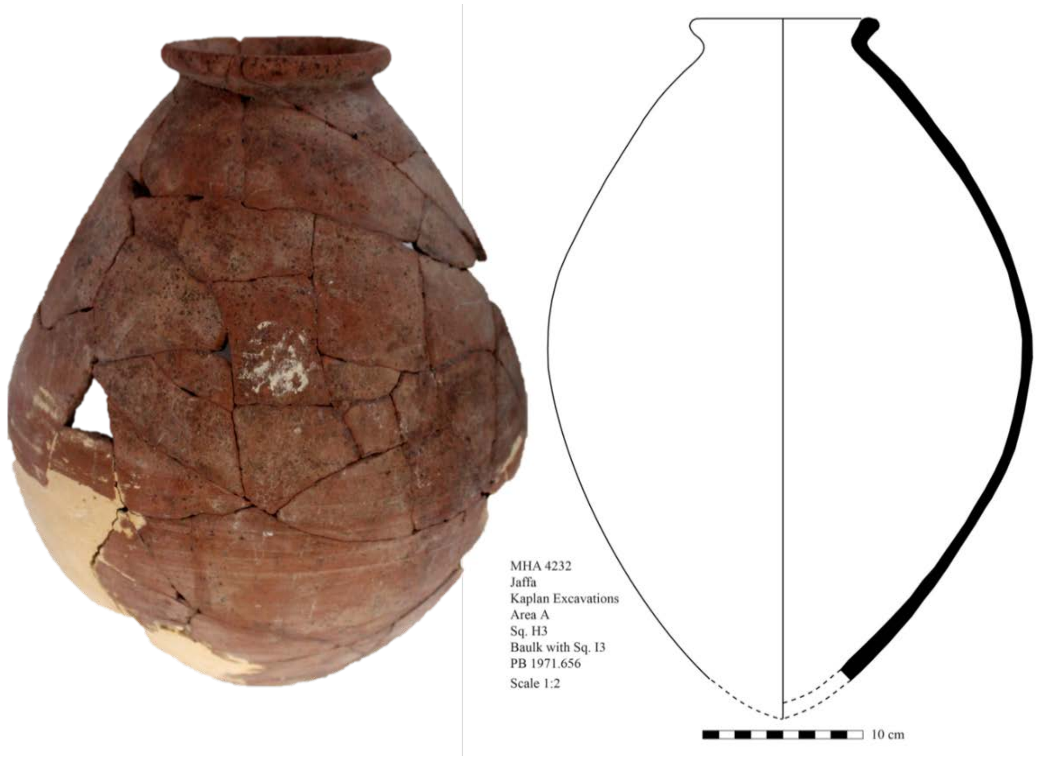


Figure 57: A near-complete Egyptian-style type JR2b jar found in a fill southeast of the ruined Phase LT-6 fortress (**Photo MHA_4232o**, drawing **DR-MHA_4232**).

As previously mentioned, no floors or occupational debris could be associated with the Phase LT-6 assemblage. One find merits discussion, however, given its probable origins within Phase LT-6. In the one of the fills (**Locus 12048**) covering over and extending to the west of the Phase LT-6 fortress, Kaplan recovered a smashed Egyptian-style type JR2b jar (**MHA 4232**), suggesting the primary deposition of rubbish in this area not long after the fortress went out of use. There is no evidence to suggest the continuity of the Egyptian-style ceramics industry after the fall of the Phase RG-3a gate complex, and therefore it is possible that this vessel represents the opportunistic reuse of an Egyptian-style jar at some point after the end of the fortress. Despite the poor stratigraphic integrity of its findspot, it offers the only evidence for locally manufactured Egyptian-style closed forms from the last stage of the garrison from any area excavated at Jaffa.

8.2.8 Phase LT-5: The Iron Age

Phase LT-5 is only discussed here as it comments on the end of the Egyptian occupation at the site. It comprises both the fills that cover over the preceding Phase LT-6 fortress that indicate its disuse, as well as several pits that cut into the fortress. Resettlement occurred after the abandonment of the site by the Egyptian garrison, as the first ceramics associated with stratified anthropogenic contexts in the Lion Temple area come from the Iron Age IB Philistine 3 tradition, falling largely into forms common to the 11th century BCE. These are only attested in small quantities at the bottom of various pits, which is the case for almost all Iron Age ceramics thereafter. The presence of Philistine ceramics in these new levels however does not imply that they were the culprits behind the destruction of the Egyptian garrison. This has already been addressed elsewhere with respect to the Ramesses Gate complex (Burke, Peilstöcker, et al. 2017, 127–28), and that same picture is reflected in the Lion Temple. There is nothing stratigraphically to suggest a Philistine city being built on the ashes of Egyptian Jaffa, nor anything to suggest Philistine agency behind the destruction of the site. The appearance of Philistine ceramics in Phase LT-5 is interpreted as a later, opportunistic settlement at an advantageously located but likely abandoned site.

8.3 Discussion: Diachronic Patterns in the Use and Appreciation of Foodways Ceramics in the Lion Temple Area

While the Ramesses Gate complex offers detailed windows into the bookends of Egyptian rule with its Late Bronze Age IB garrison kitchen and the Late Bronze Age IIB – Late Bronze Age III phases of the gate, the Lion Temple area clarifies the periods in between by offering multiple phases of the Late Bronze Age IB and then a major exposure of the Late Bronze Age IIA. The nature of Kaplan's excavations meant that the earliest phases received more limited exposures, but the broad exposure of Phase LT-8 offers the only clear picture of the Late Bronze Age IIA at Jaffa. Prior to this analysis, the little that could be said of Jaffa during the Late Bronze Age IIA stemmed from the contemporary Amarna archive, which indicated that the site hosted a granary and likely served as a seat of imperial administration.[350] This section reviews the diachronic patterns related to the use and appreciation of foodways ceramics at Jaffa following the same format as Section 7.3, exploring patterns more generally as well as across the functional categories of tableware, culinary wares, containers, and varia.

The first pattern is the simple proportion between Egyptian-type ceramics and Levantine ceramics. This has been the traditional metric for understanding the degree of "Egyptianization" at Late Bronze Age sites throughout the southern Levant and has become a fixture within Levantine archaeological reports (see Damm Forthcoming a).[351] However, these proportions can only serve as a starting point, as they are subject to a variety of variables that affect their utility for discussing socially meaningful patterns.

[350] Jaffa is referred to as hosting a "granary of the king" in EA 294 and Rib-Hadda, ruler of Byblos, mentions being told to report to Jaffa and meet with an Egyptian official in EA 138 (Moran 1992).

[351] This is not unique to the Late Bronze Age. It has long been the preferred method for discussing the contact between different cultural groups in the southern Levant. This includes the movement of Early Transcaucasian Ware (ETC) in the 3rd millennium BCE (Batiuk 2013), the migration of the Sea Peoples (Yasur-Landau 2010), and the presence of ethnic Greeks in the late Iron Age at Meṣad Hashavyahu (Fantalkin 2001).

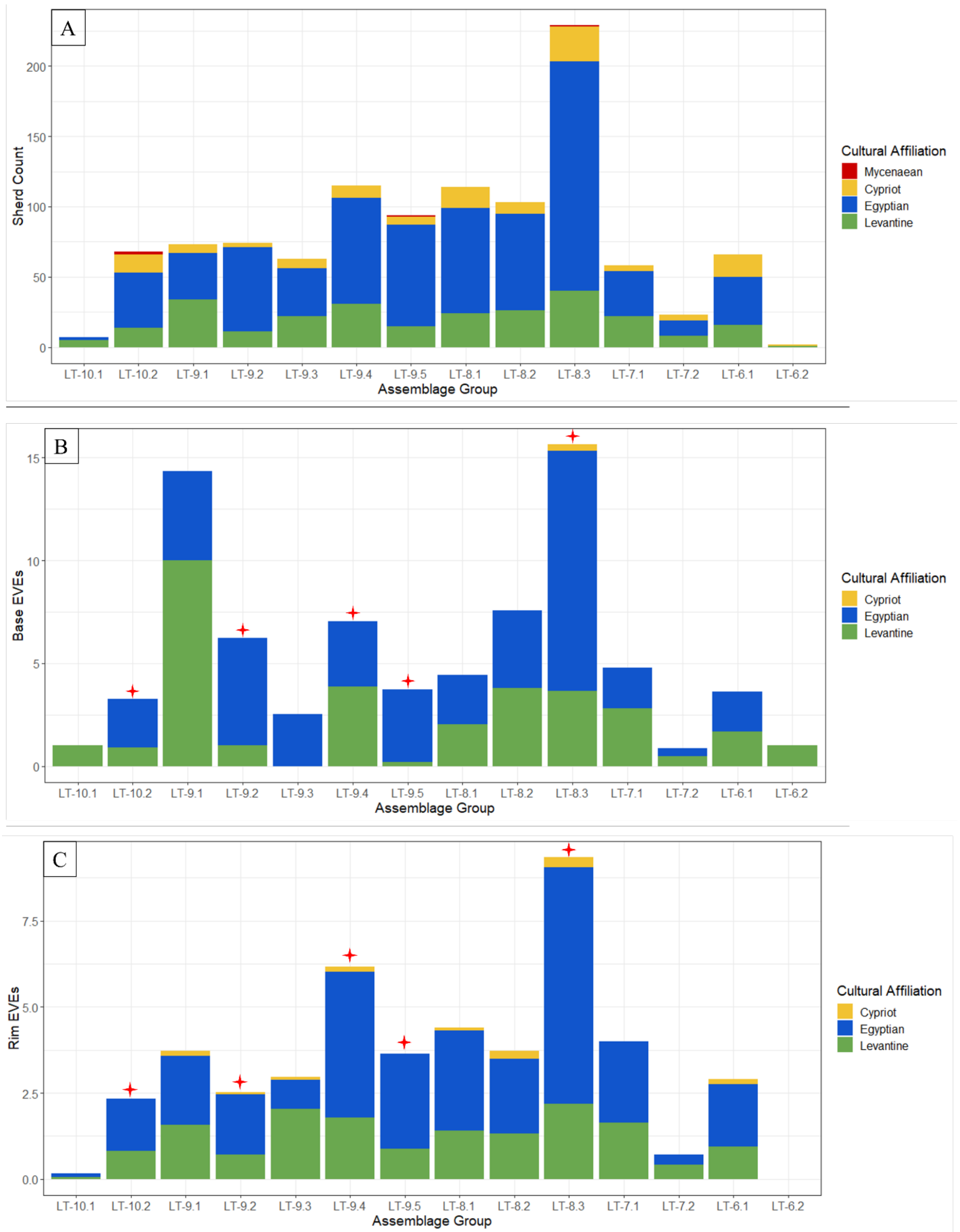


Figure 58: Proportional breakdown of assemblage groups by cultural affiliation using A) raw sherd count, B) base EVEs, and C) rim EVEs. Red stars mark floors and occupational debris.

The proportional breakdown of ceramics by cultural affiliation is demonstrated with a stacked bar graph, allowing for a comparison of the size of each assemblage group while simultaneously illustrating the proportional breakdown within them (see Figure 58). In this figure, sherds exhibiting hybrid characteristics are not separated from the cultural affiliation to which they are most strongly associated (e.g., type RB2 with the Levantine tradition), as their rarity would produce visual clutter of little analytical utility.[352] Instead, they are discussed individually where relevant. The three graphs within Figure 58 provide a different mode of proportional quantification: raw sherd count, base EVE, and rim EVE. All three quantification methods are presented as each variably accounts for certain biases. This is immediately visible in Figure 58 with the disappearance of Mycenaean fragments from both modes of EVE quantification, since Mycenaean vessels are only attested as body sherds. Within this section, I discuss all assemblage groups, both occupational and otherwise, with Chapter 9 focusing solely on occupational material.

As can be seen from Figure 58, there is proportional congruity across all quantification methods, with discrepancies found only in the base EVEs of assemblage groups LT-9.1, LT-9.3, and LT-9.5. In these three cases, the proportion from base EVEs contrasts with that of raw counts and rim EVEs. Even with this discrepancy, a clear pattern is apparent. Leaving aside assemblage groups LT-10.1 and LT-6.2 due to their small size, there is either a parity between the frequency of Levantine and Egyptian-type ceramics or a majority of Egyptian-type ceramics for every phase thereafter. Furthermore, in the earliest Late Bronze Age IB occupational stratum, assemblage group LT-10.2, there are already at least five distinct types present from the locally

[352] From the entire assemblage (n = 1,300), only 13 sherds could be classified as coming from vessels that exhibit hybrid characteristics. All are traditional Levantine forms produced with techniques from the Egyptian tradition.

produced Egyptian-style tradition (types BL1a, BL1b, BL3, FP, and JR). Consequently, from the beginning of the Egyptian garrison at Jaffa, the Egyptian-style ceramic industry is not only present, but it also already supplied a diverse package of forms. This is extraordinary compared to other contemporary sites, where Egyptian-style forms only occupy a marginal position within the assemblage.[353] Given the similar picture from the Level VI Late garrison kitchen (see Section 7.2.1), Jaffa is singular among well-studied Egyptian imperial centers for the frequency of Egyptian-style ceramics in the Late Bronze Age IB. Even if we disassociate the coherence and high frequency of the locally manufactured Egyptian-style ceramics from the presence of Egyptians, there was clearly an intense, early investment at Jaffa enabling practices associated with Egyptian foodways. The sudden appearance and complexity of the Egyptian-style ceramics industry, however, likely attests to the early, direct occupation of a coastal harbor site by Egyptian personnel not long after Thutmose III's conquest at Megiddo in 1460 BCE.

[353] The highest proportion achieved by Egyptian-style ceramics at a Late Bronze Age IB site after Jaffa is Stratum XI at Tel Sera', where they occupy at most 10% of the assemblage (Martin 2011b, 223). This is followed by stratum R-1b at Beth Shean, where they comprise 4% of the overall assemblage (Mullins 2007, 442). At other sites, even those with extremely large Egyptian-style assemblages from the later Late Bronze Age IIB, only a handful of vessels are attested during the Late Bronze Age IB. This pattern can be seen at Tel Aphek stratum X-14 (Martin, Gadot, and Goren 2009), Tel Mor stratum IX (Martin and Barako 2007, 149), and Tel Michal (Negbi 1989, Fig. 5.7:14).

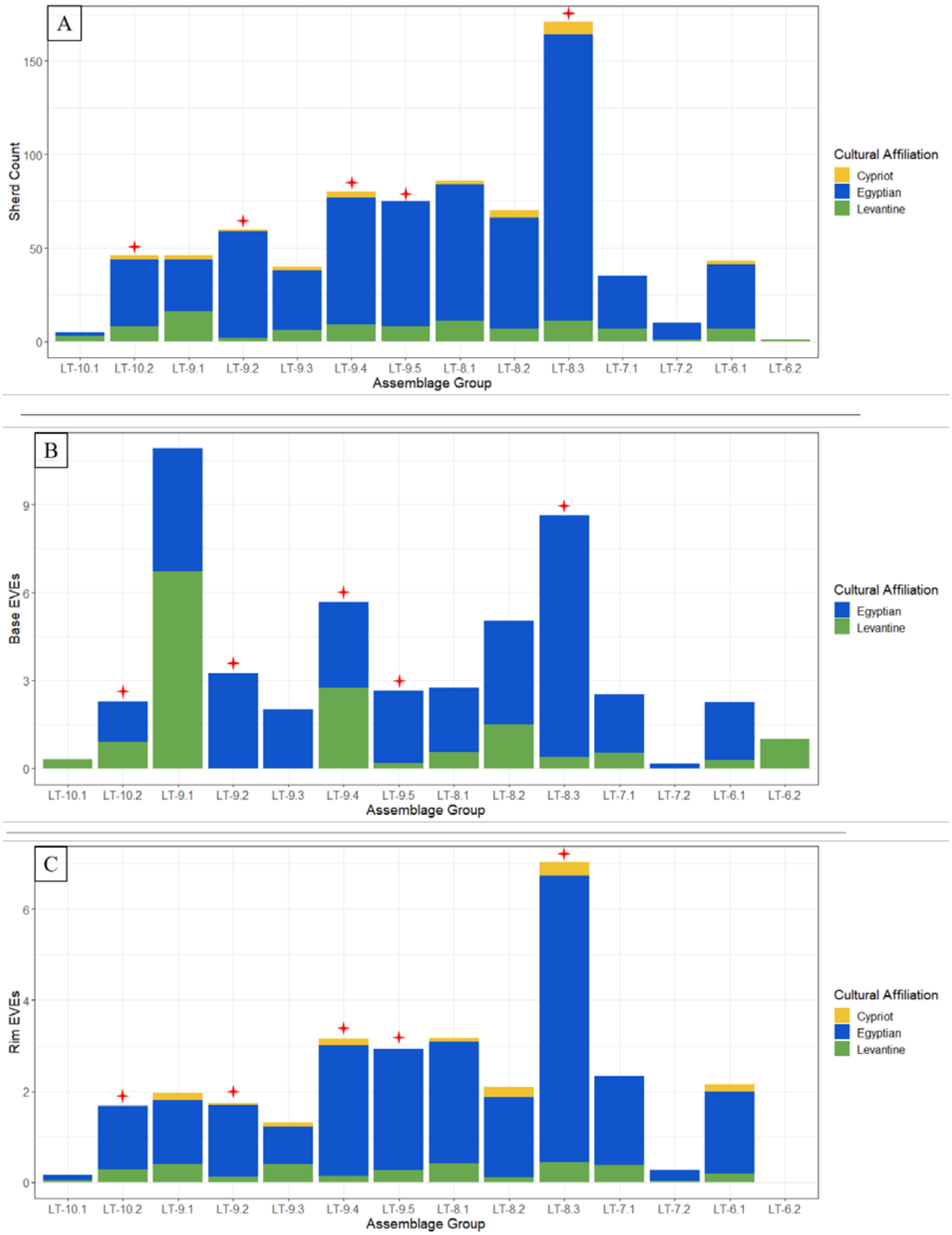


Figure 59: Proportional breakdown of tableware by cultural affiliation, as shown with A) raw sherd count, B) base EVEs, and C) rim EVEs. Red stars mark floors and occupational debris.

Since assemblage-level proportions are subject to an array of variables, diachronic patterning must be revisited within narrower functional categories. Tableware, the dominant class of vessel in all assemblage groups, is addressed first. Figure 59 shows the cultural affiliation of tableware forms across three metrics: raw sherd count, base EVE, and rim EVE. Notably, imported Mycenaean sherds are absent from the tableware assemblage. All the body sherds from Mycenaean vessels found in the Lion Temple area bear decoration and surface finishes on the outer wall, suggesting closed forms. Imported Cypriot forms are present in the raw sherd count and the rim EVE calculations; however, no vessel bases were recovered and therefore they do not register a base EVE count. Sherds from both of these families are best interpreted with respect to their presence, and therefore it can be argued that they are a regular feature in all phases prior to the cessation of the classic Late Bronze Age Cypriot ceramic trade in the 12th century BCE (A. Sherratt and Sherratt 1991, 373–75). The absence of Cypriot sherds by Phase LT-7 assemblage potentially indicates the cessation of this trade. Regardless, since Phase LT-6 must postdate the destruction of the Phase RG-4a gate (c. 1135 BCE) any Cypriot sherds that are present there must be residual. The relatively sparse distribution of Cypriot tableware is curious at a port like Jaffa, though it seems most likely we have simply not discovered their primary locus of consumption and/or disposal. This is supported by Kaplan's discovery of a pit filled with Cypriot vessels in the Ramesses Gate area as well as tombs in the vicinity of Jaffa that contained substantial quantities of Cypriot ceramics, such as the Ganor Compound burials (see Peilstöcker 2011a).[354] Even still, Cypriot tableware must be regarded as a conspicuously foreign element available to the people of Jaffa, though never adopted in

[354] Additionally, the sporadic Late Bronze Age exposures in Kaplan's Area Y produced more than a quarter of all of the Cypriot forms found at Jaffa thus far (Ben-Marzouk and Karoll Forthcoming; Yannai Forthcoming). My thanks to the authors for allowing me to see preliminary versions of their reports.

sufficient quantities to suggest it played a prominent role in identification compared to either Egyptian-style or Levantine forms.

When discussing tableware preferences at Jaffa, the consumer choice was, therefore, almost entirely between locally produced Egyptian-style or Levantine traditions. Regardless of assemblage size, the pattern is consistent in that Egyptian-style tableware is always the majority. The only exceptions are in base EVE calculations, where there is relative parity between Levantine and Egyptian-style forms in assemblage groups LT-9.1 and LT-9.4—the former a series of construction fills and the latter occupational debris. In assemblage group LT-9.4, however, a third of the EVEs for Levantine-style bowl bases come from the hybridized generic type RB2, which is morphologically Levantine but adapts Egyptian manufacturing technologies. Also, despite the Levantine majority for bowl bases in assemblage group LT-9.1, there is an unusually high quantity of bowl bases in relation to rims, at a rate of nearly six to one, suggesting atypical depositional processes.[355] Apart from these two groups, Egyptian-style tableware was definitively favored in this area of the site throughout the imperial period. Levantine forms are a constant presence, but their consistently low frequency implies that they were substantially less common.

[355] In this assemblage group, there were 10.925 bowl base EVEs in comparison to 1.835 bowl rim EVEs.

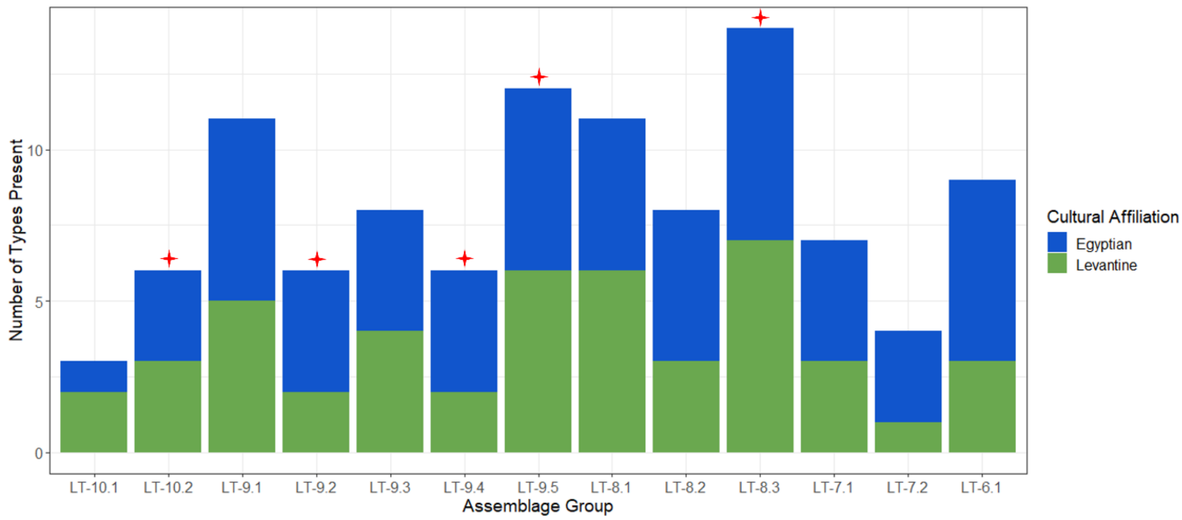


Figure 60: Figure depicting the number of Levantine and Egyptian tableware types present in each assemblage group. Red stars mark floors and occupational debris.

The simple proportion of Egyptian-style to Levantine tableware can be clarified with the number of differentiable tableware types present per assemblage group, which reveals a roughly consistent parity of types through time (see Figure 59).[356] The Egyptian-style table service reaches its fullest expression by Phase LT-9, and this collection of forms comprises the relatively stable array of types throughout the imperial period. These are the simple bowl with plain rim in two sizes (types BL1a/b), a shallow bowl (types BL2/3), and large communal serving form (types BL5a/b/c). Due to the low frequency of Levantine forms, it is unclear if the array of types seen in each phase comprises similar elements of an alternative Levantine table service, though the mixed presence of different size groups suggests the possibility. Regardless, the rough parity in the number of tableware types from either tradition that are present holds true for most of the phases with clear occupational debris excepting assemblage groups LT-9.2 and LT-9.4. Since the former is the first occupational layer post-dating the destruction evidenced in Phase LT-10 and

[356] This excludes base types since they associate with a variety of rim morphologies (types BL, RB, and DB).

the latter a renewal of floors not long after, it is possible that the popularity of Levantine forms fell following the destruction episode (see also Figure 59).

Tableware decoration offers a conspicuous mode of symbolic communication, and while tableware is generally used in domestic settings and not necessarily in the public gaze, the prospect of shared meals and feasting events can make the private eminently public (Vroom 2000; Mills 2007). Recalling isochrestism (see Chapter 2), tableware decoration is not functional in the mechanistic sense, but rather falls into realm of symbolic modes of communication for group affiliation, status, or aesthetics, though ephemeral functions such as apotropaic protections must also be considered. These aspects are not mutually exclusive nor exhaustive; it is enough to say the act of decorating was both symbolically charged and highly conspicuous. It is therefore significant that decorated tableware from the Levantine tradition is extraordinarily rare in the Lion Temple area. Below, Figure 61 compares of the proportion of decorated sherds between Levantine and Egyptian-style bowls by raw sherd count.

Figure 61: Proportion of decorated to undecorated sherds within the A) Egyptian-style and B) Levantine tableware traditions. Red stars mark floors and occupational debris.

As can be seen in Figure 61, not only is decorated Levantine tableware rare in comparison to decorated Egyptian-style tableware, but it is also disproportionately rare in comparison to undecorated Levantine tableware despite the richness of indigenous Levantine decorative traditions (see Sugimoto 2012; Choi 2016). Only a few excavations have published the proportion of decorated to undecorated Levantine tableware, but from these figures it seems that Jaffa is not unusual in comparison to other southern coastal sites.[357] Northern sites however, even Egyptian centers such as Beth Shean, tend to have a much higher frequency of decorated tableware from the Levantine tradition.[358] Consequently, it seems that at Jaffa, or at least in explored contexts thus far, the rarity of decorated Levantine tableware is at least partially a regional phenomenon, which might be further exacerbated by the low desirability of conspicuously Levantine motifs. If the Levantine table service was the inferior option to its Egyptian-style counterpart, then decorated Levantine forms seem to have been even less desirable. Interestingly, of the 10 Levantine tableware sherds with traces of decoration, six are decorated with a red-painted rim, a style which was analogous to the Egyptian-style lipstick rim. Therefore, it is possible that these Levantine vessels were more acceptable due to their greater congruity with the Egyptian-style tableware tradition.

[357] Among sites that did not publish metrics, Tel Aphek, Ashdod, and Tel Mor are the most relevant. At Tel Aphek, decoration is uncommon but a wide variety of styles are present, including geometric decorations paired with metopes on the exterior of kraters (Gadot 2009b, Fig. 8.64.3), paired wavy and straight lines across the interior of bowls (Gadot 2009b, Fig. 8.53.6), as well as the decorated biconic krater (Gadot 2009b, Fig. 8.33.11). At Ashdod we see exterior painted lines on bowls (M. Dothan and Porath 1993, Fig. 8.9), elaborate cross-hatch decoration on kraters (M. Dothan and Porath 1993, Fig. 8.15), and a variety of other figural and geometric motifs (Ben-Shlomo 2005, Fig. 3.1). The situation at Tel Mor corresponds to Ashdod (Barako 2007a, 69). The one major exception seems to be Tel Michal to the north of Jaffa, where a wide array of decorated forms and different motifs from the Levantine tradition—including figural painting—are attested on tableware (O. Negbi 1989, fig. 5.8-5.9).

[358] For instance, at Late Bronze Age IB Beth Shean in Area R, 12.0% of bowls (n = 469), 32.4% of goblets (n = 12), 19.7% of kraters (n = 274), and 76.2% of biconic kraters (n = 32) bore decoration (Mullins 2007, 395, Table 5.3).

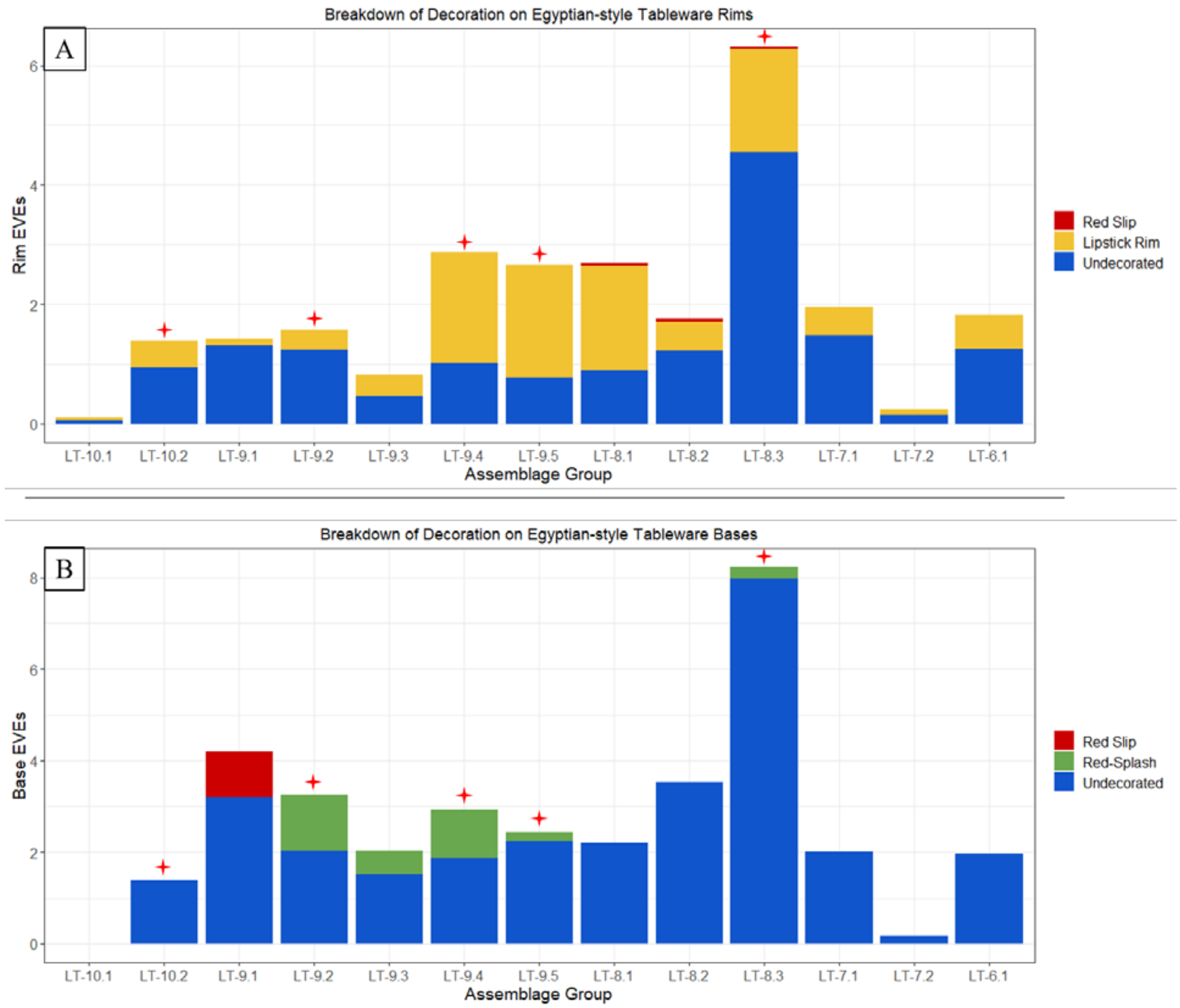


Figure 62: Proportional comparison of Egyptian-style bowl decorative styles using both A) rim EVEs and B) base EVEs. Red stars mark floors and occupational debris.

Further information can be gleaned from focusing just on decorated tableware within the Egyptian-style tradition, given that it provides the largest overall dataset for diachronic study. For this, base and rim EVEs must be addressed separately since the bulk of the sample comes from fragments. In short, red-splash decoration can only be identified on the interior bottom of a bowl and the lipstick rim can only be identified on rim fragments (see Figure 62). The first notable pattern is the rarity of bowls decorated with a red slip, an unsurprising outcome since red-slipped Egyptian-style bowls are better attested at more northern sites such as Beth Shean, Tell es-Saʿidiyeh, Megiddo, Tell Abu Hawam, Tel Dan, and Hazor (Martin 2011b, 119–20). At

Jaffa, it is mostly known from the type BL *varia* bowls, which seem to go out of use early in the Late Bronze Age IB, either by or just before Phase LT-9 since they are only present in the fills of that phase (assemblage group LT-9.1). Given the C14 date from Phase LT-10, this would place this type going out of use in the early mid-18th Dynasty at Jaffa, which matches their popularity in Egypt and at Tel Sera', the only other southern Levantine site where they occur (Martin 2011b, 50). Similarly, the red-splash decorated bowl disappears from Jaffa by Phase LT-9 at the latest, though it likely peaked earlier in that phase given its lower abundance in the last lamination of Phase LT-9 floors (assemblage group LT-9.5). This closely follows the pattern known from Egypt, where red-splash decoration went out of use during the reign of Amenhotep II (1427-1400 BCE) (Aston 2006). The floors associated with assemblage group LT-9.4—where red-splash decorated bowls are common—produced a C14 sample with a dated range of 1440-1387 BCE (86.0%), which corresponds closely with the expected chronology. Therefore, these two decorative types at Jaffa almost perfectly follow their chronological distribution in Egypt, suggesting little to no provincial lag in the popularity of Egyptian decorative styles at Jaffa. It seems that there were a relatively steady series of inputs from the Egyptian core into the ceramic industry and consumption patterns at Jaffa, either through the cycling of itinerant potters or through closely maintained communication networks that kept the garrison current with the changing fashions in Egypt.

Another important pattern is the distribution of the red lipstick rim on Egyptian-style bowls through time. In Egypt, this mode of decoration gradually increases in popularity from the reign of Thutmose III (1479-1425 BCE) to the Third Intermediate Period (1069-664 BCE) where it reaches its peak, a pattern that is largely mirrored in the southern Levant until the Late Bronze Age III cessation in the local production of Egyptian-style ceramics (Martin 2011b, 119). This pattern is so extreme in the southern Levant that by the Late Bronze Age III strata S-4 and S-3 in Area S at Beth Shean, lipstick rims are found on 88% of type BL1-3 bowls (Martin 2009c, 441, Fig. 6.2). Curiously, Jaffa exhibits the opposite pattern. While lipstick rimmed bowls are present at the site from the earliest phases of the Egyptian occupation until the end, they peak during phases LT-9 and LT-8 in the Lion Temple area, corresponding with the final stages of the Late Bronze Age IB and the Late Bronze Age IIA. While the Late Bronze Age IIB is poorly understood with respect to its assemblage, the more coherent assemblages from the Late Bronze Age III in the Ramesses Gate also showcase a lower popularity for this style (see Chapter 7).

In contrast to tableware, patterns in the distribution of culinary ceramics are more difficult to assess given generally low frequency of this functional group in the Lion Temple area. They are only attested as fragments, and it is only in the rarest instance that they occupy more than 5% of the assemblage by raw sherd count. Even in those cases, this only occurs for the Levantine triangle rim cookpot (type CP1) and the Egyptian-style flowerpot (type FP).[359] It is, therefore, more useful to examine culinary forms with respect to presence rather than their frequency. Cooking pots from the Levantine tradition (types CP1, CP2, and CP4), are found in all assemblage groups but two, and the two in question—assemblage groups LT-10.1 and LT-6.2—only produced nine sherds between them. From what is present, it seems that the Levantine cookpot tradition provided the only possibility for cooking over a (in)direct heat. There are Egyptian types that satisfy this purpose, namely the carinated bowls (type BL6), the necked globular jars (type JR5), and a poorly understood form of baggy jar known from terminal Late

[359] Both forms are unusually dense in assemblage group LT-7.2, which can be disregarded as significant since that assemblage only comprises 23 sherds total. Type CP1 cookpots do achieve this frequency in assemblage group LT-9.4 and likewise flowerpots in assemblage group LT-8.2, which comprise 115 and 103 objects, respectively.

Bronze Age and early Iron Age I sites in the southern Levant.[360] None of these types are present at Jaffa, and, generally speaking, they are rare to nonexistent at most sites in the southern Levant—including those that clearly hosted Egyptian personnel (Martin 2011b, 251–52). Regardless of the overall frequency of Egyptian-style pottery within a phase, the bulk of cooking occurred in local Levantine vessels, a pattern which is analogous to what is known from the Nubian sector of the New Kingdom empire (S. T. Smith 2003a). Therefore, while it might have been important at Jaffa to eat like an Egyptian at the table, the practice of cooking was mostly derived from the Levantine sphere of practice.

Vessels lacking Levantine analogues are the only exception to the rarity of Egyptian-style culinary forms. Specialized forms that existed only within the Egyptian sphere of practice were reproduced locally in the southern Levant, including the so-called firedogs, bread molds, flowerpots (type FP), and beer jars (type BB). Of these, the first two are exceedingly rare and not present in the Lion Temple area, therefore they will not be discussed here.[361] The latter two are attested in both the Lion Temple and Ramesses Gate areas at Jaffa, with flowerpots being common enough to remain a frequent residual find well after they went out of use. Flowerpots fell from popularity during the late 18th Dynasty in Egypt and were replaced by the beer jar, which is morphologically different but maintains characteristic elements such as the perforated base, deep finger impressions, and overall coarse character. Regardless of whether the functional

[360] The carinated bowl is rare in the southern Levant, known from only two examples at Late Bronze Age IIB Beth Shean—neither of which seem to have been used for cooking (Martin 2011b, 44). In Egypt, where the form is ubiquitous, most examples exhibit clear use alteration patterns consistent with (in)direct heat cooking (Hope 1989, 54; Aston 1998, 170; 1999, 15). Globular jars are slightly more common in the southern Levant, though only three examples from Tel Seraʿ were demonstrably used for cooking and the remained seem to have been storage vessels (Martin 2011b, 63). Finally, the ambiguous baggy shaped vessel is an unusual form known only in high quantities from Tel Dan in the Iron Age I (Ilan 2019), a curious development considering the general rarity of Egyptian-style ceramics at Dan throughout the Late Bronze Age (see Ben-Dov and Martin 2011).

[361] Both are known only from Beth Shean (James and McGovern 1993a, I:187), though the bread mold identification is disputed (Martin 2011b, 89; Oren 2019, 285).

equivalency between the two types is warranted, this chronological pattern is also evident at Jaffa, with the beer jar first appearing in the Late Bronze Age IIA contexts.[362] However, the beer jar is surprisingly rare in the Lion Temple area, especially considering the frequency of the form at other Egyptian centers such as Beth Shean.[363] While their rarity at Jaffa is unusual, the rarity of culinary forms from either the Levantine or Egyptian-style tradition suggests that the issue is likely contextual. Considering the large cache of flowerpots in the Level VI Late garrison kitchen (see Section 7.2.1), their low frequency in the Lion Temple area belies a much higher quantity of vessels in use at the site in antiquity. For the time being, it is therefore safe to say that their presence is indicative of two important spheres of Egyptian practice—the knowledge to produce and utilize such forms and the desire to consume their specialized product.

Container forms are better attested than culinary forms, and given the common association between Egyptian-style containers and Egyptian ethnicity (e.g., Martin 2011b, 51), it is worthwhile to consider this functional group closely. Below, Figure 63 compares the frequency of Egyptian-style and Levantine container forms diachronically across raw counts, base EVEs, and rim EVEs. Cypriot container forms have been excluded from this graphic since they are only clearly attested by two sherds, with their rarity being unsurprising given that the primary context for their recovery is generally tombs (Bergoffen 1991). Since they are excluded however, a stacked bar graph is no longer the appropriate means of data visualization, with quantities instead being displayed side-by-side.

[362] The first example appears in assemblage group LT-8.2, in a fill beneath the Lion Temple.

[363] At Late Bronze Age IIB Beth Shean they comprised 7% of the overall assemblage in stratum S-5, and 3% in both strata S-4 and S-3 (Martin 2009c, 448).

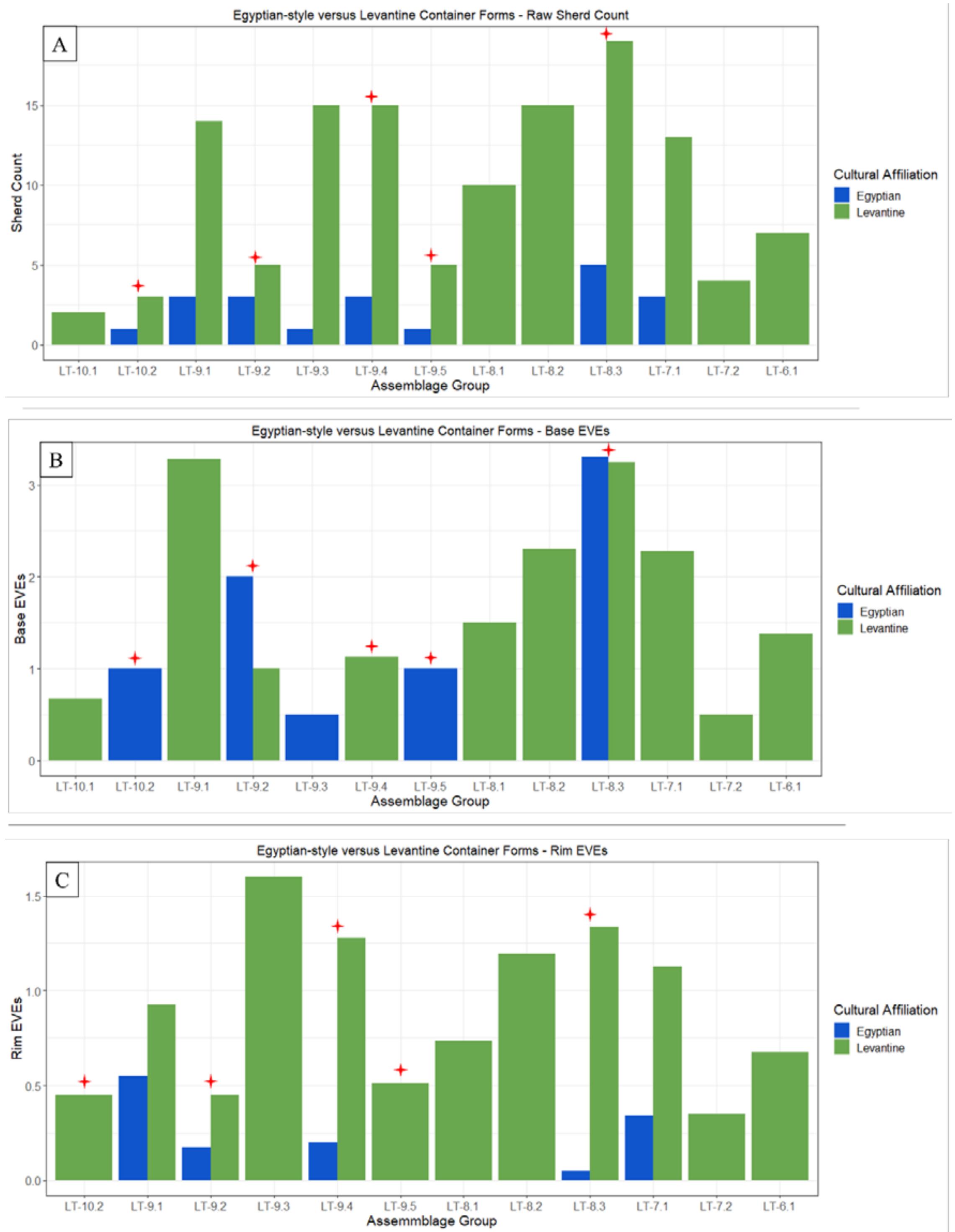


Figure 63: Comparison of the relative quantities of container forms from either the Levantine or Egyptian tradition across assemblage groups using A) raw sherd count, B) base EVEs, and C) rim EVES. Red stars mark floors and occupational debris.

As seen in Figure 63, Levantine forms consistently dominate the container assemblage except for base EVEs in assemblage groups LT-10.2, LT-9.2, LT-9.3, LT-9.5, and LT-8.3. This is almost entirely the result of the dominance of the so-called Canaanite store jar (type SJ), which is second to only Egyptian-style simple bowls in all phases. This problem was addressed in Section 7.3, though it raises an important question regarding the cultural implications for the container assemblage. When considering the breakdown within a functional group, the importance is not just with respect to the quantity of the forms themselves, but also the practices with which they can be associated. While the Canaanite store jar is the dominant medium-to-large storage jar form within the Levantine ceramic tradition, it is also the principle maritime transport container (MTC) for the entire region with production centers in the northern and southern Levant and findspots throughout the entire Mediterranean (Raban 1980; Knapp and Demesticha 2017, 46–66). Its high frequency at a port site is unsurprising (Knapp and Demesticha 2017, 55), as it likely would have been a major component of incoming and outgoing cargoes. Therefore, while the choice of Egyptian-style over Levantine container vessels would have likely been a culturally significant one due to the logistical effort required to reproduce a foreign container form locally, the selection of Canaanite store jars need not have been. It is crucial to note that of the assemblage groups where the majority of base EVEs are from the Egyptian-style tradition, four stem from occupational debris. This is highly suggestive that in these spaces Egyptian container forms were far more common than the raw sherd count and rim EVEs suggest. In short, despite the relatively low frequency of Egyptian-style jars at Jaffa through time, the quantity that was found indicates an appreciable amount of effort was exerted to feed the demand for low-prestige container forms that followed an Egyptian template. Notably, the demand for Egyptian-style vessels was wholly met by manufacturing in the southern Levant, with large storage forms from the Egyptian-type tradition almost exclusively being attested in local fabrics—included highly specialized vessels such as the *zīr* (type JR10).

Container forms were imported from Egypt, but nothing suggests that the intent was to supply the vessels themselves. In all cases, the contents of the containers seem to have been the desired product—specialty products that likely were otherwise unavailable locally. It is for this reason that Martin was inclined to disassociate imported Egyptian forms from any specifically Egyptian cultural practice (Martin 2011b, 253). I would disagree partially, but only in the case of imported foodstuffs for which there is no reason to assume a strong Levantine demand.

The final functional group that I examined is the varia category, which in the Lion Temple area encompasses Levantine lamps (type LM) and pot stands (type PS)—the latter almost certainly being related to the Egyptian-style ceramics tradition. Neither are common, with nine fragments of lamps and two fragments from pot stands known in the entire excavation area. Lamps are of interest simply because they lack a true counterpart in the Egyptian ceramic tradition, which made use of bowls and reused broken ceramics rather than a devoted ceramic form for this function (see Martin 2011b, 259 and citations there). Consequently, their presence is a manifestation of an explicitly Levantine practice within a predominantly Egyptian-style assemblage. While this has little to do with foodways, it shows the blending of various cultural templates within complex activity areas. Pot stands on the other hand are related to foodways, and while they certainly became more common within the Levantine cultural sphere during the Late Bronze Age, their presence was an explicit necessity to support round-bottomed forms from the Egyptian-style jar family and likely should be related to Egyptian practices given there generally high frequency at New Kingdom Egyptian sites (Mullins and Yannai 2019, 168). While it cannot be said definitively, their presence in the Lion Temple area should be interpreted as an extension of a domestic kit inspired by the Egyptian tradition.

8.4 Conclusions

The assemblage from the Lion Temple area offers a remarkable window into the earliest period of Egyptian occupation at Late Bronze Age IB Jaffa, and the only insight to date into Egyptian rule during the Late Bronze Age IIA/Amarna era at the site. The picture that emerges is one wherein locally produced Egyptian-style forms dominated the tableware assemblage, augmented the Levantine culinary assemblage, and existed in competition with the Levantine container assemblage. This implies a cultural contact scenario wherein the ideal table service was in alignment with the Egyptian habitus, though the accoutrement and activities within the kitchen were a mixture of various cultural practices. Neither Egyptian nor Levantine foodways manifested in a "pure" sense, but rather the entire process of food became a combination of both traditions. Unfortunately, the picture from the Late Bronze Age IIB and Late Bronze Age III is less clear, so it is impossible to say what conditions persisted in this area towards the end of Egyptian rule. Clarification requires the incorporation of the assemblage from the Ramesses Gate area, which will be examined alongside the Lion Temple area in the following chapter. As will be shown, the two assemblages are congruent in the Late Bronze Age IB. However, the unique picture of the Late Bronze Age IIA in the Lion Temple excavation area bridges the crucial gap between the beginning and end of Egyptian rule at Jaffa. As the separate investigation of each area has shown, the variable adaptation of Egyptian and Levantine foodways points towards dynamic identification practices that made use of the inputs from several communities of practice, producing something altogether novel in the colonial interaction sphere.

Chapter 9 – Conclusion: Foodways, Practice, and Identities at New Kingdom Jaffa

The use of foodways—through the study of staple foods such as grain and legumes as well as the study of culinary ceramics and tableware—enables the evaluation of Egypto-Levantine interaction during the New Kingdom imperial period through practice-based approaches. Data pertaining to foodways is ubiquitous within archaeology, but a practice-based approach to foodways requires more than the constituent elements that comprise foodways. Andrew Sherratt once remarked that "we do not eat species, we eat meals" (A. Sherratt 1991, 50). Similarly, Claude Lévi-Strauss noted that "nothing is simply cooked, but must be cooked in one fashion or another" (Lévi-Strauss 1966, 587). In short, raw ingredients only become food through cultural intervention (Fischler 1988, 284; Hastorf 2017, 2). Consequently, to think our way through the potential relationship between foodways and identification in the ancient world requires an iterative approach, building our interpretations from the lowest level of practice and its material correlates through progressively higher levels of social signification. But articulating the saliency of practices for identification requires a demonstration of how they might have acquired social meaning or cultivated distinction along particularly charged boundaries. To this end, in this chapter I draw together the data from the preceding chapters, first providing a historical stage for interaction at Jaffa and then reconstructing communities of practice that are detectable within the garrison community. In turn, the final discussion will translate these practices into strategies of signification that might have manifested over the course of the tumultuous Egyptian occupation of the site. As will be shown, not only do foodways provide us with crucial information about social interactions at the garrison, but they also indicate how that community navigated the day-to-day contingencies of the imperial periphery.

9.1 Historicizing Foodways at Jaffa: Cross-Site Stratigraphy and Chronology

Thus far in this dissertation, I have largely treated strata at Jaffa as local contexts wherein practices occurred, leaving the historicization of diachronic patterns at the site undiscussed. Since the purpose of this chapter is to contextualize the manifestation of practices at Jaffa against the social conditions within which they occurred, I begin the discussion with a brief summation of the cross-site stratigraphy, which in turn is projected against broader historical developments within the Egyptian empire. This serves two purposes. First, the discussion of communities of practice at Jaffa within this chapter is based upon the total site assemblage from both the Ramesses Gate area and Lion Temple area, and therefore this constitutes the first instance in which these separate assemblages are discussed as one. Second, the absolute chronology synchronizing these levels is pivotal for understanding the various patterns in foodways attested at Jaffa.

Table 9 below provides a cross-site summary of the various strata discussed within this chapter, including a description of the termination of each phase.

LT Phase	RG Phase	Relative Period	Absolute Dates	Contextual Notes
LT-6	RG-3a /RG-3b	Late Bronze Age III	1135 – 1125 BCE	Phase RG-3a ends in violent destruction; Phase RG-3b ends in renovation; Phase LT-6 end is unclear
LT-7	RG-4a	Late Bronze Age IIB – Late Bronze Age III	1300 – 1135 BCE	Phase RG-4a ends in violent destruction; Phase LT-7 end is unclear
LT-8	RG-4b /Level V	Late Bronze Age IIA	1400-1300 BCE	Phase RG-4b end is unclear; Phase LT-8 end is unclear

LT Phase	RG Phase	Relative Period	Absolute Dates	Contextual Notes
LT-9	Level VI Late	LB IB	1460 – 1400 BCE	Phase LT-9 end is unclear, but several superimposed floors show evidence of destruction, Level IV Late ends in destruction
LT-10	?			Phase LT-10 potentially ends in destruction

Table 9: Correlation of the relative and absolute chronologies for the Lion Temple and Ramesses Gate areas.

The archaeological evidence for life at Jaffa indicates a dynamic colonial history over the course of the Egyptian occupation. The contemporaneity of strata has already been discussed in chapters 7 and 8, with the primary stratigraphic connection between the two areas being the architectural alignment of the Level VI Late garrison kitchen with the Phase LT-9 structures, as well as the architectural connections between the Phase RG-4a through RG-3a gates with the Phase LT-7 and LT-6 buttressed fortress. Neither Phase LT-10—where there is the earliest evidence for the Egyptian occupation—nor Phase LT-8—which currently constitutes our best evidence for the Late Bronze Age IIA at Jaffa—have corresponding levels in the Ramesses Gate area. Collectively, both areas provide insight into the duration of the Egyptian occupation at Jaffa across a wide variety of contexts—administrative, domestic, and ritual. Moreover, the multiple attested destructions constitute important disruptive events against which to examine the articulation of practice. Even if we are to refrain from associating certain destructions at Jaffa with episodes of violence (e.g., Phase LT-10), destructions of accidental or natural origin still represent major disruptions to the status quo. Numerous cases are attested from cultural contact situations where natural disasters caused by non-human agents ushered in particularly sensitive, even dangerous periods of identity negotiation, power structure reconsolidation, and reconfigurations of the middle ground.[364] Furthermore, events need not be destructive to constitute major disruptions of the status quo. Constructive events would have been equally disruptive, as might have occurred during the top-down reorganization of the site when the Phase RG-4a gate and LT-7 Fortress B were installed. Whether by the use of corvée labor, the extraction of taxes to pay for such efforts, or simply the disruption of daily life through the reconfiguration of space and the creation of new symbols of imperial domination, these projects could have had an equally profound effect on community dynamics at the garrison. Consequently, I will briefly contextualize these local developments against contemporary events in the Egyptian empire, which in turn will outline the subsequent discussion of communities of practice at Jaffa.

As has been noted several times, there is no evidence to necessitate a violent takeover of Jaffa by the Egyptians, with the site plausibly coming under Egyptian control after Thutmose III's victory at Megiddo in c. 1460 BCE (Burke, Peilstöcker, et al. 2017, 88).[365] Because Phase LT-10 and Phase LT-9/Level VI Late both date to the Late Bronze Age IB and showcase strong evidence for practices following an Egyptian model, it is likely that some sort of Egyptian control was imposed at the site not long after Thutmose III's victory.[366] The potential destruction

[364] Notable examples include the reconfiguration of power structures after the 1746 earthquake in Lima, Peru (Walker 2008), the confused restructuration of the middle ground after volcanic disasters and earthquakes in the Dutch East Indies (Schrikker 2016), and for a more recent example, policies for public administration and the "post-Katrina cultural rebirth" during the rebuilding of New Orleans (A. Gould 2007). Somewhat anecdotally, one might also cite the response to the 2016 accidental fire in the Al-Jazzar Mosque in Akko, Israel. First reactions from residents included the desire to stamp out the idea that it might have been a malicious attack, specifically to protect image of Akko as a bastion of Arab-Israeli relations (Shaalan and Raved 2016).

[365] Textual sources indicate that Egyptian control during this period was largely established through oaths of fealty (Redford 1992, 157–58), moreover, even if destructions are attested there is no need to associate them automatically with the Egyptian conquest (see Weinstein 1991; Hasel 1998; Burke 2008, 101).

[366] This supports the assertion that Jaffa was a *ḫtm*-base by this point, specifically meant to surveil, collect taxes, recover fugitives, and cache goods in support of the empire (Morris 2005, 138–39; contra Redford 2003, 255–57).

terminating Phase LT-10—with a *terminus post quem* of year 53 of Thutmose III's reign (1426 BCE)—and the destruction of Phase LT-9/Level VI Late—likely on the margin of the 15th/14th centuries BCE—suggest that the first decades of Egyptian control at Jaffa were far from stable.[367] Whether these destructions stemmed from local violence is unclear, though it would not be out of keeping with our current understanding of the Late Bronze Age IB. Frontier and proxy wars between Egypt and Mitanni resulted in instability throughout the Levant (Redford 2003, 238–44), and an Egyptian popular story, "The Capture of Joppa," potentially preserves a historical memory of a small-scale rebellion at Jaffa that was put down by Thutmose III's general Djehuty.[368] Moreover, the reign of Thutmose III's successor Amenhotep II (1427-1400 BCE) was a period of frequent warfare throughout the Levant, including a campaign in the immediate vicinity of Jaffa to put down a rebellion at nearby Aphek (Hoffmeier 2000). Moreover, records from Amenhotep II's reign discuss his parading the corpses of rebellious leaders throughout the southern Levant, a form of necroviolence intended to cow prospective rebels (Morris 2018, 133).[369] This brutal messaging, along with the episodic campaigns, means that regardless of whether these Late Bronze Age IB destructions constituted local violence, the prospect of violence was likely not far from the minds of the inhabitants at Jaffa.

By comparison to the tumultuous Late Bronze Age IB, the position of Jaffa in the succeeding Late Bronze Age IIA seems relatively stable. While this period is often referred to as the *pax Aegyptiaca* (e.g., Weinstein 1981), this mostly refers to the cessation of open conflict

[367] For a discussion of these dates see sections 7.2.1, 8.2.3, and 8.2.4, as well as Appendix 17.

[368] The historicity of the event is disputed (Allen 2001; Manassa 2013); however, Djehuty is a well-known historical figure (Lilyquist 1988; Reeves 1993; Giovetti et al. 2016). It has therefore been argued that the story, while fictionalized, preserves a historical memory of a real event at Jaffa (Burke 2018a).

[369] This likely corresponded with another display of necroviolence common to Egyptian military practice at the time, which was the use of severed body parts—namely hands and male genitalia—as trophies (Candelora 2019c).

between Egypt and its imperial rivals. As evidence from the Amarna archive indicates, the local geopolitics of the southern Levant remained mercurial, with internecine conflict among Levantine rulers and local rebellions against Egyptian rule being commonplace.[370] There is no archaeological or textual evidence to suggest that any of this instability manifested directly at Jaffa. Contemporary textual sources refer to the site as an imperial granary (Moran 1992, EA 294), and the primary archaeological context for this period—the Phase LT-8 Lion Temple—suggests complex colonial entanglements that might have included an imperial lion cult of Amenhotep III (see Section 8.2.5). The long use-life of the Lion Temple suggested by radiometric dates—as well as its plausible ritual decommissioning—all suggest a relatively stable period in the history of the garrison community.

The evidence for the Late Bronze Age IIB at Jaffa corresponds well with our understanding of the dramatic intensification of Egyptian activities in the southern Levant, with the construction of the monumental Phase RG-4a gate and—likely contemporary—installation of the Phase LT-7 fortress structure paralleling developments at other sites in the region (Oren 1984; Morris 2005, 382–95; Hoffmeier 2013). The monumental nature of the structures—including the brightly painted gate façade stones bearing the titulary of Ramesses II (1279-1213 BCE)—served as highly visible symbols of the empire, with the gate notably controlling and surveilling the daily comings and goings of the inhabitants of the garrison. Jaffa became part of a chain of sites central to the Egyptian efforts to consolidate, streamline, and stabilize their Levantine empire in the face of resurgent northern threats (Murnane 1990; Morris 2018, 187–210). The heavy hand of the Egyptian administration in this period is evident not just in the

[370] Local warlords such as Labayu of Shechem carved out short-lived territorial states within the Levantine territorial holdings of Egypt (Finkelstein and Naʾaman 2005). It was for this reason that Ellen Morris recharacterized this period not by a *pax Aegyptiaca*, but by Levantine rulers' attempts at "outwitting the state" (Morris 2018, 165).

explosion of imperial infrastructure, but also frequent pacification campaigns and increased resource extraction—all attempting to ensure the southern Levant remained a stable corridor in support of imperial projects afield.[371] As attested by the series of destructions that occurred at Jaffa towards the end of Egyptian rule, while Egyptian efforts at control were sustained for much if not all of the Late Bronze Age IIB, Phase RG-4a/Phase LT-7 also constitutes the last period from which the Egyptians controlled Jaffa from a position of strength.

Beginning in the second half of the 12th century BCE, the situation at Jaffa changed dramatically. In 1135 BCE, a local, violent insurrection resulted in the destruction of the Phase RG-4a gate complex and presumably the Phase LT-7 fortress. Despite taking place well into the classic phase of Late Bronze Age collapse and well after the traditional end of the New Kingdom empire in the region, some form of Egyptian control was maintained at Jaffa after this destruction, with both the gate complex and fortress being rebuilt in Phase RG-3b/LT-6.[372] The situation remained unstable, since within approximately a decade the Phase RG-3a gate complex and presumably the Phase LT-6 fortress were also destroyed, after which all evidence for Egyptian practices and material culture vanish. The new absolute chronology places this event in the last quarter of the 12th century BCE (Burke, Peilstöcker, et al. 2017), with the collapse of

[371] Evidence for Egyptian campaigns throughout the southern Levant in this period abounds, including the victory stelae of Seti I (1294-1279 BCE) at Beth Shean (Rowe 1929; Albright 1952) as well as a similar stela of Ramesses II found at the same site. In general, there was a peak of royal inscriptions during the reign of Ramesses II throughout the southern Levant (E. Levy 2017). While some of these campaigns were against restive, dislocated populations, there were also against cities, including campaigns by Ramesses II against Akko and Aphek (Morris 2005, 371–72), as well as by his successor Merenptah (1213-1203 BCE), who was forced to recapture the city of Ashkelon to the south of Jaffa in a complex campaign that also engaged dispersed peoples like the early Israelites (Yurco 1986; Singer 1988; Burke 2009; Kahn 2012).

[372] Traditionally, the Late Bronze Age collapse is proposed to have occurred in the first half of the 12th century BCE (Cline 2014), with the unravelling of Egyptian control often linked to the arrival of the Sea Peoples during the reign of Ramesses III (1184-1153 BCE) (Weinstein 2012; Cline and O'Connor 2012). Lawrence Stager (1995) proposed that the Egyptians monitored and policed the new arrivals through a series of key forts—what he refers to as the *cordon sanitaire*. Recent work has questioned the degree of Egyptian control, suggesting instead that Philistine sites were in a state of hostile opposition to the remaining Egyptian centers (Barako 2013). A third approach lowers the chronology of the Philistine arrival to after the end of Egyptian rule (Finkelstein 1995; 1998).

Egyptian rule at Jaffa likely occurring during the reign of Ramesses IX (1126-1108 BCE), whose tenure was marked by social, political, and economic implosions at home in Egypt (van Dijk 2000, 301). Consequently, even if the imperial core desired to support its beleaguered garrison at Jaffa, it presumably could not summon the strength to do so. This sheds further light on life during the final years of the garrison, which would have likely been tense, precarious, and therefore a particularly charged time for the articulation of identity. Collectively, then, if we consider the history of the New Kingdom garrison at Jaffa, garrison life was far from stable. Rather, it was a constantly shifting—sometimes contested and sometimes collaborative—cultural interaction sphere where the only constant was uncertainty. As will be shown in the following section, this picture can be complicated further with foodways, showing the types of human entanglements that occurred at the site, and furthermore, how practices might link with shifting strategies of signification as the inhabitants of Jaffa responded to localized disruptions.

9.2 Communities of Practice at Jaffa

As discussed in Chapter 2, a practice-based approach to foodways must begin from the ground up, delineating first the manifestation of practices and their associated material culture and then—if possible—discussing the prospect of their saliency as markers between identity groups. Within this section, I examine the patterns demonstrated via paleoethnobotanical and ceramics analyses of foodways at Jaffa, delineating various communities of practice that resided at the site. Specifically, I will address six categories in which communities of practice related to foodways or at the very least differing habiti are definable at Jaffa: ceramics production (Section 9.2.1), cooking (Section 9.2.2), baking (Section 9.2.3), brewing (Section 9.2.4), storage (Section 9.2.5), and dining (Section 9.2.6). Moreover, I historicize these arenas of practice diachronically in relation to the history of Jaffa, discussing shifts that might relate to strategies of signification.

While it is not possible in all cases to definitively identify salient practices or objects at the site, the data indicates a complex, hybrid foodways system that drew upon modes of doing with both local and Egyptian roots, and furthermore, was used to respond to shifting needs of identification throughout the tumultuous history of the garrison.

9.2.1 Ceramics Production

Perhaps the clearest attestation of distinct communities of practice at Jaffa are those which provided the residents of the site with ceramics related to foodways. Over the course of the imperial period, Jaffa was supplied by two separate, local ceramic industries that produced distinct versions of functionally equivalent forms. One made forms from the local Levantine tradition and the other local replications of classic domestic forms from the Egyptian Nile clay tradition. The term replication is not too strong for characterizing the Egyptian-style ceramic industry at Jaffa, since the vessels not only follow the form and decoration of their counterparts from Egypt, but they were also produced using an identical *chaîne opératoire*. This includes technological aspects such as clay recipe, but also techniques of the body such as coil width, surface treatment, the methods used for removing vessels from the wheel, and even unusual joinery methods such as the means of combining wheel-thrown with hand-built vessel elements for the construction of the type JR10 *zīr* (see Section 6.2).[373] Moreover, the characteristic red coating on a socket from a potter's wheel (**MHA 2309**) found in association with Level VI Late kitchen further attests to ceramic manufacturing techniques with roots in Egyptian traditions. Importantly, many of these techniques were wholly foreign to the Levantine ceramic tradition,

[373] The replication of the Egyptian ceramic manufacturing tradition at the level of bodily logic is attested at all southern Levantine sites with local manifestations of the Egyptian-style ceramic industry (Glanzman and Fleming 1993; Killebrew 1998, 187–257; 2004; Martin 2011b, 91–122; Pierce 2013, 462–529; Streit 2019a; 2019b).

indicating that—at least initially—the arrival of the Egyptian-style ceramic tradition at Jaffa required exogenous input from individuals originating in the imperial core.

The exogenous origin of the community of practice that produced Egyptian-style ceramics at Jaffa is supported by its sudden appearance as a fully realized ceramics industry at the earliest Late Bronze Age IB garrison. Phase LT-10—despite its small assemblage—already produced a majority of Egyptian-style forms, and by Phase LT-9/Level VI Late the Egyptian-style ceramics industry at Jaffa produced at least eight varieties of bowl with three decorative motifs (types BL varia, BL1a, BL1b, BL2, BL3a/b, BL5a, BL5c, and BL6), two culinary forms (types BL5d and FP), at least five varieties of jar (types JR1, JR2a, JR2b, JR4, and JR10), and two varieties of pot stand (types PS1 and PS2).[374] Notably, several varieties possess morphological and technological traits completely foreign to the Levantine ceramic tradition, meaning they could only have manifested at Jaffa via a chain of socialized learning connected directly to potters in Egypt.[375] Another support for the exogenous origin of this community is that at no point in the history of the garrison, even upon its initial foundation, were the Egyptian-style ceramics at Jaffa predominantly supplied by trade—either with the imperial core or another local garrison.[376] Instead, Egyptian-style ceramics are produced in the same local fabric over the

[374] To date, no contemporary southern Levantine site parallels the diversity, high frequency, or high proportion of Egyptian-style forms seen at Jaffa. This especially includes Beth Shean (Mullins 2002; 2006; 2007) and Tel Sera' (Martin 2011b, 221–29), where Egyptian-style ceramics never achieve more than 10% of the total assemblage using a maximalist method for calculation. Had other southern coastal sites been subject to modern excavation methods, however, they likely would have been similar to Jaffa—as suggested by the preliminary results from the renewed excavations at Tell el-'Ajjul (P. Fischer and Sadeq 2000; P. Fischer et al. 2002; P. Fischer 2003; M. Fischer 2004).

[375] Forms with morphologies unique to the Egyptian tradition include the type BL5c ledge-rim bowl, the type FP flowerpot, all the closed forms from the type JR jar family, and the type PS2 tall pot stand. Forms with technological characteristics unique to the Egyptian tradition include the finger-indented and oftentimes perforated type FP flowerpot base as well as the type JR10 *zīr*, with the unusual method used to join its wheelmade neck to its handmade body resulting in erratic changes in the direction of the clay grain at the join. Moreover, the red-splash decoration is purely Egyptian in origin, having no similar counterpart in the Levantine repertoire either before, during or after the New Kingdom period (Martin 2011b, 120).

[376] This situation is echoed at other Levantine sites with only limited exceptions (Martin 2011b, 97–108).

course of the entire occupation. Imports from Egypt are rare, and always comprised closed forms known to have contained specialized commodities.[377] The only possible Egyptian-style form that was imported to Jaffa from another Levantine site are type JR10 *zīrs*, which were produced from a Levantine clay source distinct from all other Egyptian-style vessels at Jaffa. However, since Jaffa is the first excavated site in the Levant to produce evidence for locally manufactured *zīrs* (see Martin 2011b, 70), it is also possible they were derived from a separate, specialist manufacturing tradition that produced only this unusual form. Regardless, the sudden manifestation of a complex *chaîne opératoire*—and more accurately taskscape—derived purely from Egyptian modes of doing is most parsimoniously explained via the arrival of an exogenous community of practice derived from Egyptian potters. There was no lag between the first appearance of Egyptian-style pottery at Jaffa and its complete expression as a complex industry, indicating that it did not develop organically via local imitation. While it is certainly possible that locals were initiated into this community during the next three centuries, the evidence suggests something far more complex.

One of the most important elements for understanding the relationship between the Egyptian-style and Levantine ceramics traditions at Jaffa is their rigid bifurcation for the entire imperial period. Both traditions used distinct clay sources, and it seems that the clay source used for Egyptian-style ceramics was specifically selected to imitate the properties of Nile clay—something previously attested only at Tel Aphek (Martin, Gadot, and Goren 2009). Additionally, lower firing temperatures—a characteristic of the Egyptian Nile clay ceramics industry (Nordström and Bourriau 1993, 155)—are a consistent, distinguishing characteristic separating

[377] Late Bronze Age IB imports include carinated jars (type JR7) and amphorae (type AM4, generic type AM), and Late Bronze Age IIB/III forms includes handled cups (type CU), amphorae (type AM), and meat jars (type JRVmj).

Egyptian-style from Levantine ceramics at Jaffa. Consequently, not only did potters from either tradition use different clay sources and recipes, but they also fired their vessels separately, indicating the complete separation of the two production chains. Remarkably, this persisted even though both traditions produced morphologically identical types like the simple bowl with plain rim (type BL1/LB1). Even after centuries of cohabitation at Jaffa, there was almost no crossover, with a single unequivocally hybrid vessel from Phase RG-4a (**JCHP 303**; see Appendix 12.2) being the sole exception not just at Jaffa, but in the entire southern Levant (see Killebrew 1998, 275; 2004, 341; Martin 2011b, 260). Interestingly, Jaffa does not even exhibit the types of technological crossover well-known from other garrison sites, such as the gradual adoption of chopped straw temper within the Levantine ceramics tradition (e.g., Martin 2009c, 468–69 for Beth Shean). Consequently, even if the community of practice that produced Egyptian-style ceramics at Jaffa initiated members of the local population, there seems to have been a rigid separation from members of the community producing Levantine ceramics.

There is, however, another piece of evidence that suggests minimal Levantine inputs into the Egyptian-style ceramics industry at Jaffa, which is that ceramic developments within the Egyptian-style tradition correspond almost exactly with their occurrence in the imperial core. In the Late Bronze Age IB, this applies especially to the case of red-splash decorated bowls and red-slipped type BL *varia* bowls, which both peak in popularity and vanish at Jaffa in accordance with their distribution in Egypt.[378] The pattern also includes utilitarian vessels like the flowerpot, which disappears at Jaffa before the Late Bronze Age IIA—precisely mirroring contemporary

[378] The type BL *varia* is attested in Egypt from the Second Intermediate Period through mid-18th Dynasty (Aston 2001, 188), and red-splash decoration dates narrowly from the late Second Intermediate Period/Early 18th Dynasty to the end of Amenhotep II's reign around the turn of the 15th century BCE (Aston 2006; 2018; Martin 2011b, 50). Notably, type BL *varia* is already rare by the beginning of Phase LT-9 and in the Level VI Late assemblage, and red-splash decorated bowls are rare within the final assemblage group of Phase LT-9 and totally absent by LT-8.

sites in Egypt (e.g., Amarna; see Rose 2007). Finally, the sudden growth in popularity for the type BL2 shallow bowl at Jaffa corresponds closely with its increase in popularity in Ramesside Egypt (Martin 2011b, 34–35).[379] Collectively, the close co-development of ceramic patterns at Jaffa and in the imperial core suggest frequent exogenous inputs into the local Egyptian-style ceramics industry at Jaffa, either via robust communication networks with Egypt that ensured the garrison closely followed core fashions or through the cycling of itinerant potters. The latter seems the most attractive explanation, given the separation of the Egyptian-style and Levantine ceramics industries and the fact that there was never any sort of provinciality to the Egyptian-style ceramics industry in the southern Levant. Effectively, its diachronic developments mirrored the Egyptian imperial core. Since it also vanished with the termination of the garrison, it would not be untoward to say it operated as an extension of imperial Egypt.

Collectively, the sudden appearance and disappearance of the Egyptian-style ceramic industry at Jaffa as well as the evidence for frequent inputs from the imperial core all suggest a degree of top-down direction. This is not unprecedented for the New Kingdom, as the site of Deir el-Medina—an artisan community that constructed the royal tombs in Thebes—has produced a robust textual record indicating that the community received ceramic vessels from a devoted community of potters as part of their ration, with at least eight different vessel types provided as part of the potters' quota (Frood 2003).[380] If state-supported communities in Egypt were supplied by devoted potters with a ration of forms deemed necessary for daily life, it would not be surprising if a similar situation prevailed at imperial garrisons abroad. Similar top-down

[379] In the Late Bronze Age IIA Lion Temple, only five fragments of bowls from this family are attested, and in the RG-4a gate alone a minimum of 43 fragments and/or restorable examples are attested.

[380] At least two of the terms—*ṯbw*- and *qbw*-vessels—likely represent classes of vessel rather than specific types, implying that a wider range of forms were delivered to the town (Frood 2003, 46).

arrangements are attested in other colonial situations, with Stacey Jordan and Carmel Schrire (2002) discussing an episode from colonial South Africa where in 1663, a Dutch commandant was so disgusted by irregular dining practices within the garrison that he requisitioned a potter specifically to ensure the garrison ate at a proper Dutch table. This is not to imply that a similar sentiment informed the situation at colonial Jaffa, but rather to note that top-down control of dining practices is commonly used to institute or maintain a sense of community.[381] If this were also the case at Jaffa, then the breadth of Egyptian-style forms seen at the site might suggest what was deemed by the central authority to be essential to the constitution of the garrison community. If it is possible to argue that there was an Egyptian habitus with respect to the bare minimum ceramic accoutrement necessary for foodways, then the colonial manifestation of the Egyptian-style ceramic industry was designed specifically to reflect that habitus—at least according to garrison administrators. Top-down organization and bottom-up consumption preferences are two completely different domains, however, and as will be seen in subsequent sections, even if Egyptian-style ceramics manufacture at Jaffa reflected an Egyptian habitus, the collective manifestation of foodways was more variable. Indeed, the presence of two distinct communities of practice producing isochrestic systems of foodways ceramics meant that the daily manifestation of foodways was always at the locus of individual choice.

9.2.2 Cooking

In addressing the communities of practice related to cooking at Jaffa, I am specifically referring to cooking over (in)direct heat with the assistance of a ceramic cooking vessel. To date, there is

[381] Similar—albeit not identical—cases can be seen in the case of using court dining practices for the constitution of new communal identities, such as was the case with the Roman *convivium* in late antiquity or the transition between dining *à la Française* to *à la Russe* in England (Hudson 2010; Gray 2009). Similarly, modern militaries rigidly controls and standardizes rations for deployed troops, with familiar foods and dining practices in the field being linked directly to troop morale (Taub 1994, 82).

no evidence from New Kingdom Jaffa for any vessel classifiable as an Egyptian-style cookpot; all cookware varieties stem from the Levantine tradition of triangle or everted rim cookpots.[382] This situation echoes other sites in the southern Levant with equally high frequencies of Egyptian-style ceramics, with the only unequivocal identification of Egyptian-style cooking vessels in the region being three globular jars (type JR5) found at Tel Seraʿ (Martin 2011b, 63). A similar phenomenon has been identified at colonial sites in New Kingdom Nubia, where Nubian cooking pots are as common if not more common than their Egyptian counterparts, even in assemblages otherwise dominated by Egyptian-style tableware and container forms (S. T. Smith 2003a; 2003b; 2003c; Spataro, Millet, and Spencer 2015; Budka 2016). The pattern in the southern Levant, however, is much more extreme, and it would not be inappropriate to refer to the situation at Tel Seraʿ as the exception that proves the rule. Even the Level VI Late garrison kitchen at Jaffa, the most heavily Egyptianized food production context known from the southern Levant, produced two restorable Levantine cooking pots. Moreover, fragments from triangle rim cookpots are ubiquitous in all phases in contexts ranging from construction fills to the quotidian garbage ground into the surface of the gate passageway.

There is, quite simply, no evidence to suggest that (in)direct heat cooking at Jaffa followed anything other than the Levantine pattern. At other Levantine garrisons, scholars have used this to argue that cooking was the domain of Levantine women who were either married to, employed by, or coerced into working for colonial personnel (Martin 2004, 280; 2011b, 259–63; Mazar 2011, 179; Fantalkin 2015, 235). The same has been argued for Nubia, where the phenomenon has been associated with the maintenance of familiar domestic practices by Nubian

[382] The only exception is a single rim fragment from a cooking jug from the Phase RG-4a gate passageway, a type that appears in the southern Levant at the end of the Late Bronze Age but is frequently associated with Aegean and/or Sea Peoples influences (Yasur-Landau 2010, 149; Mazar 2015, 13; Mullins and Yannai 2019, 160).

women who were asserting their ethnic identity in the face of Egyptian colonialism (S. T. Smith 2003c, 189–206). Regardless of whether this domain of practice can be gendered, the fact that the community of practice for cooking at Jaffa was derived predominantly—if not exclusively—from local members of the community can be supported through several pieces of evidence. First, if garrison communities included individuals who adhered to *chaîne opératoire* for cooking that was rooted in Egyptian modes of doing, this would require that the Levantine cooking pot was substituted in place of the Egyptian version. While this is possible given that Levantine cookpots are technologically and morphologically similar to the Egyptian carinated cooking pots, the fact that identical forms like the simple bowl with plain rim were produced by both the Levantine and Egyptian-style ceramics industries at Jaffa means that the presence of isochrestic—even identical—variants did not contribute to substitutionary choices.[383] Moreover, Jaffa has produced no cooking accoutrement from the Egyptian tradition such as the "fire dog," a cooking tripod commonly found at sites in Egypt and Nubia (Aston 1989; Budka 2017, 441).[384] Collectively, the most plausible explanation is that the community of practice conducting cooking at Jaffa adhered to Levantine modes of doing.

At New Kingdom Askut in Nubia, residue analysis demonstrated that Egyptian and Nubian cooking vessel were used to produce separate cuisines (S. T. Smith 2003c, 119–24). Given the sole presence of Levantine cooking vessels at Jaffa, this would seem to suggest a predominantly Levantine cuisine at the garrison. As attested by the case of bitter vetch, however, some aspects common to regional Levantine foodways did not manifest at Jaffa. The attestation

[383] For the similarity between Levantine cookpots and Egyptian carinated cooking bowls, compare **MHA 2310** with types C and D from Sai Island (Budka 2016, 294 figs. 3-4). Technologically, both traditions used plastic inclusions to resist thermal shock (Budka 2016, 287; Mullins and Yannai 2019, 159).

[384] Another version of tripod cooking is depicted in the Tomb of Ramesses III (Franzmeier 2021, 83; fig. 3b).

of only a single seed of bitter vetch seed within the diverse macrobotanical assemblage from Jaffa is extraordinary in comparison with other Levantine sites, where bitter vetch exploitation transcended socioeconomic status and plausibly could be regarded as a signature component of Levantine foodways—either as food or fodder. Instead, legume exploitation at Jaffa utilized pulse crops—lentil and fava—common to regional Egyptian and Levantine foodways, and possibly replaced the use of bitter vetch for fodder by substituting the Egyptian practice of *Trifolium* exploitation. Whether this pattern indicates an active rejection of an unfamiliar food with extreme characteristics by the colonial population, accommodation by locals, or the development of a hybrid colonial foodways, cannot be said with certainty. What is clear, however, is that while the picture from cookpots indicates Levantine individuals likely became entangled with garrison personnel through culinary activities, what manifested was not a pure reflection of Levantine foodways. Whether the interpersonal contact this instituted was positive or negative is unknown, but what is clear is that foodways at Jaffa were not a pure reflection of either Egyptian or Levantine modes of doing, but rather something altogether new.

9.2.3 Baking

Bread has been argued to form a central component of the Egyptian habitus during the pharaonic period, and certainly, its common attestation as a mortuary good and the centrality of baking scenes to—especially 18th Dynasty—mortuary art certainly indicates its symbolic potency and importance to Egyptian foodways (Chazan and Lehner 1990; Samuel 1999a; Lang 2017). Indeed, this was central to the argument that access to familiar bread was essential to Egyptian identity in the imperial periphery during the New Kingdom (e.g., Pierce 2013). The archaeological evidence, however, complicates this image. Certainly, bread was a key staple at Jaffa and other garrison communities, but the entire taskscape for its production was unequivocally derived from

Levantine foodways. Since the only attested wheat varieties at garrison sites like Jaffa are free-threshing tetraploid variants, the entire process and product of bread from field to table were categorically different from what occurred in the regional foodways of Egypt. Emmer, the preferred crop in Egypt, produced secondary products like chaff in different stages, was stored differently, required additional processing to free the grain from the spikelet, and due to the chemical composition of the grain, would have performed differently as a dough and during the rising process. Moreover, the final product would have had a noticeably different texture and flavor. Consequently, simply by virtue of the wheat variety, the entire *chaîne opératoire* of bread production quite literally could not follow the Egyptian pattern.

This is borne out in the archaeological evidence as well. While no grinding installations have yet to be excavated in situ at Jaffa, all such examples from domestic contexts at other garrison sites follow the Levantine model (Damm Forthcoming a). Moreover, baking accoutrement from the Egyptian ceramics tradition have yet to be convincingly identified at any southern Levantine sites despite their overwhelming ubiquity in Egypt (e.g., the bread mold; Martin 2011b, 89; Oren 2019, 285). The only possible exception would be the flowerpot, though its proposed function as a bread mold is questionable and it is more plausibly related to beer production (see Section 9.2.4).[385] The situation is therefore akin to cookpots at Jaffa, in that a major culinary sphere was derived purely from Levantine practices. Bread was certainly as central to Levantine foodways as it was Egypt (Frumin, Melamed, and Weiss 2019), and it seems that in the imperial periphery Levantine-style breads were sufficient for the colonial population. As was the case with cooking pots, this represents another culinary sphere wherein the

[385] The functional association of flowerpots with baking is based on their similarities to Old Kingdom bread molds, though even one of the original proponents of this theory noted that it was problematic due to the total lack of evidence for repeated, secondary exposure to heat (Holthoer 1977, 83)—a pattern also true of the Jaffa examples.

community of practice was predominantly derived from the local population. While it is impossible to characterize fully the human entanglement that intertwined locals with garrison personnel, it certainly shows the depth to which the imperial had become part of the quotidian. It is equally impossible to gauge the reaction of the colonial population to the new, hybrid cuisine of the imperial periphery. That no changes were instituted to support the local production of bread along an Egyptian model over the centuries of imperial occupation suggests either contentment or indifference. Given that there is no evidence for the acceptance of Levantine wheat strains into cultivation in Egypt despite the lower labor requirements of free-threshing wheat, however, makes a fully positive response by the colonial population unlikely. But even if the new staple was regarded as a source of dissonance, the price was either one the colonial population was willing—or required—to pay.

9.2.4 Brewing

The Egyptian *chaîne opératoire* for beer production during the New Kingdom is well understood, involving the use of malted barley to form cakes, which after a period of fermentation were placed into some sort of sieve, either a basket or perforated vessel that was then placed in the mouth of a larger jar that served as a fermentation vat. Water was added to the vessel containing the cake, with the collective mixture being either pressed or simply draining into the larger jar.[386] The existence of a distinct, Levantine brewing system based on slightly modified procedures can also be reconstructed, with the primary difference being that the Levantine method involved soaking chunks of bread or malted barley cakes directly in the fermentation vat, which in turn was sealed with a perforated stopper to allow fermentation gasses

[386] The process of Egyptian beer production in the New Kingdom has been reconstructed through a combination of art historical, ceramic, contextual, experimental, and chemical residue evidence (Samuel 1993b; 1994a; 1995a; 1996a; 1996a; 1997b; 1997a; 1999b; 2000).

to escape (Gal 1989; Homan 2002; Ebeling and Homan 2008). This method also can likely be related to the use of straws with strainer tips to consume directly from the fermentation vessel (Maeir and Garfinkel 1992), though the exact distribution of this artifact class is unclear since the majority of examples are unprovenanced.[387] While none of the accoutrement associated with the Levantine style of brewing has been recovered from Jaffa, Egyptian-style vessel types specifically associated with brewing—notably the flowerpot and beer jar—are attested in Late Bronze Age IB through Late Bronze Age III levels.

Indeed, the high frequency of perforated flowerpots in the Level VI Late garrison kitchen was argued to demonstrate that the primary function of that context—as well as the collective Egyptian-style assemblage therein—was the production of beer in an Egyptian fashion (Burke and Lords 2010; Burke and Mandell 2011; Pierce 2013, 519–31). Moreover, perforated flowerpot bases are well attested in Late Bronze Age IB levels in the Lion Temple excavation area as well, and commonly appear as residual sherds well after the form went out of use. Given the perforation characteristic of this form, its local manufacture at Jaffa signifies not just the presence of a vessel type, but also a system of practice that required it. While my preliminary GC/MS residue analysis has yet to identify a biomarker that characterizes a specific use for flowerpots, ratios across key fatty acids suggest that they were used for a singular purpose (see Appendix 16). Consequently, beginning with the earliest Late Bronze Age IB garrison community, the Egyptian-style ceramics industry not only produced flowerpots, but did so in such quantity to suggest the presence of a substantial community of practice that both desired and knew how to use them.

[387] This object type is attested in the Levant beginning in the Middle Bronze Age, though its distribution and chronology are poorly understood. Their rarity in Egypt and probable first appearance there during the New Kingdom suggests the importation of a Near Eastern drinking practice (Griffith 1926; Sparks 2004, 37–38).

The clearest expression of this community of practice is within the Level VI Late kitchen, the assemblage of which was previously argued to relate almost entirely to the production of beer in an Egyptian fashion (Pierce 2013, 530). While I argue that this perspective should be moderated to include a broader array of foodways (see especially Section 9.2.6), the performance of Egyptian-style brewing in this context is certain due to the close correspondence of the Level VI Late assemblage with objects depicted in New Kingdom brewing scenes (Pierce 2013, 519–24). Interestingly, the physical characteristics of the vessels within the assemblage might explain both their cooccurrence and the lack of substitution for morphologically similar Levantine forms. For instance, given the proposed function of perforated vessels as a sieves that drained into larger fermentation vats, it is notable that the base diameter of flowerpots and the type BL5d large bowls were too large to nest into the necks of the primary Levantine storage vessel at Jaffa—the type SJ jar. Consequently, the use of these perforated vessels also required the correctly sized storage jar to serve as a fermentation vat, a task seemingly fulfilled by either the Egyptian-style type JR10 *zīr* or the type JR2b large storage jar.[388] In this particular case, the desire to brew beer in an Egyptian fashion required not just the specialized perforated forms, but the local production of a complete kit, entangling the communities of practice that produced Egyptian-style vessels with those who produced beer in an Egyptian fashion. The degree to which this kit was perpetuated at garrison sites is precisely the reason why the Level VI Late kitchen need not be associated solely with brewing beer in an Egyptian fashion. If it served only this purpose, then the presence of Levantine cooking pots would be incongruous—the one acceptable substitution within a kit that rejected all other Levantine forms. Allowing that the primary function of the

[388] The base of type BL5d bowls from Jaffa range from 9.5 – 12 cm in diameter, and the base of the Jaffa type FP flowerpots were between 9.3 and 12 cm. The typical rim diameter of a type SJ jar—approximately 10 cm along its outer edge—indicates that the type JR2b and JR10 openings (13 – 19.5 cm) were much better suited for the task.

kitchen was to satisfy garrison foodways more generally, with beer being a central objective, enables a less constraining interpretation of activities therein.[389] Regardless, the coherency of the Level VI Late kitchen assemblage sheds light on the more fragmentary attestation of these forms in the Lion Temple area, indicating that the manufacture of beer in an Egyptian fashion plausibly occurred in contexts there as well.

It is abundantly clear, therefore, that a community of practice familiar with the *chaîne opératoire* of Egyptian-style beer production resided at Jaffa in the earliest days of the garrison. Given that there is no indication of substantive differences in barley agriculture in Egypt and the southern Levant, there is no reason to believe that the final product was overly different from that which was produced in Egypt. The sudden appearance of a fully realized, exogenous style of brewing therefore should plausibly be related to the colonial population replicating a familiar domain of foodways in the imperial periphery. Unlike the culinary domains of baking and brewing, however, there seems to have been a diachronic shift in how these practices manifested at Jaffa. One of the first key transitions is that the shift between flowerpots and perforated beer jars at Jaffa seems to have occurred in the Late Bronze Age IIB, corresponding exactly to this shift as it occurred in Egypt—suggesting that exogenous inputs into the Egyptian-style ceramics industry incorporated not just changing fashions but also shifting practices (see Section 9.2.1). Plausibly, there were similar exogenous inputs into the community of practice responsible for

[389] For example, it was originally proposed that the type JR7 carinated jars contained special ingredients imported from Egypt specifically as sweeteners or flavoring agents for beer—potentially dates, honey or doum fruit (Pierce 2013, 520). While additives might have been employed in special recipes, sweeteners are not required for the brewing of beer since malted barley possesses sufficient sugar content (Samuel 2000, 556–57). Moreover, the distribution of imported type JR7 jars at southern Levantine sites begins in the Middle Bronze Age, well before the New Kingdom imperial period, and is also attested in the Late Bronze Age at sites bearing minimal evidence for Egyptian practices (e.g., at Tel Dan; Ben-Dov and Martin 2011), therefore the presence of this form need not imply essential components of Egyptian foodways. Even if they contained honey, it need not have been as a beer ingredient since it was an important commodity in its own right (Aston 2007). Most likely, the form contained a number of possible precious commodities (see Martin 2011b, 66–69 and references there).

Egyptian-style brewing at Jaffa, possibly through the cycling of garrison personnel. In both the Lion Temple and Ramesses Gate areas, however, there is a substantially different distribution frequency for this later type in comparison to the flowerpot.

Relatively few examples of beer jars are attested at Jaffa following their first appearance in the Late Bronze Age IIA, which is in direct contrast to contemporary garrison sites elsewhere in the southern Levant.[390] The form was manufactured at Jaffa until at least Phase RG-4a, ten to twenty years before the collapse of the garrison, so it is possible that the rarity of beer jars in these levels might simply be contextual. The higher frequency of flowerpots in the Late Bronze Age IB is derived from a kitchen context where the vessels were also manufactured, and their higher frequency in contemporary levels in the Lion Temple area are within contexts that bear evidence for domestic activities. In contrast, the Late Bronze Age IIA is only attested within a ritual area, and the Late Bronze Age IIB/III within the Ramesses Gate complex and the construction fills of the Phase LT-7/LT-6 fortresses. Consequently, it is distinctly possible that we simply have not yet encountered the contexts wherein beer jars were used or disposed. The higher overall frequency of Levantine cookpot fragments in Late Bronze Age IIA to III contexts at Jaffa, however, suggests the intermixing of domestic garbage with the broader gate assemblage. It is, therefore, distinctly possible that towards the end of the Egyptian occupation, at least after the destruction of the Phase RG-4a gate complex, the manufacture of beer in an Egyptian fashion ceased. There are several possibilities that might explain this, including changing demographics at the garrison, changing tastes within the colonial foodways system, disruption of other systems that supported the production of beer in an Egyptian fashion, or

[390] The few fragments recovered from Jaffa thus far contrast with the numerous examples recovered from Grid 21 at Ashkelon (Martin 2008; 2009a), Area S at Beth Shean (Yadin and Geva 1986, fig. 35:3; Martin 2009c, 437, Table 6.1), Deir el-Balaḥ (B. Gould 2010, 33, fig. 2.5), and Tel Mor (Martin and Barako 2007, 162–63, fig. 4.11).

shifting strategies of identification wherein a product so closely associated with the imperial society became less desirable. As will be shown in Section 9.2.6, some combination of the above seems most likely. Regardless, in the final stages of the imperial occupation of Jaffa, it seems that a community of practice that had been sustained at Jaffa for centuries was either disrupted or ceased to exist altogether.

9.2.5 Storage

Apart from cases where storage forms might be associated with specific functions, as with brewing (see Section 9.2.4), it is less appropriate to speak of storage ceramics as being associated with communities of practice and more reasonable to discuss the habitus instead. Generally, the rarity of Egyptian-style storage jars at southern Levantine sites has been used to suggest that they might serve as distinct markers of ethnicity (e.g., Martin 2011b, 51). It might be more appropriate to argue that they point towards an Egyptian habitus, since referring to them as ethnic markers implies that they were salient symbols of distinction. As was shown with the case of brewing, some types were plausibly part of a kit and therefore their presence more signifies a community of practice rather than bounded identity groups. Regardless, given that a variety of large storage forms from both the Egyptian-style and Levantine ceramic traditions are attested at Jaffa throughout the entire New Kingdom occupation, choice between isochrestic variants was always possible. The overwhelming frequency of Levantine type SJ jars indicates that the garrison population typically opted for the Levantine variant. Again, the choice likely related less to conscious signaling, especially since storage forms are hardly public display pieces. And yet, the choice can plausibly be regarded as significant.

Given their difference in shape, aperture, and the presence/absence of handles, storage vessels from the Egyptian-style and Levantine traditions would have had inherently different use patterns. While most storage forms were likely destined for minimal movement after placement, there was still a tangible difference in use patterns for vessels from either class, as attested in the concurrent use of pot stands with Egyptian-style storage jars in the Level VI Late kitchen.[391] While the selection of an Egyptian-style storage jar might not constitute an overt statement regarding Egyptian ethnicity, it remains plausible that it does reflect individual choices in alignment with the habitus, in that individuals selected forms in keeping with their conception of domestic storage. The common co-occurrence of Egyptian-style storage forms with their Levantine counterparts within domestic contexts at other garrison sites in the region implies that even at the household level the decision was not particularly charged (Damm Forthcoming a). And yet, the local production of Egyptian-style storage containers clearly fed a community that—when given the chance—opted for that specific variety. That such individuals were socialized into a habitus where these containers constitute the normative or optimal form of storage seems the most parsimonious explanation, otherwise it is necessary to explain the autochthonic development of a local demand for foreign storage containers strong enough to bring the requisite specialists for their manufacture to Jaffa. As discussed in chapters 7 and 8, however, regardless of who was consuming these vessels, they clearly become progressively less common within the assemblage during the final decades of the garrison. The only definitive evidence that they still were manufactured at 12th century BCE Jaffa comes from a single restorable vessel found in secondary context in the Lion Temple area. Like the situation with beer jars, it is certainly possible that we have not encountered the primary context where they were consumed. The overwhelming quantity of fragments and restorable storage forms from the Levantine assemblage across the final three phases of the Ramesses Gate complex, however,

[391] The 18th Dynasty paintings from the Tomb of Rekhmire in Thebes provides a direct example of the tandem use of storage jars with simple ring stands (N. de G. Davies 1943, Pl. LXIV).

suggests that the rarity of Egyptian-style storage forms is genuine. Whether this stems from a lack of demand or a disruption of supply cannot be said with certainty, though diachronic shifts in dining practices suggest major transformations of foodways during the final decades of Egyptian rule.

9.2.6 Dining

The evidence for dining practices at Jaffa is perhaps the most robust body of evidence for foodways at the garrison. Serving wares fall across four major cultural traditions: Egyptian-style, Levantine, Cypriot, and Mycenean. Of these, the latter two are a relatively rare but constant presence, indicating that while they played a role in foodways, the primary choice was between Egyptian-style and Levantine tableware.[392] Across all phases, there is a consistent and oftentimes overwhelming majority of tableware from the Egyptian-style tradition. And yet, there is no such thing as a pure context presenting only Egyptian-style forms. Even within the Level VI Late garrison kitchen—the most Egyptianized Late Bronze Age IB context yet encountered in the southern Levant—included a finely made, near-complete Levantine carinated bowl (**MHA 2193**). A majority of Egyptian-style tableware accompanied by a small quantity of Levantine forms is a consistent pattern across all phases, even within the same structures. Although the persistent majority of Egyptian-style forms over time indicates that garrison dining practices were heavily informed by the Egyptian habitus, several patterns suggest a more complex reality.

First, when we think about the broad functionality of tableware outside of quotidian foodways, the only attested ritualistic use of tableware at Jaffa thus far is with Egyptian-style vessels. First, in the Level VI Late garrison kitchen, the recovery of several Egyptian-style tall

[392] Given that Cypriot ceramics tend to appear in mortuary contexts at Jaffa—as in the Ganor Compound (see (Peilstöcker 2011a)—and are much more common in the excavations of Jacob Kaplan's Area Y (Ben-Marzouk and Karoll Forthcoming; Yannai Forthcoming), they were likely more prominent elsewhere at Jaffa.

stands (type PS2) meant to support bowls plausibly indicates a close association between garrison food production and food offering rituals derived from Egyptian cultural traditions.[393] Within the garrison kitchen, such offerings could have been considered as instrumental to food production as the culinary act itself, as inseparable from the technology of foodways as the flowerpot. In the Late Bronze Age IIA Lion Temple, the association of Egyptian-style bowls with the lion skull—including an incised bowl (**MHA 7703**) unique in the southern Levant but with parallels at New Kingdom ritual sites in Egypt—also implies further multifunctionality that raised mundane domestic forms to a higher symbolic level. Finally, there is the case of a miniature Egyptian-style shallow bowl (**JCHP 577**, type BL3a) that was found in the Phase RG-4a gate passageway, which—while not necessarily ritual in character in this locale—at the very least attests to the flexible adaptation of a well-established type from the Egyptian tradition. Collectively, while the overall tableware assemblage at Jaffa is broadly indicative of more mundane dining practices, the forms themselves could possess more complex meanings across wider variety of practices.

When we consider tableware in relation to mundane foodways, several key patterns complicate the consistent majority of Egyptian-style tableware at Jaffa over time. The first relates to the existence of a stable body of forms that seems to have comprised the Egyptian-style dining set. Beginning with the earliest Late Bronze Age IB garrison and manifesting through the Phase RG-4a gate complex, there seems to have been a cohesive dining service produced by the Egyptian-style ceramics industry, broadly characterized by small-to-medium hemispheric bowls for the consumption of liquid food/drink (types BL1a/b), shallower bowls for the consumption of

[393] There are no parallels for this type of stand in the southern Levant, though a large collection is attested at the New Kingdom fort of Haruba in the northern Sinai, where they were found in vicinity of a kiln and a large collection of flowerpots—a context almost identical to that of the Level VI Late kitchen (Oren 1987, 102; see Burke and Lords 2010, 18–19).

solid or viscous food (types BL2/3), and a large bowl either for communal serving or food preparation (type BL5). While the Levantine assemblage is much more fragmentary in character, the array of attested types and sizes indicates a similar—but less clearly preserved—system. Previously, it had been argued that the Egyptian-style tableware set should be associated with the production, rationing, and consumption of beer—especially for the Level VI Late garrison kitchen.[394] Given the *longue durée* perspective now available from other periods and areas at Jaffa, however, it is more likely that they represent a multifunctional array of vessels designed to achieve a broad variety of foodways objectives—supported especially now by the use-alteration evidence for a shallow bowl being used as a cutting platform (**JCHP 507**). That the Late Bronze Age IB assemblage already included multiple decorative styles across the categories of the small simple bowl (type BL1b), small-to-medium simple bowl (type BL1a), straight-walled bowl (type BL2), shallow everted rim bowl/plate (type BL3a/b), carinated bowl (type BL6), and two rim morphologies of the large bowl (types BL5a and BL5c) seems to contradict a single functional association. This is not to say that these forms had no function within the rationing system; the fact that they are regularly cached at Egyptian centers implies that they almost certainly did.[395] Instead, as pointed out in Section 9.2.1, it is more likely that these vessels were themselves part of the rations. And yet, despite the stability of the Egyptian-style table service after centuries of

[394] The original proposal was that the family of large bowls, jars, imported carinated jars, and flowerpots were all used to produce beer in an Egyptian fashion, whereas smaller bowls were used either for consuming beer or for the rationing of grain for daily allowances to produce bread or beer (Pierce 2013, 519–31). The interpretation regarding provisioning was based on volumetric analyses, with the mean volume of small bowls roughly corresponding to a daily ration of barley according to Middle and New Kingdom texts (Pierce 2013, 527–28). The lack of standard deviation or coefficient of variation means that the actual volumetric variation among Egyptian-style bowls is unclear, and therefore it is equally unclear if the bowls were standardized to contain a fixed volume of grain.

[395] Such caches can be seen at Tel Aphek Stratum X-12 (Locus 3827, Gadot 2009, 62–63), Beth Shean Stratum Q-2 (Pit 88943, Mazar 2006, 98), and Beth Shean Level VII Late (Locus 1213, James and McGovern 1993, 51–52).

occupation and multiple violent disruptions at the garrison, the 1135 BCE destruction resulted in a major shift in the use and appreciation of tableware at Jaffa.

While Egyptian-style tableware continues to be the majority type present after the Phase RG-4a destruction, the character of the assemblage changes dramatically. First, two elements of the Egyptian-style dining set vanish from the assemblage—the small personal hemispheric bowl (type BL1b) and the large communal serving or food preparation bowl (type BL5). Moreover, in Phase RG-3b, immediately after the destruction, there is a slight proportional increase in Levantine bowls that would be unremarkable were it not for the dramatic increase in frequency of the Levantine bowl (type LB2), providing the first instance at Jaffa where a Levantine form constitutes an appreciable component of the tableware assemblage.[396] The brief increase in Levantine tableware is short-lived, because by the final phase of the Egyptian occupation Egyptian-style tableware achieves its highest ever proportion at Jaffa, forming more than 90% of tableware irrespective of calculation method—a pattern echoed at contemporary Egyptian centers like Beth Shean.[397] And yet the character of the assemblage at Jaffa was quite unlike what had preceded it. In addition to the reduced diversity of Egyptian-style forms present, relatively stable patterns of intra-assemblage complexity were dramatically transformed as well.

[396] In Phase RG-4a more than 80% of the tableware comes from the Egyptian-style tradition no matter how it is calculated. In Phase RG-3b, however, more than half of the base EVE assemblage (2.275 of 4.060 EVEs) and nearly a quarter of the rim EVE assemblage (1.955 of 8.100 EVEs) is from the Levantine tradition, with 9.2% percent of the *total* rim EVE assemblage from the type LB2 bowl alone (1.075 of 11.725 EVEs). Only the ubiquitous Egyptian-style type BL1a and BL2 bowls are more common.

[397] For example, the final two phases of the Egyptian occupation in Area S at Beth Shean demonstrate 88% (Stratum S-4) and 91% Egyptian-style bowls (Martin 2009c, 457, Table 6.8).

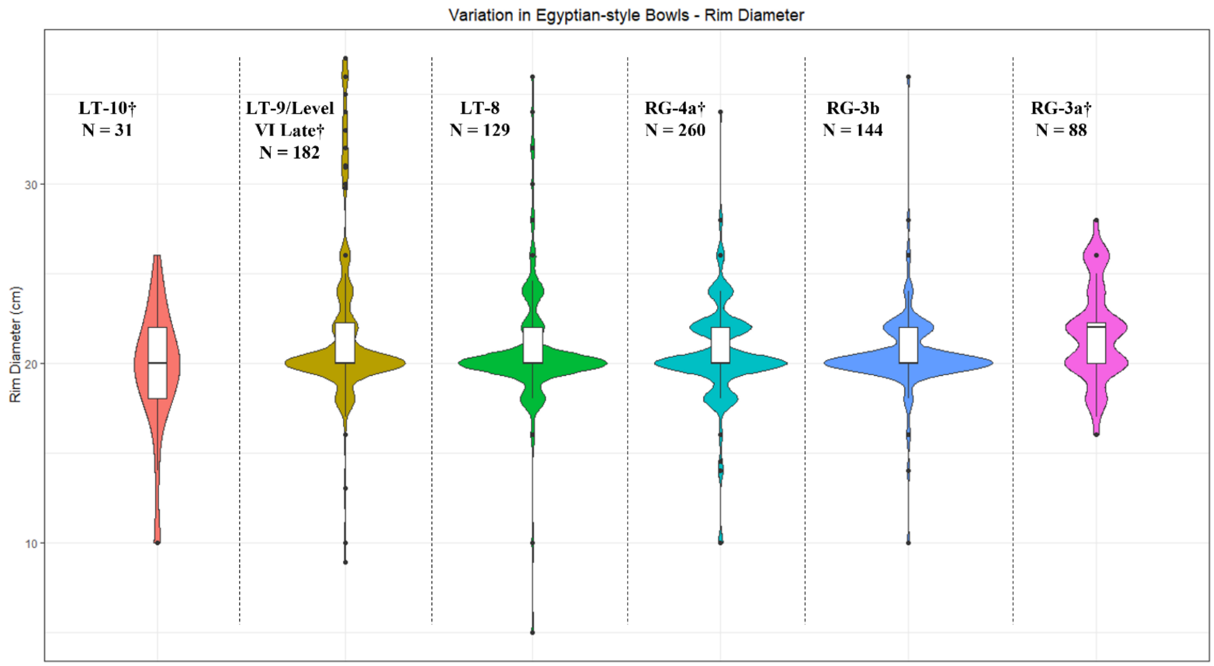


Figure 64: Violin plot with overlain box and whisker plot tracing rim diameter groupings of Egyptian-style bowls over time at Jaffa (calculation method: sherd count). † Indicates phases that ended in destruction or plausible destruction events.

Figure 64 shows size variation among Egyptian-style bowls over time at Jaffa using violin plots, a data visualization method described in Section 6.4.2.[398] Each plot shows the density of bowls around particular size groupings, with a box and whisker plot overlaid on the violin plot to provide additional summary statistics like mean, range, and quartiles, with dots representing outliers. The narrower the peaks at a given point, the more consistently vessels cluster around that diameter. If we exclude the small assemblage from the earliest phase of the

[398] The coding and data for this visualization can be found in Appendix 15. Only occupational levels were used to avoid bias from residual sherds. An identical plot was created where occupational assemblage groups were lumped with fills that most likely would have contained contemporary material. For example, given that constructional fill assemblages tended to be composed of contemporary sherd material, they were likely derived from middens of the preceding phase. Therefore, this schema assumed that assemblage group LT-9.1 was comprised of refuse material from the Phase LT-10, and thus the two phases were lumped together as one. This method of quantification, while increasing the overall sample size available for analysis, did not affect the picture visible in Figure 64. It was therefore excluded as needless data transformation. Additionally, a similar plot was produced using rim EVEs to see calculation methods adjusted the pattern. EVEs, however, cannot be graphed using a violin plot. As seen in Figure 64, violin plots require a single discrete variable (e.g., rim diameter groupings) and a single continuous variable (e.g., count of sherds within the rim diameter groupings)—which can be sorted by phase. EVEs have two discrete variables per phase, the rim diameter grouping and the EVE value for that rim diameter grouping. Consequently, EVE values were plotted as a histogram to see if clustering occurred along the same rim diameter groups as the violin plot, resulting in minor differences in height of peaks but overall, the same consistent size groupings.

garrison as an outlier (Phase LT-10, n = 31), there is a consistent pattern of size groupings within the Egyptian-style bowl assemblage from the Late Bronze Age IB (Level VI Late/Phase LT-9) to the Late Bronze Age III (Phase RG-4a), surviving nearly three hundred years and at least one severe disruption of life at the garrison—the destruction of Level VI Late/Phase LT-9. The pattern consists of a dominant size grouping at 20 cm—which also is the mean and second quartile value for the assemblage—followed by 3-4 additional clusters and an array of unusually large or small vessels, suggesting that we are viewing the consistent presence of a rule-governed dining set. Notably, even if we break the constituent assemblages of Phase LT-9 into separate assemblage groups this pattern persists within the smaller samples.[399] After the 1135 BCE destruction, however, Phase RG-3b shows the persistence of only two of the three characteristics. The outliers remain and the second quartile is equivalent to the mean diameter, but the four density clusters have begun to contract into two main groups, suggesting only partial continuation of the rules that had governed previous phases.

By the final period of the Egyptian occupation, Phase RG-3a, all the elements of the pattern have evaporated, with the hierarchical clustering around rim diameter groupings disappearing altogether in favor of general parity in the frequency of two main size groupings. Outliers are almost nonexistent, signifying the disappearance of specialized bowls in the exceptionally large and small categories—something already noted in the disappearance of type BL1b and BL5 bowls from the assemblage. Finally, the quartile pattern has shifted, with the third quartile falling on the mean rim diameter value, which has also shifted to the 22 cm mark. Consequently, the overwhelming proportion of Egyptian-style tableware in the final phase of the

[399] This applies to the assemblage groups associated with occupational debris: assemblage group LT-9.2 (n = 41), assemblage group LT-9.4 (n = 55), and assemblage group LT-9.5 (n = 56).

garrison belies the fact that the character of that assemblage was categorically different from those that preceded it. Given that the time separating the Phase RG-4a destruction and Phase RG-3a was possibly as little as one decade, the data indicate the dramatic, rapid transformation of a pattern of production, use, and appreciation that had otherwise been stable for centuries. Potential explanations include the disruption of the Egyptian-style ceramic industry, shifts in identification practices, demographic change, or more benign shifts in foodways preferences. Regardless of the cause, violence at the garrison seems to correlate with major disruptions in established foodways patterns.

Further nuance into dining practices at Jaffa can be derived from the requisite patterns of use that would have accompanied vessels from either the Egyptian-style or Levantine tradition. Fundamentally, the issue lies at the intersection of Mauss' (1973) techniques of the body and object materiality, in that particular vessels encourage specific uses that would have in turn contributed to the habitus of how a meal should unfold (see Meskell 2005, 3). Notably, while there was a great deal of morphological and decorative variation separating Egyptian-style and Levantine bowls, most of these stylistic elements (e.g., rim morphology) would have had little impact on the bodily logic of meals. Indeed, the Egyptian-style simple bowl with plain rim (type BL1a) is singlehandedly the most common ceramic find in any phase at Jaffa. But since the Levantine ceramic tradition produced a largely identical form (type LB1), the most dominant element within the table service would have been equally at home in either region. Consequently, simple proportions of Egyptian-style to Levantine tableware do not completely characterize dining practices at Jaffa (see also Damm Forthcoming a). Instead, it is more productive to examine classes of vessels that required dramatically different use patterns, namely closed serving wares.

The contrast between Egyptian-style and Levantine vessels used for the serving of liquids is stark, requiring completely different dining behaviors (Panitz-Cohen 2009, 242). Levantine forms—namely jugs (type JG family)—are notable for their pronounced bases and handles, which are designed support the vessel on level surfaces and be used much in the same way we might utilize a modern-day pitcher.[400] This is especially notable in the high placement of the handle and the common use of trefoil or pinched rims to control the outflow of liquids. Furthermore, serving practices in the Levant seem to have centered around the krater as a serving container shared among several individuals who either dipped into it or drank from it using straws (Stockhammer 2012c, 23–25)—a practice depicted in the Megiddo ivories (Loud 1939, 160, Pl. 32). In contrast, Egyptian-style vessels for serving and drinking liquids lack both handles and bases, requiring support from either a pot stand, a person, or a hanging net to keep the vessel upright. All three means of support are commonly depicted in New Kingdom tomb paintings, with the first two being depicted in the same registers of the feasting scene from the tomb of Rekhmire and the last appearing in the tomb of Djeserkeresonb—both from the 18th Dynasty. Furthermore, these jars could function either as decanting vessels or drinking vessels, with even larger variants like the type JR2a being shown in Egyptian art functioning as drinking vessels, as in the 18th Dynasty tomb of Neferhotep (Paice 1997, 16, Fig. 10). Recalling Hulin's (2013) concept of ambience, the inclusion of even a single Egyptian-style serving vessel would have completely transformed the articulation of the meal. Regardless of whether we follow Hulin in interpreting such a presence as dissonant, it would have required conscious negotiation by the

[400] Jugs with round bases and pinched rims are known from the Levantine tradition, albeit more rarely and with no regional patterns evident (Mullins and Yannai 2019, 228–37). Regardless, none are attested at Jaffa.

individuals present if only to adjust bodily logics accordingly. Given the major differences between the two traditions of closed serving forms, their diachronic frequency is of interest.

Beginning with the earliest Late Bronze Age IB garrison, small Egyptian-style tableware forms are either equally or more frequently attested in comparison to their Levantine counterparts. Neither group is ever particularly common, but they remain a consistent presence over time. By the Late Bronze Age III, however, phases RG-4a and RG-3b each only produced a single non-diagnostic base fragment from an Egyptian-style closed form, and the final phase of the garrison failed to produce any stratified examples of Egyptian-style closed forms. And yet, the Phase RG-4a destruction debris produced restorable examples of small Levantine closed forms used for serving food and drink. Though it is distinctly possible that we simply have not excavated the primary contexts where Egyptian-style closed forms might have been consumed, their paucity within assemblages that are otherwise overwhelmingly composed of open forms from the Egyptian-style table service is striking. Furthermore, this pattern is echoed at other Late Bronze Age III sites like Beth Shean (Martin 2009c; Damm Forthcoming a), where despite an overwhelming proportion of Egyptian-style tableware, vessels for serving or consuming drink are almost purely from the Levantine tradition. Consequently, if we compare the distribution of different elements of the table service at Jaffa, although open forms are predominantly derived from the Egyptian tradition throughout most the history of the site, by the Late Bronze Age III the articulation of the meal was no longer subject to a material habitus of dining that also employed the classic Egyptian vessels used for the service of drink.

One final pattern of note with respect to dining practices at Jaffa relates to decorated tableware. While I have already discussed how decorative patterns within the Egyptian-style assemblage kept pace with developments in the imperial core (see Section 9.2.1), I have not yet addressed the relationship between Levantine and Egyptian-style decoration. Despite the robust figural and geometric decorative traditions attested on Levantine ceramics during the Late Bronze Age (see Choi 2016), Levantine decorated pottery—and especially tableware—is remarkably rare at Jaffa. Of the few examples recovered, nearly all adhere to relatively simple patterns of decoration analogous to what is seen on Egyptian-style bowls—either a red-painted rim or a red rim in combination with red concentric circles on the interior of the bowl. Both decorative motifs antedate the Late Bronze Age and therefore should not be understood as a Levantine adaptation from the Egyptian-style "lipstick" rim tradition. What is peculiar, however, is that these two decorative types are the only ones common on Levantine bowls at Jaffa. Consequently, while these motifs are not borrowed from the Egyptian-style ceramic tradition, there does seem to be a sort of aesthetic convergence within garrison dining practices wherein the only motifs retained on Levantine vessels were those also present in the Egyptian-style tradition.

The abstract nature of red bands means that delineating their exact significance is difficult, however, recent analyses of New Kingdom coffins have shown the use of red bands around coffin rims in combination with apotropaic spells (Arbuckle Forthcoming), suggesting that painted bands of red could function as a barrier against forces dangerous to the body. Given the embodied nature of food consumption, it would not be unreasonable if red-painted bowls functioned similarly by protecting substances that would in turn be placed in the body. This must obviously remain conjecture, though it is distinctly possible that such a shared meaning led to the popularity of similar decorative styles across the garrison community. It is equally possible that alignment with Egyptian-oriented decorative motifs simply became more popular at the garrison over time, or perhaps conferred greater status. Whatever the case, Levantine motifs foreign to the

Egyptian tradition are conspicuously absent from Jaffa, suggesting the development of a hybrid colonial aesthetic that elided much of the local decorative ceramic tradition during mealtimes.

9.3 Conclusions

Practice-based analysis of quotidian foodways shows the mutual transformation of Egyptian and Levantine actors after more than three centuries of interpersonal entanglements within regional garrisons. By accessing both the deep-seated products of socialized learning as well as the more malleable, public-facing trends in dining practices, foodways reveal previously unknown dynamics. The garrison at Jaffa provides an ideal case study for the discussion of these dynamics, providing a large ceramic and archaeobotanical assemblage that comments on multiple aspects of foodways over the course of the entire imperial period. With these data, it is possible to demonstrate that no single model of cultural interaction encompasses the complex reality of Egypto-Levantine relations at Jaffa. Instead, if we begin at the level of practice, it is possible to demonstrate the complex interweaving of different domains of practice, sometimes conservative and sometimes malleable, that produced a hybrid system of foodways that was purely a product of garrison life. This garrison community subsequently adapted foodways in accordance with the realities of an oftentimes unstable imperial periphery, drawing on a constellation of objects and practices to deal with the frequent irruption of the imperial and colonial into everyday life.

The communities of practice that existed at Jaffa were not all independent communities; individuals likely participated in several of these communities simultaneously. And yet, each of these communities represents independent traditions of socialized learning, some with roots in Egyptian modes of doing and others with roots in the Levant. The community of practice that produced Egyptian-style ceramics, for instance, was inseparable from the Egyptian imperial apparatus, likely being part of the provisioning structure for the garrison. Despite the frequent exogenous inputs into that community that suggests its deep entanglement with the imperial authority, the repertoire of Egyptian-style forms that they produced were but one possible option for consumers at the site. While the use and appreciation of foodways ceramics at the site was heavily influenced by the habitus of Egyptian foodways through this top-down provisioning structure, the final selection of forms used in foodways was still the product of bottom-up individual choices between the Egyptian-style and Levantine ceramics tradition. The result was never a pure expression of one or the other, but rather a hybrid creation inherently tied to the cultural reality of the imperial periphery.

The hybrid system of foodways that manifests at Jaffa over the course of the entire imperial period is one element testifying to the mutual transformation of all parties by the colonial encounter. The product of overlapping communities of practice, foodways at Jaffa united the Levantine culinary system of cooking and baking, the Egyptian system of brewing, and a variable mixture of practices from either tradition related to dining and storage. But even where a particular system prevailed, the exact manifestation was hybridized to a certain extent. For instance, although (in)direct heat cooking was clearly the product of Levantine modes of doing, key components of the Levantine diet like bitter vetch were elided in favor of pulse species common to Egyptian and Levantine foodways. The shift, whether it occurred by accommodation or overt rejection, had a profound enough effect on local agricultural practices that it seemed to have required the importation of an exogenous—likely Egyptian—foddering practice to make up for the loss of bitter vetch. Moreover, while certain elements of Egyptian foodways like bread and beer have been argued to constitute non-negotiable elements of the Egyptian habitus, therefore being central to Egyptian identification in the Levantine imperial periphery, a practice-based approach demonstrates the picture to be more complicated. Indeed, it was possible to fulfill these elements of the habitus at Jaffa, though the only part that might have been expressed in a purely Egyptian fashion was the beer production. The entire taskscape of bread, in contrast, reflected only Levantine modes of doing. While bread might have been central to an Egyptian habitus, its exact expression in the colonial sphere was subject to negotiation. It is not too much to say that foodways at Jaffa were a purely colonial phenomenon. Non-garrison sites in the southern Levant show little evidence to indicate that similar foodways developed there. Even in elite contexts like the Late Bronze Age IIA palace at Beth Shemesh seem to have maintained traditional Levantine foodways down to the level of bitter vetch exploitation (Weiss et al. 2019), meaning that elite emulation need not apply to foodways behaviors outside of arenas of close cultural contact. Moreover, there is little to no evidence demonstrating that the colonial foodways from sites like Jaffa were exported to Egypt, as long-term stability in regional Egyptian foodways—as with emmer cultivation—show no signs of transformation during or immediately after the imperial period. The foodways at Jaffa seem to be purely the product of human entanglements common to garrison life.

Foodways entangled actors at Jaffa in a variety of ways, all of which had profound social implications for interaction. At the simplest level, local food production, be it at the agricultural or culinary level, directly tied the local community to the provisioning of the imperial apparatus. The same food that fed the local population was processed or cached to serve imperial personnel, from the administrators who resided locally at garrison sites to the troops that moved throughout the region on campaign. How the local population felt about this relationship cannot be said with certainty, though the frequent outbursts of violence at Jaffa and the surrounding regions imply that the prevailing sentiment at times deemed overt resistance to be an appropriate response. One of the central entanglements revealed by foodways, however, is the plausible incorporation of locals into the systems designed for sustaining the garrison community, both through cooking and baking. The exact social dynamic by which this occurred is unclear. Previous studies focusing on the rarity of Egyptian-style cooking vessels in the region have suggested that intermarriage and/or some form of employment incorporated local women into garrison foodways (Martin 2004, 280; 2011b, 259–63; Mazar 2011, 179; Fantalkin 2015, 235). While such work need not necessarily be gendered, it cannot be overstated that such interactions might not have been completely consensual. An important corrective can be found in Ellen Morris' analysis of an Egyptian satirical text from the Ramesside period (P. Anastasi I), where an Egyptian official, upon arriving in the vicinity of Jaffa, has a sexual encounter with a woman in a field outside the city. As noted by Morris, the description of mutually desired sexual contact between an Egyptian administrator and an unfamiliar local woman should be regarded as colonial fantasy, and in reality, this encounter more plausibly would have been preceded by a financial transaction or be better classified as rape (Morris 2018, 208–9). While we cannot know with certainty how the situation unfolded within the food production at Jaffa, we should not assume such interactions were always amicable, especially given the closely associated relationship between sexual violence and the colonial encounter (see also Mcclintock 1995; Andrea Smith 2003; 2015; Morgensen 2012).

The possibility that certain aspects of foodways might be gendered within the garrison raises a crucial point about identification at Jaffa. In considering the areas in which foodways or objects might become salient to identification, there is no reason to assume that any one identity was always at the forefront of consideration. Any of the communities of practice described in Section 9.2 could plausibly overlap with specific ethnic groups. For example, the community of practice that produced Egyptian-style ceramics was almost certainly initially derived from an exogenous population of potters from Egypt. But this is more a comment on the relationship between practices and habitus, as well as the most plausible explanation for the closely bounded chain of socialized learning that manifested suddenly within the garrison community. This does not necessarily tell us what practices were salient as individuals underwent the process of identification to a specific ethnic group. For instance, given the probable relationship between cooking and bread production and the presence of locals at the garrison, the primary identities under consideration could have been related to gender, age, or marital status, with the manifestation of practice being more related to the habitus of participants rather than overt identity negotiation related to ethnicity or culture. Interestingly, there does seem to have been a partial negotiation of gender roles specifically among the colonial Egyptian population. In Egypt, the provisioning of bread and beer were closely assigned to traditional domestic roles of women, with both processes typically being re-gendered as male—or at the very least overseen by the male gaze—when they became professionalized.[401] At Jaffa, however, the separation of baking and cooking to Levantine modes of doing on the one hand from brewing in an Egyptian style on the other suggests that some sort of reconfiguration of the expected gender roles occurred in the imperial periphery. While it cannot be said with certainty, it is distinctly possible that—following the original argument that beer was part of the garrison ration (Pierce 2013)—the brewing of beer was professionalized and re-oriented as a specific task of male members of the garrison community. And beginning with the earliest garrison of the Late Bronze Age IB, this

[401] This process is explicitly discussed by Gay Robins with respect to baking and brewing as it shows up in New Kingdom tomb art (Robins 2012, 99–104), though an analogous situation is seen in other industries such as textile manufacture (Barber 1995, 256–57). Specifically with respect to beer, a similar situation occurred in Late Medieval into Renaissance England (Bennett 1996).

resulted in the introduction of a community of practice that was largely—if not exclusively—composed of individuals from Egypt.

While it is impossible to say whether these practices were directly drawn upon for identification with respect to larger social identities like ethnicity, there is strong evidence to suggest that some elements of foodways did become salient in the wake of localized disruptions at the garrison. Whether this signifies the articulation of ethnic boundaries, or simply the signaling of affiliation with certain power structures via conspicuous cultural practices is unclear.[402] What is clear, however, is that aspects of foodways functioned as markers in some capacity. To demonstrate that such saliency likely occurred requires comparing the manifestation of foodways in the aftermath of the Late Bronze Age IB destructions at Jaffa to the destructions characterizing the final dissolution of Egyptian control at Jaffa. If Phase LT-10—the earliest iteration of the garrison—was indeed destroyed, there seems to be no indication that there was an interruption in the manifestation of foodways associated with an Egyptian mode of doing in the following Level VI Late/Phase LT-9. This picture persists following the destruction of Level VI Late/Phase LT-9 during the transition into Phase LT-8. In short, the entire period of the Late Bronze Age IB through Late Bronze Age IIA at Jaffa points to a previously unattested frequency and diversity of Egyptian-style material culture and practices than has been encountered at any contemporary site in the southern Levant. Moreover, this system remained stable despite violent disruptions.

If anything, these episodic disruptions to the garrison community resulted in progressively more intense alignments of garrison foodways with Egyptian modes of doing, with

[402] In the case of signaling affiliation with power structures independent of ethnic identity, Susan Braunstein has argued for a similar situation in the use of Egyptian-style objects in mortuary contexts at southern Levantine garrison sites (Braunstein 1998; 2011).

conspicuously Levantine elements like tableware—and especially decorated tableware—almost vanishing. This can be immediately contrasted with the situation following the destruction of the fortress in c. 1135 BCE, wherein stable patterns that had characterized Egyptian-style tableware assemblage for centuries broke down over the course of perhaps as little as a decade. While the Egyptian-style ceramics industry persisted after the destruction, the production, use, and appreciation of ceramics at Jaffa had categorically shifted. The transformation of dining practices especially could be explained by disruption of the systems that produced foodways ceramics, changing demographics at the site (perhaps via the introduction of mercenaries; see Burke 2018c), or perhaps, the saliency of conducting a meal in accordance with the Egyptian habitus developed an overtly negative connotation. Regardless of the case, there is a clear distinction between foodways in cases where the Egyptian imperial authority was able to assert their authority at Jaffa after a disruption versus instances where their ability to project power had been curtailed.

The erosion of the role played by foodways of an Egyptian derivation at Jaffa was not a drawn-out process beginning early in the 12th century BCE, as might be assumed from traditional narratives regarding the collapse of the New Kingdom empire. Instead, this process coincided rather suddenly with local challenges to Egyptian rule in the final decades of imperial rule. In many ways, the hybrid foodways that developed at colonial Jaffa were directly linked to the fortunes of the garrison as an imperial outpost. Nothing testifies to this reality more than the final destruction of Jaffa in the last quarter of the 12th century BCE. The foodways that had characterized Jaffa for more than three centuries, as well as the systems that supported them, all vanished with the last iteration of the garrison. The end of the empire saw the end of Egyptian-style ceramic production in the region, as well as the disappearance of all other communities of practice related to foodways that drew on Egyptian modes of doing. Jaffa is not unique in this respect, as the situation was repeated at every other Egyptian center. With the collapse of Egyptian rule, the act of identification in the southern Levant ceased to use Egypt as a focal point, either in understanding the self or depicting the other, and local foodways returned to a stable pattern with deep roots in the Levantine past. It was not long after the last Egyptian garrison fell, however, that foodways would be drawn upon again for the creation of new identities, this time among the communities emerging from the ashes of the Egyptian empire.

Appendices

Appendix 1. Qualitative Characterization of the Archaeobotanical Dataset

The characterization of the archaeobotanical data is split into two tables, the first five columns of which are identical. **Site** provides the name of the site, followed by **R**, which gives the region: E (Egypt) or L (Levant). **Area** provides the excavation area within the site. **Phase** provides the original, intra-site stratigraphic designation. If **Phase is** blank, then no designation was made; otherwise, SP indicates a single-phase site and the letter D followed by a number with no dash a site where stratigraphic levels were done by dynasty (e.g., D13 for the Egyptian 13th Dynasty). **Period** provides the relative chronological period. For Egypt, this includes the continued use of the D + number formula and the more common pharaonic periods of MK (Middle Kingdom), SIP (Second Intermediate Period), NK (New Kingdom), and TIP (Third Intermediate Period). Levantine sites use MB (Middle Bronze Age), LB (Late Bronze Age), and IR (Iron Age). These are then followed by period subdivisions (I, IA, IB, etc.). Organization is first by region, then alphabetically by site name, then by chronological periodization, and finally by intra-site phasing, earliest to latest. Appendix 1.1 provides descriptive information, including the total volume of all samples taken for that phase if provided (**Tvol.**). This is followed by several columns summarizing the total NISP for each phase: **CNISP** (total NISP of charred macrobotanical remains), **DNISP** (total NISP of desiccated macrobotanical remains), **LNISP** (total NISP of lumped charred/desiccated macrobotanical remains for those publications that do not differentiate), and **TNISP** (the total NISP of all macrobotanical remains at the site). This is followed by the total number of samples taken from that phase, **NSamp**, and a final column **Reference** offering the bibliographic reference for the data. The variables for Appendix 1.2 can be found at the beginning of that subheading.

Appendix 1.1 Phase-by-Phase Assemblage Compositional Data

Site	R	Area	Phase	Period	Tvol.	CNISP	DNISP	LNISP	TNISP	NSamp	Reference
Abu Ghâlib	E			SIP		448	0	0	448	6	Schiemann 1941
Amara West	E	Villa E12.10	SP	post-D19	36.5	0	0	4526	4526	14	Ryan et al. 2016
Amarna	E	Ranefer	SP	Late D18	10.2	5460	2070	0	7530	5	Stevens & Clapham 2010
Amarna	E	Grid 12	SP	Late D18	42.5	3542	1240	0	4782	20	Stevens & Clapham 2010
Amarna	E	Stone Village	SP	Late D18	22.9	19208	20291	0	39499	15	Clapham & Stevens 2012
Gebel Qarn el-Gir	E			MK		1	155	0	156	1	Cappers et al. 2017
Gebel Qarn el-Gir	E			SIP		0	4	0	4	1	Cappers et al. 2017
Gebel Qarn el-Gir	E			SIP/NK		0	118	0	118	1	Cappers et al. 2017
Gebel Qarn el-Gir	E			NK		2870	3614	0	6484	1	Cappers et al. 2017
Gebel Qarn el-Gir	E			NK/TIP		0	2291	0	2291	1	Cappers et al. 2017
Gebel Qarn el-Gir	E			TIP		0	374	0	374	1	Cappers et al. 2017
Gebel Roma‘	E			MK		6	295	0	301	1	Cappers et al. 2017
Gebel Roma‘	E			SIP		4	1806	0	1810	1	Cappers et al. 2017

Site	R	Area	Phase	Period	Tvol.	CNISP	DNISP	LNISP	TNISP	NSamp	Reference
Gebel Roma‘	E			SIP/NK		1	405	0	406	1	Cappers et al. 2017
Gebel Roma‘	E			NK		10	5664	0	5674	1	Cappers et al. 2017
Gebel Roma‘	E			NK/TIP		1	810	0	811	1	Cappers et al. 2017
Gebel Roma‘	E			TIP		4	2833	0	2837	1	Cappers et al. 2017
Memphis	E	A	IIB	D20		0	0	220	220	1	Murray 2000
Memphis	E	A	III	Mid/Late D18		0	0	24417	24417	19	Murray 2000
Memphis	E	A	IV	Early/Mid D18		0	0	3136	3136	4	Murray 2000
Memphis	E	B	V	D12/D13		0	0	471	471	1	Murray 2000
Memphis	E	B	VIb	D12/D13		0	0	1148	1148	3	Murray 2000
Memphis	E	B	VIc	D12/D13		0	0	18465	18465	7	Murray 2000
Memphis	E	B	VIe	D12/D13		0	0	17074	17074	6	Murray 2000
Memphis	E	B	VI	D12/D13		0	0	12965	12965	7	Murray 2000
Memphis	E	B	VI-VII	D12/D13		0	0	1025	1025	1	Murray 2000
Memphis	E	B	VII	D12/D13		0	0	3037	3037	1	Murray 2000
Memphis	E	B	VIIa	D12/D13		0	0	6393	6393	3	Murray 2000
Memphis	E	B	VIIc	D12/D13		0	0	543	543	1	Murray 2000

Site	R	Area	Phase	Period	Tvol.	CNISP	DNISP	LNISP	TNISP	NSamp	Reference
Tel el-Dabʿa	E	A/V	D-2	SIP	258	4947	0	0	4947	14	Thanheiser 2004
Tell el-Borg	E	III		D18/D19		253	0	0	253	3	Malleson 2019
Tell el-Borg	E	IV		D18		6268	0	0	6268	5	Malleson 2019
Tell Maskhuta	E		1	SIP		1214	0	0	1214	1	Crawford 2003
Tell Maskhuta	E		1+2	SIP		4671	0	0	4671	3	Crawford 2003
Tell Maskhuta	E		2	SIP		2249	0	0	2249	3	Crawford 2003
Tell Maskhuta	E		3	SIP		2364	0	0	2364	2	Crawford 2003
Tell Maskhuta	E		3+4	SIP		1328	0	0	1328	2	Crawford 2003
Tell Maskhuta	E		4	SIP		7834	0	0	7834	3	Crawford 2003
Tell Maskhuta	E		4+	SIP		999	0	0	999	1	Crawford 2003
Tell Maskhuta	E		5	SIP		11255	0	0	11255	6	Crawford 2003
Tell Maskhuta	E		5+	SIP		11880	0	0	11880	1	Crawford 2003
Tell Maskhuta	E		5+6	SIP		7738	0	0	7738	4	Crawford 2003
Tell Maskhuta	E		6	SIP		4220	0	0	4220	4	Crawford 2003
Umm Mawagir	E		D13	MK		2779	0	0	2779	115	Cappers et al. 2014
Wadi el-Hôl	E			SIP/NK		1	64	0	65	1	Cappers et al. 2017

Site	R	Area	Phase	Period	Tvol.	CNISP	DNISP	LNISP	TNISP	NSamp	Reference
Wadi el-Hôl	E			NK		3	421	0	424	1	Cappers et al. 2017
Wadi el-Hôl	E			NK/TIP		3	412	0	415	1	Cappers et al. 2017
Ashdod Beach Site	L		SP	LBIIB		18568	0	0	18568	10	Melamed 2013
Ashkelon	L	North Slope	MBIIA	MBIIA		164	0	0	164	75*	Kislev et al. 2019
Ashkelon	L	North Slope	MBIIA/B	MBIIA/B		219	0	0	219	75*	Kislev et al. 2019
Ashkelon	L	North Slope	MBIIB	MBIIB		135	0	0	135	75*	Kislev et al. 2019
Ashkelon	L	North Slope	MBIIC	MBIIC		7	0	0	7	75*	Kislev et al. 2019
Beth Shean	L	N	N-4	LBIIB		141375	0	0	141375	2	Kislev et al. 2009
Beth Shean	L	S	S-3a	IRIA		625911	0	0	625911	4	Kislev et al. 2009
Beth Shean	L	S	S-2	IRIB		6600	0	0	6600	1	Kislev et al. 2009
Beth Shean	L	R		MBIIB		553	0	0	553	10	Simchoni et al. 2007
Beth Shean	L	R	R-2	LBIA		6	0	0	6	1	Simchoni et al. 2007
Beth Shean	L	R	R-1b	LBIB		55	0	0	55	1	Simchoni et al. 2007
Beth Shean	L	R	R-1a	LBIIA		36071	0	0	36071	3	Simchoni et al. 2007
Beth Shemesh	L	L1505	9	LBIIA		58690	0	0	58690	8	Weiss et al. 2019
Deir ʿAlla	L			LBIIB		39799.5	0	0	39799.5	8	van Zeist & Heeres 1973

Site	R	Area	Phase	Period	Tvol.	CNISP	DNISP	LNISP	TNISP	NSamp	Reference
Deir ʿAlla	L			IRIA		163257	0	0	163257	5	van Zeist & Heeres 1973
Deir ʿAlla	L	KIII		IRIB		71	0	0	71	1	van Zeist & Heeres 1973
Deir el-Balaḥ	L		V	LBIIB		1426	0	0	1426	4	Kislev 2010
Jaffa	L		RG-4a	LBIIB/LBIII		32545	0	0	32545	113	Orendi Forthcoming
Jaffa	L		RG-3b	LBIII		24	0	0	24	6	Orendi Forthcoming
Jaffa	L		RG-3a	LBIII		226	0	0	226	10	Orendi Forthcoming
Manaḥat	L			MBIIB		411	0	0	411	9	Kislev 1998
Megiddo	L			MB		347	0	0	347	6	Borojevic 2006
Megiddo	L			LBI		29	0	0	29	7	Borojevic 2006
Megiddo	L			IRIA		22	0	0	22	2	Borojevic 2006
Megiddo	L			IRIB		286	0	0	286	10	Borojevic 2006
Tel Aphek	L	Palace VI	X12	LBIIB		1838	0	0	1838	5	Kislev & Mahler Slasky 2007
Tel Aphek	L		X11	LBIII/IRI		159	0	0	159	1	Kislev & Mahler Slasky 2007
Tel Aphek	L		X10	IRIB		1629	0	0	1629	3	Kislev & Mahler Slasky 2007

Site	R	Area	Phase	Period	Tvol.	CNISP	DNISP	LNISP	TNISP	NSamp	Reference
Tel Aphek	L		X9	IRIB		1944	0	0	1944	2	Kislev & Mahler Slasky 2007
Tel Aphek	L		X13-X12	LBIIB		61	0	0	61	3	Kislev & Mahler Slasky 2007
Tel Batash	L		VII	LBIIA		189957	0	0	189957	7	Kislev et al. 2006
Tel Batash	L		VIII	LBIB		27853	0	0	27853	14	Kislev et al. 2006
Tel Batash	L		VIB	LBIIB		1553	0	0	1553	1	Kislev et al. 2006
Tel Batash	L		X	LBIA		1208	0	0	1208	1	Kislev et al. 2006
Tel Hadar	L		V	IRIB		7151	0	0	7151	2	Kislev 2015
Tel Ifshar	L	A		LBIIB		423	0	0	423	3	Chernoff 1988, 1992; Chernoff & Paley 1998
Tel Ifshar	L	A		LBIIA		934	0	0	934	3	Chernoff 1988, 1992; Chernoff & Paley 1998
Tel Ifshar	L	C	B	MBIIA		516	0	0	516	31	Chernoff 1988, 1992; Chernoff & Paley 1998
Tel Ifshar	L	C	B/C	MBIIA		364	0	0	364	8	Chernoff 1988, 1992; Chernoff & Paley 1998

Site	R	Area	Phase	Period	Tvol.	CNISP	DNISP	LNISP	TNISP	NSamp	Reference
Tel Ifshar	L	C	C	MBIIA		293	0	0	293	37	Chernoff 1988, 1992; Chernoff & Paley 1998
Tel Ifshar	L	C	D	MBIIA		185	0	0	185	2	Chernoff 1988, 1992; Chernoff & Paley 1998
Tel Ifshar	L	C	E	MBIIA		31772	0	0	31772	3	Chernoff 1988, 1992; Chernoff & Paley 1998
Tel Ifshar	L	C	E	MBIIA		5213	0	0	5213	1	Chernoff 1988, 1992; Chernoff & Paley 1998
Tel Keisan	L		9a	IRIB		5213	0	0	5213	1	Kislev 1980
Tel Shiloh	L	F	VIII	MBII-III		6	0	0	6	1	Kislev 1993
Tel Shiloh	L	F	VII	MBII-III		356	0	0	356	1	Kislev 1993
Tel Shiloh	L	C/D	V	IRI		22942	0	0	22942	8	Kislev 1993
Tell es-Ṣafi	L	E	E-4	LBIII/IRI		284	0	0	284	5	Mahler-Slasky & Kislev 2012; Maier 2013
Tell es-Ṣafi	L	E	E-3	IRIA		45	0	0	45	1	Mahler-Slasky & Kislev 2012; Maier 2013
Tell es-Ṣafi	L	A	A-5	IRIB		28	0	0	28	1	Mahler-Slasky & Kislev 2012; Maier 2013

Site	R	Area	Phase	Period	Tvol.	CNISP	DNISP	LNISP	TNISP	NSamp	Reference
ʿUmayri	L			LBII		271	0	0	271	1	Ramsay & Mueller 2016
ʿUmayri	L			LB/IRI		694	0	0	694	4	Ramsay & Mueller 2016
ʿUmayri	L			IRI		57	0	0	57	1	Ramsay & Mueller 2016

Appendix 1.2 Phase-by-Phase Assemblage Qualitative Data

In addition to the five columns already discussed above in Appendix 1.1, this table includes further information that might indicate contextual and/or collection biases at the level of assemblage. Organizing principles remain the same, but the key for the new columns is as follows. The **Method** column refers to the sampling method used to recover macrobotanical remains and consists of the following values: P (probabilistic sampling), NP (non-probabilistic sampling), SP (selective publication), and QS (quasi-systematic sampling, for projects that adapted systematic sampling procedures but made methodological decisions that rendered the published data not fully systematic). For those phases labeled with QS, see the prose description of the data in Section 3.2 for an explanation behind the designation. The **Recov.** column provides information with respect to how archaeobotanical remains were physically recovered from the soil matrix, with the following values: Flot. (flotation), DS (dry sieving), BFlot. (bucket flotation), HP (hand picking in the field), and HS (hand selection from mass deposits in the lab). The **Mesh** column refers to the smallest mesh size used for recovery. **Context Type** offers a qualitative categorization of the types of contexts surveyed in the study. Finally, **Data** indicates the how the data was reported in the final report, which is indicated by one of the following values: LBL (locus-by-locus), SBS (sample-by-sample), Chron. (lumped by chronological period), and Pres./Abs. (indicating a report that only provides a presence/absence list of taxa in lieu of quantitative data).

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Abu Ghâlib	E			SIP	NP	HS	X	No	No	Occ. Deb.	LBL
Amara West	E	Villa E12.10	SP	post-D19	QS	BFlot.; DS	X	No	No	Fill, Occ. Deb., Ovens	SBS; LBL
Amarna	E	Ra Nefer	SP	Late D18	QS	DS	X	No	No	Occ. Deb., Installations, Streets	SBS; LBL
Amarna	E	Grid 12	SP	Late D18	QS	DS	X	No	No	Occ. Deb., Installations, Streets	SBS; LBL
Amarna	E	Stone Village	SP	Late D18	QS	DS	X	No	No	Occ. Deb., Collapse, Fills, Vessels	SBS; LBL
Gebel Qarn el-Gir	E			MK	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Qarn el-Gir	E			SIP	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Qarn el-Gir	E			SIP/NK	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Qarn el-Gir	E			NK	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Qarn el-Gir	E			NK/TIP	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Qarn el-Gir	E			TIP	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Roma‘	E			MK	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Roma‘	E			SIP	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Roma‘	E			SIP/NK	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Roma‘	E			NK	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Gebel Roma‘	E			NK/TIP	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Gebel Roma‘	E			TIP	P	DS	0.5 mm	Yes	X	Various Contexts	Chron.
Memphis	E	A	IIB	20th D.	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Memphis	E	A	III	Mid/Late D18	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Memphis	E	A	IV	Early/Mid D18	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Memphis	E	B	V	D12/D13	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Memphis	E	B	VIb	D12/D13	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Memphis	E	B	VIc	D12/D13	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Memphis	E	B	VIe	D12/D13	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Memphis	E	B	VI	D12/D13	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Memphis	E	B	VI-VII	D12/D13	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Memphis	E	B	VII	D12/D13	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Memphis	E	B	VIIa	D12/D13	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Memphis	E	B	VIIc	D12/D13	QS	Flot.	250 µm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Cooking Installation	SBS; LBL
Tel el-Dabʿa	E	A/V	D2	SIP	NP	Flot.	0.5 mm	No	Yes	Pit, Midden, Occ. Deb.	SBS; LBL
Tell el-Borg	E	III		18th/D19	NP	BFlot.	0.125 mm	No	Yes	Jars, Architecture, Installations	LBL
Tell el-Borg	E	IV		D18	NP	BFlot.	0.125 mm	No	Yes	Jars, Architecture, Installations	LBL
Tell Maskhuta	E		1	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Tell Maskhuta	E		1+2	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL
Tell Maskhuta	E		2	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL
Tell Maskhuta	E		3	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL
Tell Maskhuta	E		3+4	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL
Tell Maskhuta	E		4	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL
Tell Maskhuta	E		4+	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL
Tell Maskhuta	E		5	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL
Tell Maskhuta	E		5+	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Tell Maskhuta	E		5+6	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL
Tell Maskhuta	E		6	SIP	QS	Flot.	1 mm	No	Yes	Occ. Deb., Middens, Installations, Containers	SBS; LBL
Umm Mawagir	E		D13	MK	P	DS	X	X	X	Various Contexts	Chron.
Wadi el-Hôl	E			SIP/NK	P	DS	0.5 mm	Yes	X	All	Chron.
Wadi el-Hôl	E			NK	P	DS	0.5 mm	Yes	X	All	Chron.
Wadi el-Hôl	E			NK/TIP	P	DS	0.5 mm	Yes	X	All	Chron.
Ashdod Beach Site	L		SP	LBIIB	NP	HS	X	No	X	Jars , Dump, Ash, Destruction Debris	LBL
Ashkelon	L	North Slope	MBIIA	MBIIA	P	Flot.	X	X	X	Various Contexts	Chron.
Ashkelon	L	North Slope	MBIIA/B	MBIIA/B	P	Flot.	X	X	X	Various Contexts	Chron.
Ashkelon	L	North Slope	MBIIB	MBIIB	P	Flot.	X	X	X	Various Contexts	Chron.
Ashkelon	L	North Slope	MBIIC	MBIIC	P	Flot.	X	X	X	Various Contexts	Chron.
Beth Shean	L	N	N-4	LBIIB	NP	ND	X	No	No	Caches	LBL
Beth Shean	L	S	S-3a	IRIA	NP	ND	X	No	No	Caches	LBL
Beth Shean	L	S	S-2	IRIB	NP	ND	X	No	No	Caches	LBL
Beth Shean	L	R		MBIIB	NP	HS; DS	0.5 mm	No	X	Caches, Destruction Debris	SBS

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Beth Shean	L	R	R-2	LBIA	NP	HS; DS	0.5 mm	No	X	Caches, Destruction Debris	SBS
Beth Shean	L	R	R-1b	LBIB	NP	HS; DS	0.5 mm	No	X	Caches, Destruction Debris	SBS
Beth Shean	L	R	R-1a	LBIIA	NP	HS; DS	0.5 mm	No	X	Caches, Destruction Debris	SBS
Beth Shemesh	L	L1505	9	LBIIA	NP	HS	X	No	X	Palace Caches/Jars	LBL
Deir ʿAlla	L			LBIIB	NP	HS	X	No	X	X	SBS
Deir ʿAlla	L			IRIA	NP	HS	X	No	X	X	SBS
Deir ʿAlla	L	KIII		IRIB	NP	HS	X	No	X	X	SBS
Deir el-Balaḥ	L		V	LBIIB	NP	HS	X	No	Yes	Pit	SBS
Jaffa	L		RG-4a	LBIIB/LBIII	QS	Flot.; HS	X	No	Yes	Gate Destruction Debris and Passageway	SBS
Jaffa	L		RG-3b	LBIII	QS	Flot.; HS	X	No	Yes	Gate Destruction Debris and Passageway	SBS
Jaffa	L		RG-3a	LBIII	QS	Flot.; HS	X	No	Yes	Gate Destruction Debris and Passageway	SBS
Manaḥat	L			MBIIB	NP	Flot.	X	X	X	Courtyard, Room, Topsoil	LBL

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Megiddo	L			MB	P; SP	Flot.	0.3 mm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Burial, Cooking Installation, Destruction Debris, Storage Jar	SBS
Megiddo	L			LBI	P; SP	Flot.	0.3 mm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Burial, Cooking Installation, Destruction Debris, Storage Jar	SBS
Megiddo	L			IRIA	P; SP	Flot.	0.3 mm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Burial, Cooking Installation, Destruction Debris, Storage Jar	SBS

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Megiddo	L			IRIB	P; SP	Flot.	0.3 mm	No	Yes	Ash, Pit, Debris layers, Floor, Fills, Silo, Occ. Deb., Burial, Cooking Installation, Destruction Debris, Storage Jar	SBS
Tel Aphek	L	Palace VI	X12	LBIIB	NP	Flot.	X	No	Yes	Palace VI, Pits, Ash, Silos, Jars, Winepresses	LBL
Tel Aphek	L		X11	LBIII/IRI	NP	Flot.	X	No	Yes	Palace VI, Pits, Ash, Silos, Jars, Winepresses	LBL
Tel Aphek	L		X10	IRIB	NP	Flot.	X	No	Yes	Palace VI, Pits, Ash, Silos, Jars, Winepresses	LBL
Tel Aphek	L		X9	IRIB	NP	Flot.	X	No	Yes	Palace VI, Pits, Ash, Silos, Jars, Winepresses	LBL
Tel Aphek	L		X13-X12	LBIIB	NP	Flot.	X	No	Yes	Palace VI, Pits, Ash, Silos, Jars, Winepresses	LBL

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Tel Batash	L		VII	LBIIA	NP	HS, HP	X	No	Yes	Destruction debris ("patrician house")	SBS; LBL
Tel Batash	L		VIII	LBIB	NP	HS, HP	X	No	Yes	Destruction debris ("patrician house")	SBS; LBL
Tel Batash	L		VIB	LBIIB	NP	HS, HP	X	X	X	X	Stratum
Tel Batash	L		X	LBIA	NP	HS, HP	X	X	X	X	Stratum
Tel Hadar	L		V	IRIB	NP	HS	X	No	Yes	Silo	SBS
Tel Ifshar	L	A		LBIIB	P	Flot.; DS	X	No	X	Storage, Occ. Deb., Ash, Floor, Destruction Debris	SBS
Tel Ifshar	L	A		LBIIA	P	Flot.; DS	X	No	X	Storage, Occ. Deb., Ash, Floor, Destruction Debris	SBS
Tel Ifshar	L	C	B	MBIIA	P	Flot.; DS	X	No	X	Storage, Occ. Deb., Ash, Floor, Destruction Debris	SBS

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Tel Ifshar	L	C	B/C	MBIIA	P	Flot.; DS	X	No	X	Storage, Occ. Deb., Ash, Floor, Destruction Debris	SBS
Tel Ifshar	L	C	C	MBIIA	P	Flot.; DS	X	No	X	Storage, Occ. Deb., Ash, Floor, Destruction Debris	SBS
Tel Ifshar	L	C	D	MBIIA	P	Flot.; DS	X	No	X	Storage, Occ. Deb., Ash, Floor, Destruction Debris	SBS
Tel Ifshar	L	C	E	MBIIA	P	Flot.; DS	X	No	X	Storage, Occ. Deb., Ash, Floor, Destruction Debris	SBS
Tel Ifshar	L	C	E	MBIIA	P	Flot.; DS	X	No	X	Storage, Occ. Deb., Ash, Floor, Destruction Debris	SBS
Tel Keisan	L		9a	IRIB	NP	HS	X	No	No	Silo	SBS
Tel Shiloh	L	F	VIII	MBII-III	NP	DS	0.5 mm	X	Yes	Rooms, Fill, Silo, Pit, Collapse	Chron.; LBL
Tel Shiloh	L	F	VII	MBII-III	NP	DS	0.5 mm	X	Yes	Rooms, Fill, Silo, Pit, Collapse	Chron.; LBL

Site	R	Area	Phase	Period	Method	Recov.	Mesh	Sta.	Dup.	Context Type	Data
Tel Shiloh	L	C/D	V	Iron I	NP	DS	0.5 mm	X	Yes	Rooms, Fill, Silo, Pit, Collapse	Chron.; LBL
Tell es-Ṣafi	L	E	E-4	LBIII/IRI	NP	Flot.	X	X	Yes	Floor, Destruction debris, Debris layers	LBL
Tell es-Ṣafi	L	E	E-3	IRIA	NP	Flot.	X	X	Yes	Floor, Destruction debris, Debris layers	LBL
Tell es-Ṣafi	L	A	A-5	IRIB	NP	Flot.	X	X	Yes	Floor, Destruction debris, Debris layers	LBL
ʽUmayri	L			LBII	NP	BFlot.	250 μm	No	Yes	Destruction Debris, Fill, Jar, Occ. Deb., Installations	LBL
ʽUmayri	L			LB/IRI	NP	BFlot.	250 μm	No	Yes	Destruction Debris, Fill, Jar, Occ. Deb., Installations	LBL
ʽUmayri	L			IRI	NP	BFlot.	250 μm	No	Yes	Destruction Debris, Fill, Jar, Occ. Deb., Installations	LBL

Appendix 2. Archaeobotanical Dataset and R Markdown File for Chapters 3 to 6

This appendix provides access to the full dataset and analyses conducted over the course of the paleoethnobotanical study in chapters 3 to 6, which are stored as a .zip file on the private server of the JCHP. It can be accessed through the JCHP database within OCHRE under the "Resources" tab and then under the child item "JCHP Shared Data", as well as using the following UID, which will automatically download the file:

https://pi.lib.uchicago.edu/1001/org/ochre/e8578841-9bb5-4ab5-892c-f302ce7969b5

The file, "Damm_2021_Appendix_2.zip", contains four files. For the analyses, the R Project file "PBot_Final.rproj" serves as the work environment for all analyses conducted in the text, with the R Markdown file "Pbot_Final.rmd" containing the coding packages for all calculations and analyses conducted within the text. Moreover, it includes prose descriptions for all coding decisions. There are three data tables—all Microsoft Excel sheets—that were used during calculations. "Master_Data.xlsx" provides the NISP-per-taxon from each individual sample utilized within this study. "Samples.xlsx" contains qualitative and quantitative summary information for each sample used in this study, including the Index of Heterogeneity (IH) and Shannon-Weaver Index (SW) for each sample. Finally, "Phases.xlsx" contains the phase-level assemblage summary for every phase at every site analyzed within this dissertation, which includes an NISP-per-taxon, the proportional value of that taxon within the phase-level assemblage, and the ubiquity of that taxon within the phase-level assemblage. For a detailed prose description of these dataset and their recorded variables, see Section 3.5.1.

Appendix 3. Chronological and Geographic Distribution of Emmer

The following two tables provide a phase-by-phase breakdown for the distribution of emmer throughout both Egypt (Appendix 3.1) and the southern Levant (Appendix 3.2) during the period of interest. Sites/phases are organized by overarching chronological period first (column **Period**), then alphabetically by site name within that period (column **Site**), then assemblages are split by mode of macrobotanical preservation (column **P**, with the possible values of C for charred, D for desiccated, and L for those publications that lumped charred and desiccated remains together into a single list). The final ordering is by stratum within the period (column **Stratum/Area**), with the earlier strata listed first, and assemblages are also divided by excavation area if the publications also chose to make such a division (e.g., the various excavation areas at Amarna). Each table includes the NISP for both grain (column **Grain NISP**) and chaff elements (column **Chaff NISP**) in each phase, as well as their proportion of the overall phase-level assemblage as a percentage (columns **Grain %** and **Chaff %**). Furthermore, the ubiquity of emmer is calculated (column **Ub.**), which is in turn followed by a column indicating the number of samples taken from the phase in question (column **NSamp**). It should be noted that ubiquity is provided here in these tables regardless of the number of samples taken, despite the fact that it is only utilized in the main text if the number of samples taken was five or greater. Therefore, the reader is encouraged to review these values with caution. Furthermore, if the number of samples is marked with an asterisk and there is no ubiquity value present in the table (e.g., Umm Mawagir in Egypt and Ashkelon in the Levant), then this indicates that despite the number of samples taken the data was lumped in the final publication, and therefore it is impossible to calculate ubiquity for the given phase. Otherwise, blanks should be taken to indicate a value of zero.

Appendix 3.1 Distribution of Emmer at Egyptian Sites

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D	2	1.29	18	11.61	100.00	1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D	2	0.68	2	0.68	100.00	1
	Umm Mawagir		C	79	2.84				115*
12th/13th Dynasty	Memphis	Stratum VIIc	L	7	1.29	131	24.13	100.00	1
	Memphis	Stratum VIIa	L	62	0.97	396	12.39	100.00	3
	Memphis	Stratum VII	L	16	0.53	56	1.84	100.00	1
	Memphis	Stratum VI-VII	L	16	1.56	65	6.34	100.00	1
	Memphis	Stratum VI	L	269	2.07	1435	11.07	100.00	7
	Memphis	Stratum VIe	L	431	2.52	2635	15.43	100.00	6
	Memphis	Stratum VIc	L	693	3.75	791	4.28	100.00	7
	Memphis	Stratum VIb	L	20	1.74	198	17.25	100.00	3
	Memphis	Stratum V	L	7	1.49	21	4.46	100.00	1
Second Intermediate Period	Abu Ghâlib		C	107	23.88			100.00	6
	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C	1	25.00	1	25.00	100.00	1
	Gebel Romaʿ		D	43	2.38	479	26.52	100.00	1
	Tel el-Dabʿa	Stratum D-2	C	85	1.72	23	0.46	50.00	14
	Tell Maskhuta	Stratum 6	C	16	0.38	740	17.54	100.00	4
	Tell Maskhuta	Stratum 5+6	C	82	1.06	1922	24.84	100.00	4
	Tell Maskhuta	Stratum 5+	C	92	0.77	1619	13.63	100.00	1

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Tell Maskhuta	Stratum 5	C	93	0.83	1760	15.64	100.00	6
	Tell Maskhuta	Stratum 4+	C	10	1.00	209	20.92	100.00	1
	Tell Maskhuta	Stratum 4	C	32	0.41	2200	28.08	100.00	3
	Tell Maskhuta	Stratum 3+4	C	9	0.68	290	21.84	100.00	2
	Tell Maskhuta	Stratum 3	C	21	0.89	767	32.45	50.00	2
	Tell Maskhuta	Stratum 2	C	4	0.18	309	13.74	100.00	3
	Tell Maskhuta	Stratum 1+2	C	14	0.30	474	10.15	100.00	3
	Tell Maskhuta	Stratum 1	C	3	0.25	54	4.45	100.00	1
Second Intermediate Period/New Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D	10	8.47	25	21.19	100.00	1
	Gebel Romaʿ		C			1	100.00	100.00	1
	Gebel Romaʿ		D	16	3.95	18	4.44	100.00	1
	Wadi el-Hôl		C	1	100.00			100.00	1
	Wadi el-Hôl		D	4	6.25	25	39.06	100.00	1
New Kingdom	Gebel Qarn el-Gir		C			2695	93.90	100.00	1
	Gebel Qarn el-Gir		D	97	2.68	1360	37.63	100.00	1
	Gebel Romaʿ		C	3	30.00			100.00	1
	Gebel Romaʿ		D	189	3.34	3139	55.42	100.00	1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D			382	90.74	100.00	1
18th Dynasty	Amarna	Grid 12	C	364	10.28	2276	64.26	80.00	20
	Amarna	Grid 12	D	22	1.77	448	36.13	80.00	20
	Amarna	House of Ranefer	C	139	2.55	2884	52.82	100.00	5
	Amarna	House of Ranefer	D	Fragments		974	47.05	80.00	5

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Amarna	Stone Village	C	339	1.76	12216	63.60	93.33	15
	Amarna	Stone Village	D	56	0.28	13717	67.60	93.33	15
	Memphis	Stratum IV	L	73	2.33	643	20.50	100.00	4
	Memphis	Stratum III	L	927	3.80	5618	23.01	100.00	19
	Tell el-Borg	Stratum IV	C	302	4.82	1448	23.10	100.00	5
19th Dynasty	Tell el-Borg	Stratum III	C	1	0.40	37	14.62	100.00	3
20th Dynasty	Amara West		L	13	0.29	1164	25.72	64.29	14
	Memphis	Stratum IIB	L	5	2.27	110	50.00	100.00	1
New Kingdom/Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D	154	6.72	1295	56.53	100.00	1
	Gebel Roma‘		C						1
	Gebel Roma‘		D	140	17.28	574	70.86	100.00	1
	Wadi el-Hôl		C	1	33.33			100.00	1
	Wadi el-Hôl		D	17	4.13	314	76.21	100.00	1
Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D	87	23.26			100.00	1
	Gebel Roma‘		C						1
	Gebel Roma‘		D	266	9.39	1917	67.67	100.00	1

Appendix 3.2 Distribution of Emmer at Southern Levantine Sites

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Bronze Age IIA	Ashkelon	North Slope	C						75*
	Tel Ifshar	Stratum B	C						31
	Tel Ifshar	Stratum B/C	C						8
	Tel Ifshar	Stratum C	C						37
	Tel Ifshar	Stratum D	C						2
	Tel Ifshar	Stratum E	C	21106	66.43	2529	7.96	100.00	3
Middle Bronze Age IIA/B	Ashkelon	North Slope	C						1
Middle Bronze Age IIB/C	Ashkelon	North Slope	C						75*
	Beth Shean	Area R	C	18	3.25			10.00	10
	Manaḥat		C						9
	Megiddo		C	63	18.16	22	6.34	50.00	6
	Shiloh	Stratum VIII	C						1
	Shiloh	Stratum VII	C						1
Middle Bronze Age IIC	Ashkelon	North Slope	C						75*
Late Bronze Age IA	Beth Shean	Stratum R-2	C						1
	Megiddo		C						1
	Tel Batash	Stratum X	C	68	5.63			100.00	1
Late Bronze Age IB	Beth Shean	Stratum R-1b	C						1
	Tel Batash	Stratum VIII	C	43	0.15			21.43	14
Late Bronze Age IIA	Beth Shean	Stratum R-1a	C	30	0.08			66.67	3
	Beth Shemesh	Stratum 9	C			7	0.01	12.50	8
	Tel Batash	Stratum VII	C						7
	Tel Ifshar	Area A	C						3

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Late Bronze Age IIB	Tel Aphek	Stratum X-13/12	C	3	4.92			66.67	3
	Tel Aphek	Stratum X-12	C	16	0.87			80.00	5
	Ashdod Beach Site		C						10
	Beth Shean	Stratum N-4	C						2
	Deir ʿAllā		C						8
	Deir el-Balaḥ	Stratum V	C						4
	Tel Batash	Stratum VIB	C						1
	Tel Ifshar	Area A	C						3
	Tall al-ʿUmayri		C						1
Late Bronze Age III/Iron Age I	Tel Aphek	Stratum X-11	C						1
	Deir ʿAllā		C						5
	Jaffa	Phase RG-4a	C			12	0.04	7.08	113
	Jaffa	Phase RG-3b	C						6
	Jaffa	Phase RG-3a	C						10
	Megiddo		C						2
	Tell es-Ṣafi/Gath	Stratum E-4	C						5
	Tall al-ʿUmayri		C			8	2.95	100.00	4
Iron Age I	Tel Aphek	Stratum X-10	C	152	9.33			66.67	3
	Tel Aphek	Stratum X-9	C	10	0.51			50.00	2
	Beth Shean	Stratum S-3a	C						4
	Beth Shean	Stratum S-2	C						1
	Deir ʿAllā		C	1	0.00			20.00	5
	Megiddo		C	20	6.99			40.00	10
	Tel Shiloh	Stratum V	C						8
	Tell es-Ṣafi/Gath	Stratum E-3	C						1

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Tell es-Ṣafi/Gath	Stratum A-5	C						1
	Tel Hadar	Stratum V	C						2
	Tel Keisan	Stratum 9a	C	71	1.36			100.00	1
	Tall al-ʿUmayri		C			3	0.43	25.00	4

Appendix 4. Chronological and Geographic Distribution of Durum

The following two tables provide a phase-by-phase breakdown for the distribution of durum throughout both Egypt (Appendix 4.1) and the southern Levant (Appendix 4.2) during the period of interest. Sites/phases are organized by overarching chronological period first (column **Period**), then alphabetically by site name within that period (column **Site**), then assemblages are split by mode of macrobotanical preservation (column **P**, with the possible values of C for charred, D for desiccated, and L for those publications that lumped charred and desiccated remains together into a single list). The final ordering is by stratum within the period (column **Stratum/Area**), with the earlier strata listed first, and assemblages are also divided by excavation area if the publications also chose to make such a division (e.g., the various excavation areas at Amarna). Each table includes the NISP for both grain (column **Grain NISP**) and chaff elements (column **Chaff NISP**) in each phase, as well as their proportion of the overall phase-level assemblage as a percentage (columns **Grain %** and **Chaff %**). Furthermore, the ubiquity of durum is calculated (column **Ub.**), which is in turn followed by a column indicating the number of samples taken from the phase in question (column **NSamp**). It should be noted that ubiquity is provided here in these tables regardless of the number of samples taken, despite the fact that it is only utilized in the main text if the number of samples taken was five or greater. Therefore, the reader is encouraged to review these values with caution. Furthermore, if the number of samples is marked with an asterisk and there is no ubiquity value present in the table (e.g., Umm Mawagir in Egypt and Ashkelon in the Levant), then this indicates that despite the number of samples taken the data was lumped in the final publication, and therefore it is impossible to calculate ubiquity for the given phase. Otherwise, blanks should be taken to indicate a value of zero.

Appendix 4.1 Distribution of Durum at Egyptian Sites

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Umm Mawagir		C						115*
12th/13th Dynasty	Memphis	Stratum VIIc	L						1
	Memphis	Stratum VIIa	L						3
	Memphis	Stratum VII	L						1
	Memphis	Stratum VI-VII	L						1
	Memphis	Stratum VI	L	2	0.02			14.29	7
	Memphis	Stratum VIe	L	22	0.13	2	0.01	33.33	6
	Memphis	Stratum VIc	L	21	0.11			28.57	7
	Memphis	Stratum VIb	L						3
	Memphis	Stratum V	L						1
Second Intermediate Period	Abu Ghâlib		C						6
	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C			7	0.39	100.00	1
	Gebel Romaʿ		D						1
	Tel el-Dabʿa	Stratum D-2	C						14
	Tell Maskhuta	Stratum 6	C						4
	Tell Maskhuta	Stratum 5+6	C						4
	Tell Maskhuta	Stratum 5+	C						1

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Tell Maskhuta	Stratum 5	C						6
	Tell Maskhuta	Stratum 4+	C						1
	Tell Maskhuta	Stratum 4	C						3
	Tell Maskhuta	Stratum 3+4	C						2
	Tell Maskhuta	Stratum 3	C						2
	Tell Maskhuta	Stratum 2	C						3
	Tell Maskhuta	Stratum 1+2	C						3
	Tell Maskhuta	Stratum 1	C						1
Second Intermediate Period/New Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Roma‘		C						1
	Gebel Roma‘		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
New Kingdom	Gebel Qarn el-Gir		C			86	3.00	100.00	1
	Gebel Qarn el-Gir		D			5	0.14	100.00	1
	Gebel Roma‘		C						1
	Gebel Roma‘		D			7	0.12	100.00	1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
18th Dynasty	Amarna	Grid 12	C						20
	Amarna	Grid 12	D						20
	Amarna	House of Ranefer	C						5
	Amarna	House of Ranefer	D						5

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Amarna	Stone Village	C						15
	Amarna	Stone Village	D						15
	Memphis	Stratum IV	L						4
	Memphis	Stratum III	L	1	0.00			5.26	19
	Tell el-Borg	Stratum IV	C						5
19th Dynasty	Tell el-Borg	Stratum III	C						5
20th Dynasty	Amara West		L						14
	Memphis	Stratum IIB	L						1
New Kingdom/Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C			18	2.22	100.00	1
	Gebel Romaʿ		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1

Appendix 4.2 Distribution of Durum at Southern Levantine Sites

In the particular case of the southern Levant during the period of interest, there is the issue of taxonomic identifications that were intentionally not to the level of ploidy. Instead, a combined species designation of *durum/aestivum* was applied. For all phases where this is relevant, the symbol † is used alongside the site name.

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Bronze Age IIA	Ashkelon	North Slope	C	39	23.78	1	0.61		75*
	Tel Ifshar	Stratum B	C						31
	Tel Ifshar	Stratum B/C	C						8
	Tel Ifshar	Stratum C	C						37
	Tel Ifshar	Stratum D	C						2
	Tel Ifshar	Stratum E	C						3
Middle Bronze Age IIA/B	Ashkelon	North Slope	C	49	22.37				1
Middle Bronze Age IIB/C	Ashkelon	North Slope	C	19	14.07				75*
	Beth Shean	Area R	C	159	28.75			40.00	10
	Manaḥat		C	9	2.19			22.22	9
	Megiddo		C						6
	Shiloh	Stratum VIII	C						1
	Shiloh	Stratum VII	C	20	5.62			100.00	1
Middle Bronze Age IIC	Ashkelon	North Slope	C	1	14.29				75*
Late Bronze Age IA	Beth Shean	Stratum R-2	C						1
	Megiddo		C						1
	Tel Batash	Stratum X	C	3	0.25			100.00	1
Late Bronze Age IB	Beth Shean	Stratum R-1b	C						1
	Tel Batash	Stratum VIII	C	23143	83.09			78.57	14
Late Bronze Age IIA	Beth Shean	Stratum R-1a	C	35408	98.16			100.00	3

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Beth Shemesh	Stratum 9	C	29155	49.68			100.00	8
	Tel Batash	Stratum VII	C	167619	88.24	33	0.07	85.71	7
	Tel Ifshar	Area A	C						3
Late Bronze Age IIB	Tel Aphek	Stratum X-13/12	C	61	21.31			66.67	3
	Tel Aphek	Stratum X-12	C	643	34.98	6	0.33	100.00	5
	Ashdod Beach Site		C						10
	Beth Shean	Stratum N-4	C	139341	98.56			100.00	2
	Deir ʿAllā†		C	963	2.42			62.50	8
	Deir el-Balaḥ	Stratum V	C	21	1.47			50.00	4
	Tel Batash	Stratum VIB	C	18	1.16			100.00	1
	Tel Ifshar	Area A	C						3
	Tall al-ʿUmayri		C						1
Late Bronze Age III/Iron Age I	Tel Aphek	Stratum X-11	C	71	44.65			100.00	1
	Deir ʿAllā†		C	158050	96.81			80.00	5
	Jaffa	Phase RG-4a	C	27866	85.62	1	0.00	75.22	113
	Jaffa	Phase RG-3b	C	5	20.83			33.33	6
	Jaffa	Phase RG-3a	C	13	5.75	6	2.65	60.00	10
	Megiddo		C						2
	Tell es-Ṣafi/Gath	Stratum E-4	C	193	67.96			100.00	5
	Tall al-ʿUmayri		C						4
Iron Age I	Tel Aphek	Stratum X-10	C	140	8.59	129	12.28	100.00	3
	Tel Aphek	Stratum X-9	C	179	9.21	2	1944.00	100.00	2
	Beth Shean	Stratum S-3a	C	1	0.00			24.00	4
	Beth Shean	Stratum S-2	C	6600	100.00			100.00	1
	Deir ʿAllā		C						1

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Megiddo		C						10
	Tel Shiloh	Stratum V	C	13353	58.20	2248	9.80	25.00	8
	Tell es-Ṣafi/Gath	Stratum E-3	C	5	11.11			100.00	1
	Tell es-Ṣafi/Gath	Stratum A-5	C	2	7.14			100.00	1
	Tel Hadar	Stratum V	C	6556	91.68	10	0.14	100.00	2
	Tel Keisan	Stratum 9a	C	3667	70.34			100.00	1
	Tall al-ʿUmayri		C						1

Appendix 5. Chronological and Geographic Distribution of Bread Wheat

The following two tables provide a phase-by-phase breakdown for the distribution of bread wheat throughout both Egypt (Appendix 5.1) and the southern Levant (Appendix 5.2) during the period of interest. Sites/phases are organized by overarching chronological period first (column **Period**), then alphabetically by site name within that period (column **Site**), then assemblages are split by mode of macrobotanical preservation (column **P**, with the possible values of C for charred, D for desiccated, and L for those publications that lumped charred and desiccated remains together into a single list). The final ordering is by stratum within the period (column **Stratum/Area**), with the earlier strata listed first, and assemblages are also divided by excavation area if the publications also chose to make such a division (e.g., the various excavation areas at Amarna). Each table includes the NISP for both grain (column **Grain NISP**) and chaff elements (column **Chaff NISP**) in each phase, as well as their proportion of the overall phase-level assemblage as a percentage (columns **Grain %** and **Chaff %**). Furthermore, the ubiquity of bread wheat is calculated (column **Ub.**), which is in turn followed by a column indicating the number of samples taken from the phase in question (column **NSamp**). It should be noted that ubiquity is provided here in these tables regardless of the number of samples taken, despite the fact that it is only utilized in the main text if the number of samples taken was five or greater. Therefore, the reader is encouraged to review these values with caution. Furthermore, if the number of samples is marked with an asterisk and there is no ubiquity value present in the table (e.g., Umm Mawagir in Egypt and Ashkelon in the Levant), then this indicates that despite the number of samples taken the data was lumped in the final publication, and therefore it is impossible to calculate ubiquity for the given phase. Otherwise, blanks should be taken to indicate a value of zero.

Appendix 5.1 Distribution of Bread Wheat at Egyptian Sites

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Umm Mawagir		C						115
12th/13th Dynasty	Memphis	Stratum VIIc	L						1
	Memphis	Stratum VIIa	L						3
	Memphis	Stratum VII	L						1
	Memphis	Stratum VI-VII	L						1
	Memphis	Stratum VI	L	2	0.02			14.29	7
	Memphis	Stratum VIe	L	22	0.13	2	0.01	33.33	6
	Memphis	Stratum VIc	L	21	0.11			28.57	7
	Memphis	Stratum VIb	L						3
	Memphis	Stratum V	L						1
Second Intermediate Period	Abu Ghâlib		C						6
	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Tel el-Dabʿa	Stratum D-2	C						14
	Tell Maskhuta	Stratum 6	C						4
	Tell Maskhuta	Stratum 5+6	C						4
	Tell Maskhuta	Stratum 5+	C						1

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Tell Maskhuta	Stratum 5	C						6
	Tell Maskhuta	Stratum 4+	C						1
	Tell Maskhuta	Stratum 4	C						3
	Tell Maskhuta	Stratum 3+4	C						2
	Tell Maskhuta	Stratum 3	C						2
	Tell Maskhuta	Stratum 2	C						3
	Tell Maskhuta	Stratum 1+2	C						3
	Tell Maskhuta	Stratum 1	C						1
Second Intermediate Period/New Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Roma'		C						1
	Gebel Roma'		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
New Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Roma'		C						1
	Gebel Roma'		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
18th Dynasty	Amarna	Grid 12	C						20
	Amarna	Grid 12	D						20
	Amarna	House of Ranefer	C						5
	Amarna	House of Ranefer	D						5

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Amarna	Stone Village	C						15
	Amarna	Stone Village	D						15
	Memphis	Stratum IV	L						4
	Memphis	Stratum III	L	1	0.00			5.26	19
	Tell el-Borg	Stratum IV	C	9	0.14	16	0.26	80.00	5
19th Dynasty	Tell el-Borg	Stratum III	C						5
20th Dynasty	Amara West		L						14
	Memphis	Stratum IIB	L						1
New Kingdom/Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Roma‘		C						1
	Gebel Roma‘		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Roma‘		C						1
	Gebel Roma‘		D						1

Appendix 5.2 Distribution of Bread Wheat at Southern Levantine Sites

In the particular case of the southern Levant during the period of interest, there is the issue of taxonomic identifications that were intentionally not to the level of ploidy. Instead, a combined species designation of *durum/aestivum* was applied. For all phases where this is relevant, the symbol † is used alongside the site name.

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Bronze Age IIA	Ashkelon	North Slope	C						75*
	Tel Ifshar	Stratum B	C						31
	Tel Ifshar	Stratum B/C	C						8
	Tel Ifshar	Stratum C	C						37
	Tel Ifshar	Stratum D	C						2
	Tel Ifshar	Stratum E	C						3
Middle Bronze Age IIA/B	Ashkelon	North Slope	C						1
Middle Bronze Age IIB/C	Ashkelon	North Slope	C						75*
	Beth Shean	Area R	C						10
	Manaḥat		C						9
	Megiddo		C			1	0.29	16.67	6
	Shiloh	Stratum VIII	C						1
	Shiloh	Stratum VII	C						1
Middle Bronze Age IIC	Ashkelon	North Slope	C						75*
Late Bronze Age IA	Beth Shean	Stratum R-2	C						1
	Megiddo		C						1
	Tel Batash	Stratum X	C						1
	Beth Shean	Stratum R-1b	C						1

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Late Bronze Age IB	Tel Batash	Stratum VIII	C						14
Late Bronze Age IIA	Beth Shean	Stratum R-1a	C						3
	Beth Shemesh	Stratum 9	C						8
	Tel Batash	Stratum VII	C						7
	Tel Ifshar	Area A	C						3
Late Bronze Age IIB	Tel Aphek	Stratum X-13/12	C						3
	Tel Aphek	Stratum X-12	C						5
	Ashdod Beach Site		C						10
	Beth Shean	Stratum N-4	C						2
	Deir ʿAllā†		C	963	2.42			62.50	8
	Deir el-Balaḥ	Stratum V	C						4
	Tel Batash	Stratum VIB	C						1
	Tel Ifshar	Area A	C						3
	Tall al-ʿUmayri		C	5	1.85	32	11.81	100.00	1
Late Bronze Age III/Iron Age I	Tel Aphek	Stratum X-11	C						1
	Deir ʿAllā†		C	158050	96.81			80.00	5
	Jaffa	Phase RG-4a	C	1	0.00			0.88	113
	Jaffa	Phase RG-3b	C						6
	Jaffa	Phase RG-3a	C						10
	Megiddo		C			1	4.55	50.00	2
	Tell es-Ṣafi/Gath	Stratum E-4	C						5
	Tall al-ʿUmayri		C	35	5.04			50.00	4
Iron Age I	Tel Aphek	Stratum X-10	C						3
	Tel Aphek	Stratum X-9	C						2
	Beth Shean	Stratum S-3a	C						4

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Beth Shean	Stratum S-2	C						1
	Deir ʿAllā		C						1
	Megiddo		C			5	1.75	20.00	10
	Tel Shiloh	Stratum V	C						8
	Tell es-Ṣafi/Gath	Stratum E-3	C						1
	Tell es-Ṣafi/Gath	Stratum A-5	C						1
	Tel Hadar	Stratum V	C						2
	Tel Keisan	Stratum 9a	C						1
	Tall al-ʿUmayri		C						1

Appendix 6. Chronological and Geographic Distribution of Barley

The following two tables provide a phase-by-phase breakdown for the distribution of barley throughout both Egypt (Appendix 6.1) and the southern Levant (Appendix 6.2) during the period of interest. Sites/phases are organized by overarching chronological period first (column **Period**), then alphabetically by site name within that period (column **Site**), then assemblages are split by mode of macrobotanical preservation (column **P**, with the possible values of C for charred, D for desiccated, and L for those publications that lumped charred and desiccated remains together into a single list). The final ordering is by stratum within the period (column **Stratum/Area**), with the earlier strata listed first, and assemblages are also divided by excavation area if the publications also chose to make such a division (e.g., the various excavation areas at Amarna). Each table includes the NISP for both grain (column **Grain NISP**) and chaff elements (column **Chaff NISP**) in each phase, as well as their proportion of the overall phase-level assemblage as a percentage (columns **Grain %** and **Chaff %**). Furthermore, the ubiquity of barley is calculated (column **Ub.**), which is in turn followed by a column indicating the number of samples taken from the phase in question (column **NSamp**). It should be noted that ubiquity is provided here in these tables regardless of the number of samples taken, despite the fact that it is only utilized in the main text if the number of samples taken was five or greater. Therefore, the reader is encouraged to review these values with caution. Furthermore, if the number of samples is marked with an asterisk and there is no ubiquity value present in the table (e.g., Umm Mawagir in Egypt and Ashkelon in the Levant), then this indicates that despite the number of samples taken the data was lumped in the final publication, and therefore it is impossible to calculate ubiquity for the given phase. Otherwise, blanks should be taken to indicate a value of zero.

Appendix 6.1 Distribution of Barley at Egyptian Sites

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Kingdom	Gebel Qarn el-Gir		C	1	100.00			100.00	1
	Gebel Qarn el-Gir		D	14	9.03	45	29.03	100.00	1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Umm Mawagir		C	2146	77.22	42	1.51		115*
12th/13th Dynasty	Memphis	Stratum VIIc	L	5	0.92	1	0.18		1
	Memphis	Stratum VIIa	L	235	3.68	17	0.27	100.00	3
	Memphis	Stratum VII	L	152	5.00	11	0.36	100.00	1
	Memphis	Stratum VI-VII	L	39	3.80	4	0.39	100.00	1
	Memphis	Stratum VI	L	717	5.53	16	0.12	100.00	7
	Memphis	Stratum VIe	L	1792	10.50	9	0.05	100.00	6
	Memphis	Stratum VIc	L	1447	7.84	41	0.22	100.00	7
	Memphis	Stratum VIb	L	32	2.79			100.00	3
	Memphis	Stratum V	L	56	11.89			100.00	1
Second Intermediate Period	Abu Ghâlib		C	274	61.16			100.00	6
	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D	25				100.00	1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Tel el-Dabʿa	Stratum D-2	C	93	1.88	23	0.46	57.14	14
	Tell Maskhuta	Stratum 6	C	160	3.79	342	8.10		4
	Tell Maskhuta	Stratum 5+6	C	99	1.28	391	5.05	100.00	4
	Tell Maskhuta	Stratum 5+	C	77	0.65	192	1.62	100.00	1

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Tell Maskhuta	Stratum 5	C	142	1.26	372	3.31	83.33	6
	Tell Maskhuta	Stratum 4+	C	8	0.80	53	5.31	100.00	1
	Tell Maskhuta	Stratum 4	C	154	1.97	286	3.65	100.00	3
	Tell Maskhuta	Stratum 3+4	C	23	1.73	5	0.38	100.00	2
	Tell Maskhuta	Stratum 3	C	72	3.05	98	4.15	100.00	2
	Tell Maskhuta	Stratum 2	C	22	0.98	49	2.18	100.00	3
	Tell Maskhuta	Stratum 1+2	C	216	4.62	145	3.10	100.00	3
	Tell Maskhuta	Stratum 1	C	113	9.31	245	20.18	100.00	1
Second Intermediate Period/New Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D	18	15.25	49	41.53	100.00	1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
New Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D	376	10.40	1509	41.75	100.00	1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
18th Dynasty	Amarna	Grid 12	C	168	4.74	68	1.92	75.00	20
	Amarna	Grid 12	D	10	0.81	305	24.60	50.00	20
	Amarna	House of Ranefer	C	109	2.00	196	3.59	40.00	5
	Amarna	House of Ranefer	D	49	2.37	85	4.11	60.00	5

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Amarna	Stone Village	C	129	0.67	254	1.32	66.67	15
	Amarna	Stone Village	D	24	0.12	703	3.46	80.00	15
	Memphis	Stratum IV	L	93	2.97	10	0.32	100.00	4
	Memphis	Stratum III	L	800	3.28	93	0.38	100.00	19
	Tell el-Borg	Stratum IV	C	52	0.83	70	1.12	100.00	5
19th Dynasty	Tell el-Borg	Stratum III	C						5
20th Dynasty	Amara West		L	66	1.46	404	8.93	64.29	14
	Memphis	Stratum IIB	L	8	3.64	3	1.36	100.00	1
New Kingdom/Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D	314	13.71	470	20.52	100.00	1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D	76	20.32	193	51.60	100.00	1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1

Appendix 6.2 Distribution of Barley at Southern Levantine Sites

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Bronze Age IIA	Ashkelon	North Slope	C	2	1.22				75*
	Tel Ifshar	Stratum B	C						31
	Tel Ifshar	Stratum B/C	C	3	0.82			37.50	8
	Tel Ifshar	Stratum C	C	15	5.12			21.62	37
	Tel Ifshar	Stratum D	C	22	11.89			100.00	2
	Tel Ifshar	Stratum E	C	5	0.02			33.33	3
Middle Bronze Age IIA/B	Ashkelon	North Slope	C	4	1.83				1
Middle Bronze Age IIB/C	Ashkelon	North Slope	C	3	2.22				75*
	Beth Shean	Area R	C	70	12.66	15	2.71	50.00	10
	Manaḥat		C	59	14.36			66.67	9
	Megiddo		C	3	0.86			16.67	6
	Shiloh	Stratum VIII	C						1
	Shiloh	Stratum VII	C	92	25.84			100.00	1
Middle Bronze Age IIC	Ashkelon	North Slope	C						75*
Late Bronze Age IA	Beth Shean	Stratum R-2	C						1
	Megiddo		C						1
	Tel Batash	Stratum X	C						1
Late Bronze Age IB	Beth Shean	Stratum R-1b	C						1
	Tel Batash	Stratum VIII	C	371	1.33			14.29	14
Late Bronze Age IIA	Beth Shean	Stratum R-1a	C	281	0.78			66.67	3
	Beth Shemesh	Stratum 9	C						8
	Tel Batash	Stratum VII	C	21	0.01			14.29	7
	Tel Ifshar	Area A	C						3

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Late Bronze Age IIB	Tel Aphek	Stratum X-13/12	C	2	3.28			33.33	3
	Tel Aphek	Stratum X-12	C	1838	15.02			80.00	5
	Ashdod Beach Site		C						10
	Beth Shean	Stratum N-4	C	370	0.26			100.00	2
	Deir ʿAllā		C	34346	86.30			50.00	8
	Deir el-Balaḥ	Stratum V	C	1400	98.18			4.00	4
	Tel Batash	Stratum VIB	C						1
	Tel Ifshar	Area A	C						3
	Tall al-ʿUmayri		C	36	13.28	2	271.00	100.00	1
Late Bronze Age III/Iron Age I	Tel Aphek	Stratum X-11	C	20	12.58			100.00	1
	Deir ʿAllā		C	198	0.12			100.00	5
	Jaffa	Phase RG-4a	C	186	0.57	2	0.01	40.71	113
	Jaffa	Phase RG-3b	C						6
	Jaffa	Phase RG-3a	C	1	0.44	2	0.88	30.00	10
	Megiddo		C	3	1.05			30.00	2
	Tell es-Ṣafi/Gath	Stratum E-4	C	1	0.35			20.00	5
	Tall al-ʿUmayri		C	519	74.78	3	0.43	75.00	4
Iron Age I	Tel Aphek	Stratum X-10	C	166	10.19	122	6.88	100.00	3
	Tel Aphek	Stratum X-9	C	120	6.17	3	0.15	100.00	2
	Beth Shean	Stratum S-3a	C	4100	0.66			25.00	4
	Beth Shean	Stratum S-2	C						1
	Deir ʿAllā		C	71	100.00			100.00	1
	Megiddo		C						10
	Tel Shiloh	Stratum V	C	5236	22.82	405	1.77	50.00	8
	Tell es-Ṣafi/Gath	Stratum E-3	C	2	4.44			100.00	1

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Tell es-Ṣafi/Gath	Stratum A-5	C	1	3.57			100.00	1
	Tel Hadar	Stratum V	C	10	0.14			100.00	2
	Tel Keisan	Stratum 9a	C	68	1.30			100.00	1
	Tall al-ʿUmayri		C	3	5.26			100.00	1

Appendix 7. Chronological and Geographic Distribution of Bitter Vetch

The following two tables provide a phase-by-phase breakdown for the distribution of bitter vetch throughout both Egypt (Appendix 7.1) and the southern Levant (Appendix 7.2) during the period of interest. Sites/phases are organized by overarching chronological period first (column **Period**), then alphabetically by site name within that period (column **Site**), then assemblages are split by mode of macrobotanical preservation (column **P**, with the possible values of C for charred, D for desiccated, and L for those publications that lumped charred and desiccated remains together into a single list). The final ordering is by stratum within the period (column **Stratum/Area**), with the earlier strata listed first, and assemblages are also divided by excavation area if the publications also chose to make such a division (e.g., the various excavation areas at Amarna). Each table includes the NISP for both grain (column **Grain NISP**) and chaff elements (column **Chaff NISP**) in each phase, as well as their proportion of the overall phase-level assemblage as a percentage (columns **Grain %** and **Chaff %**). Furthermore, the ubiquity of bitter vetch is calculated (column **Ub.**), which is in turn followed by a column indicating the number of samples taken from the phase in question (column **NSamp**). It should be noted that ubiquity is provided here in these tables regardless of the number of samples taken, despite the fact that it is only utilized in the main text if the number of samples taken was five or greater. Therefore, the reader is encouraged to review these values with caution. Furthermore, if the number of samples is marked with an asterisk and there is no ubiquity value present in the table (e.g., Umm Mawagir in Egypt and Ashkelon in the Levant), then this indicates that despite the number of samples taken the data was lumped in the final publication, and therefore it is impossible to calculate ubiquity for the given phase. Otherwise, blanks should be taken to indicate a value of zero.

Appendix 7.1 Distribution of Bitter Vetch at Egyptian Sites

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Umm Mawagir		C						115*
12th/13th Dynasty	Memphis	Stratum VIIc	L						1
	Memphis	Stratum VIIa	L						3
	Memphis	Stratum VII	L						1
	Memphis	Stratum VI-VII	L						1
	Memphis	Stratum VI	L	2	0.02			14.29	7
	Memphis	Stratum VIe	L	2	0.01			16.67	6
	Memphis	Stratum VIc	L	12	0.06			57.14	7
	Memphis	Stratum VIb	L						3
	Memphis	Stratum V	L						1
Second Intermediate Period	Abu Ghâlib		C	22	4.91			66.67	6
	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Tel el-Dabʿa	Stratum D-2	C	13	0.26			42.86	14
	Tell Maskhuta	Stratum 6	C						4
	Tell Maskhuta	Stratum 5+6	C						4
	Tell Maskhuta	Stratum 5+	C						1

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Tell Maskhuta	Stratum 5	C						6
	Tell Maskhuta	Stratum 4+	C						1
	Tell Maskhuta	Stratum 4	C						3
	Tell Maskhuta	Stratum 3+4	C						2
	Tell Maskhuta	Stratum 3	C						2
	Tell Maskhuta	Stratum 2	C						3
	Tell Maskhuta	Stratum 1+2	C						3
	Tell Maskhuta	Stratum 1	C						1
Second Intermediate Period/New Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
New Kingdom	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
18th Dynasty	Amarna	Grid 12	C	16	0.45			30.00	20
	Amarna	Grid 12	D						20
	Amarna	House of Ranefer	C						5
	Amarna	House of Ranefer	D						5

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Amarna	Stone Village	C	6	0.03			20.00	15
	Amarna	Stone Village	D	2	0.01	3	0.01	6.67	15
	Memphis	Stratum IV	L						4
	Memphis	Stratum III	L	27	0.11			5.26	19
	Tell el-Borg	Stratum IV	C						5
19th Dynasty	Tell el-Borg	Stratum III	C						5
20th Dynasty	Amara West		L						14
	Memphis	Stratum IIB	L						1
New Kingdom/Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1
	Wadi el-Hôl		C						1
	Wadi el-Hôl		D						1
Third Intermediate Period	Gebel Qarn el-Gir		C						1
	Gebel Qarn el-Gir		D						1
	Gebel Romaʿ		C						1
	Gebel Romaʿ		D						1

Appendix 7.2 Distribution of Bitter Vetch at Southern Levantine Sites

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
Middle Bronze Age IIA	Ashkelon	North Slope	C	14	8.54				75*
	Tel Ifshar	Stratum B	C	2	0.39			9.68	31
	Tel Ifshar	Stratum B/C	C	26	7.14			62.50	8
	Tel Ifshar	Stratum C	C	5	1.71			16.22	37
	Tel Ifshar	Stratum D	C	4	2.16			50.00	2
	Tel Ifshar	Stratum E	C						3
Middle Bronze Age IIA/B	Ashkelon	North Slope	C	11	5.02				75*
Middle Bronze Age IIB/C	Ashkelon	North Slope	C	5	3.70				75*
	Beth Shean	Area R	C	24	4.34			20.00	10
	Manahat		C	6	1.46			22.22	9
	Megiddo		C						6
	Shiloh	Stratum VIII	C						1
	Shiloh	Stratum VII	C	26	7.30			100.00	1
Middle Bronze Age IIC	Ashkelon	North Slope	C						75*
Late Bronze Age IA	Beth Shean	Stratum R-2	C						1
	Megiddo		C						1
	Tel Batash	Stratum X	C						1
Late Bronze Age IB	Beth Shean	Stratum R-1b	C						1
	Tel Batash	Stratum VIII	C	7	0.03			21.43	14
Late Bronze Age IIA	Beth Shean	Stratum R-1a	C						3
	Beth Shemesh	Stratum 9	C	11449	19.51			75.00	8
	Tel Batash	Stratum VII	C						7

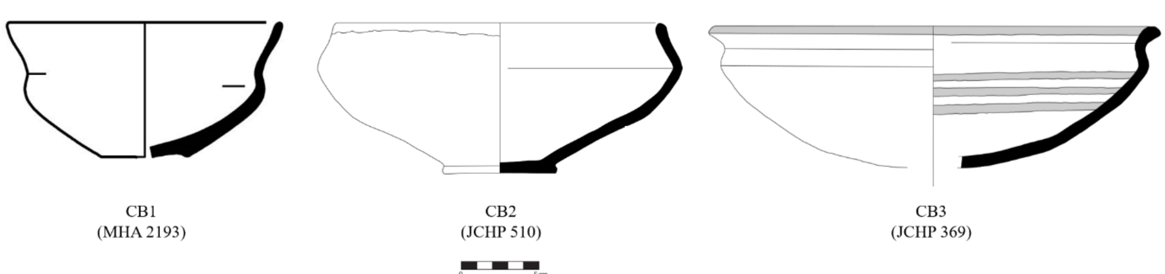
Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Tel Ifshar	Area A	C	2	0.21			100.00	3
Late Bronze Age IIB	Tel Aphek	Stratum X-13/12	C						3
	Tel Aphek	Stratum X-12	C	16	0.87			60.00	5
	Ashdod Beach Site		C	1	0.01			10.00	10
	Beth Shean	Stratum N-4	C						2
	Deir ʿAllā		C	10	0.03			12.50	8
	Deir el-Balaḥ	Stratum V	C						4
	Tel Batash	Stratum VIB	C						1
	Tel Ifshar	Area A	C						3
	Tall al-ʿUmayri		C	20	7.38			100.00	1
Late Bronze Age III/Iron Age I	Tel Aphek	Stratum X-11	C	1	0.63			100.00	1
	Deir ʿAllā		C						5
	Jaffa	Phase RG-4a	C	1	0.00			0.88	113
	Jaffa	Phase RG-3b	C						6
	Jaffa	Phase RG-3a	C						10
	Megiddo		C						2
	Tell es-Ṣafi/Gath	Stratum E-4	C						5
	Tall al-ʿUmayri		C	11	1.59			50.00	4
Iron Age I	Tel Aphek	Stratum X-10	C						3
	Tel Aphek	Stratum X-9	C	25	1.29			50.00	2
	Beth Shean	Stratum S-3a	C						4
	Beth Shean	Stratum S-2	C						1
	Deir ʿAllā		C	3064	1.88			60.00	5
	Megiddo		C	19	6.64			10.00	10
	Tel Shiloh	Stratum V	C	28	0.12			37.50	8

Period	Site	Stratum/Area	P	Grain NISP	Grain %	Chaff NISP	Chaff %	Ub.	NSamp
	Tell es-Ṣafi/Gath	Stratum E-3	C						1
	Tell es-Ṣafi/Gath	Stratum A-5	C						1
	Tel Hadar	Stratum V	C	30	0.42			100.00	2
	Tel Keisan	Stratum 9a	C	56	1.07			0.00	1
	Tall al-ʿUmayri		C						1

Appendix 8. Typological Key for Levantine forms at Jaffa Discussed in Chapters 6 - 8

The following plates provide line drawings of Levantine types discussed in chapters 6 to 8, with special emphasis on complete vessels where possible. Each line drawing includes the type designation, which is in turn followed by a parenthetical note indicating the registration number of form. Generic bases are excluded here (types DB, RB, PB), and several types that remain to be drawn are excluded as well (types LB3, LB6-9, CP3, and JG2). These types are rare, and were created out of the field on the basis of photographs once it was clear they were substantially different from the more established type sequence. They will be drawn for future publication. The plates are divided into six groups: carinated bowls (Appendix 8.1), bowls (Appendix 8.2), kraters (Appendix 8.3), cooking pots (Appendix 8.4), small, closed forms and a lamp (Appendix 8.5), and large closed forms (Appendix 8.6). Appendix 8.3 includes an image of a type KR3 as this well-known variety was mostly attested in the form of decorated body sherds, identifiable to this form based on their curvature.

Appendix 8.1 Carinated Bowls

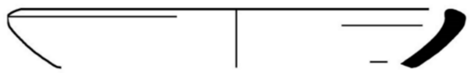


Appendix 8.2 Bowls

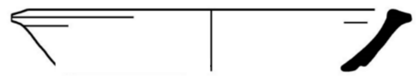
LB1
(MHA 5273)

LB2
(MHA 5862)

LB4
(1574.002)



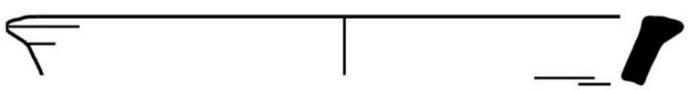
LB5
(MHA 5862)



LB10
(MHA 5867)

Appendix 8.3 Kraters

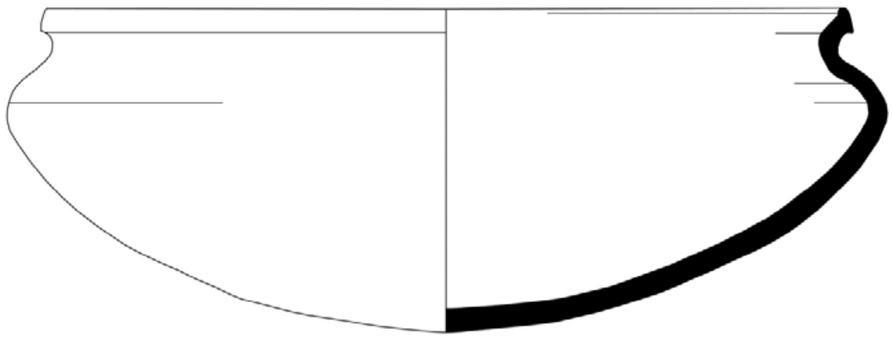
KR1
(1059.001)



KR2
(MHA 4790)

KR3
(MHA 7509)

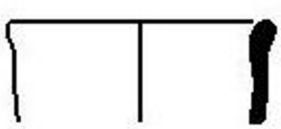
Appendix 8.4 Cooking Pots



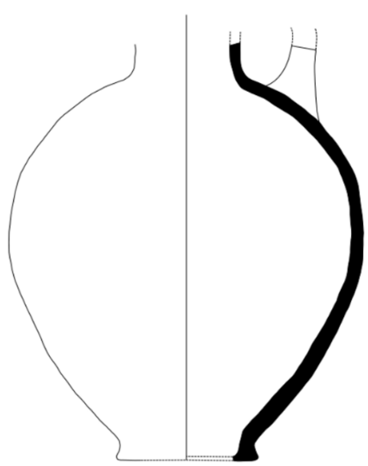
CP1
(MHA 2310)

CP2
(1017.017)

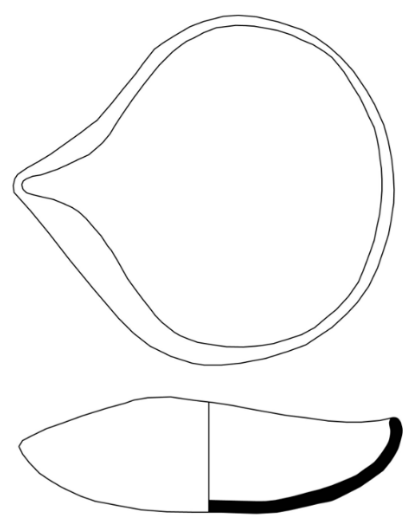
Appendix 8.5 Small Closed Forms and a Lamp



JG1
(1421.001)

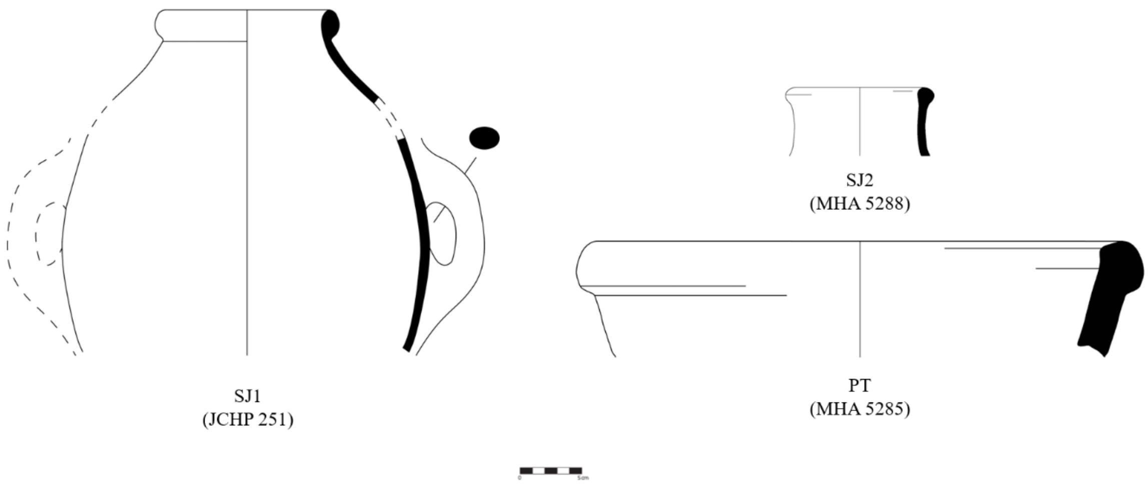


JG3
(JCHP 499)



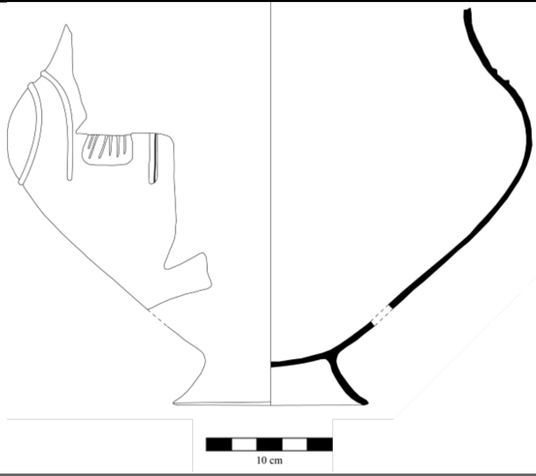
LM
(MHA 2312)

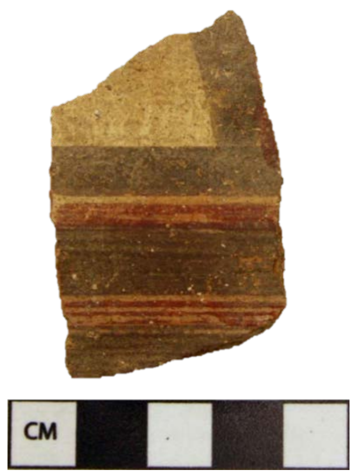
Appendix 8.6 Large Closed Forms



Appendix 9. Typological Key for Cypriot and Mycenaean forms at Jaffa Discussed in Chapters 6 - 8

The presentation of Cypriot and Mycenaean types here is different from the preceding and following treatments of Levantine and Egyptian-style ceramics, as no restorable examples were part of the dataset used in the current study. These ware groups, which are mostly identifiable due to their conspicuous decoration, were mostly identified based on small, fragmentary elements. For the purposes of assisting the reader in the criteria used for their identification, images are preferred over line drawings except in those cases where line drawings demonstrate the main diagnostic criteria (e.g., plastic decoration on Base Ring I forms). The images have been selected for their demonstration of key diagnostic elements. The forms presented here—while from Jaffa—were therefore not necessarily part of the dataset, but rather are for demonstrative purposes. Only non-generic identifications are supplied, thereby excluding the following types: generic white painted ware (CYP1), generic base ring ware (CYP2), generic white slip ware (CYP5), and Mycenaean body sherds (MYC). In these cases, enough diagnostic information was present to place the form into a broader ware group, however it was not possible to classify the sherd more narrowly. The remaining types will be presented in tabular form with an image for their identification.

Type	Image
CYP3 – Base Ring I **(after MHA 2299)**	
CYP4 – Base Ring II **(after MHA 4725)**	
CYP6 – Cypriot Monochrome **(after MHA 7680)**	

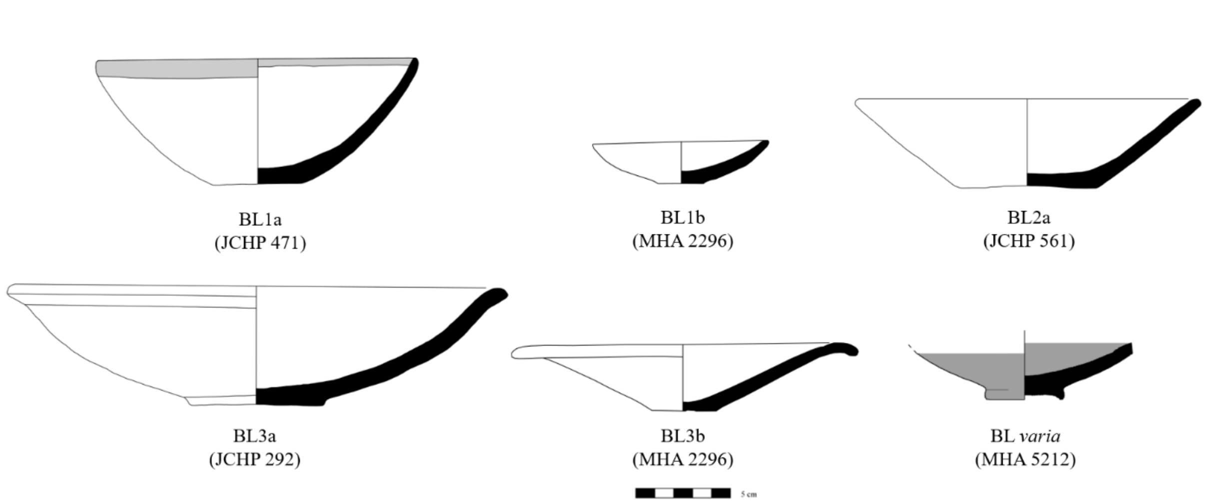
Type	Image
CYP7 – Cypriot Red-on-Black **(after MHA 3193)**	
CYP8 – Cypriot Bichrome (after MHA 4783)	
CYP9 – White Slip II **(after MHA 3877)**	

Type	Image
CYP10 – Cypriot Pithoi **(after MHA 7591)**	
CYP11 – White Slip I **(after MHA 3199)**	

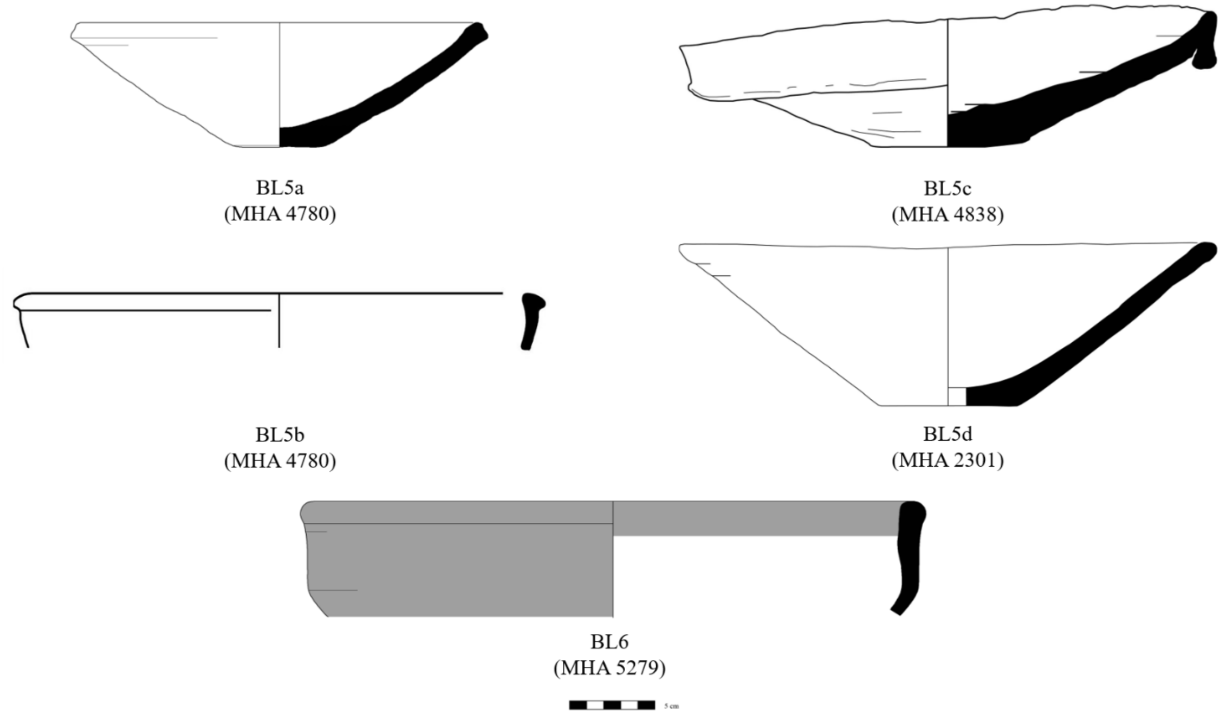
Appendix 10. Typological Key for Egyptian and Egyptian-style forms at Jaffa Discussed in Chapters 6 - 8

The following plates provide line drawings of all Egyptian-style types discussed in chapters 6 to 8, with special emphasis on complete vessels where possible. Each line drawing includes the type designation, which is in turn followed by a parenthetical note indicated the form representing the type. The plates are divided into five groups: small bowls (Appendix 10.1), large bowls (Appendix 10.2), varia and culinary forms (Appendix 10.3), small, closed forms (Appendix 10.4), and large closed forms and a type AM4 amphora (Appendix 10.5).

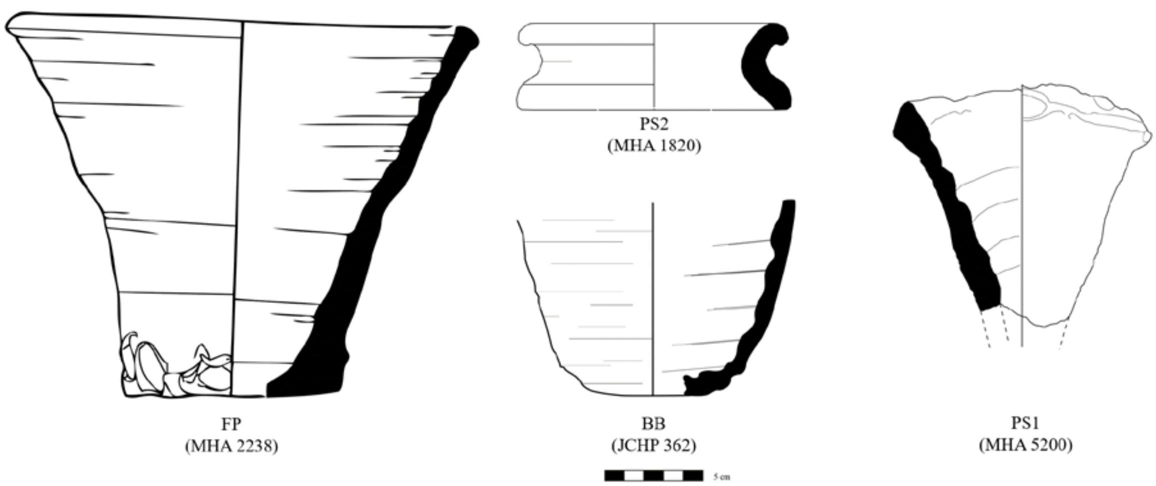
Appendix 10.1 Small Egyptian-style Bowls



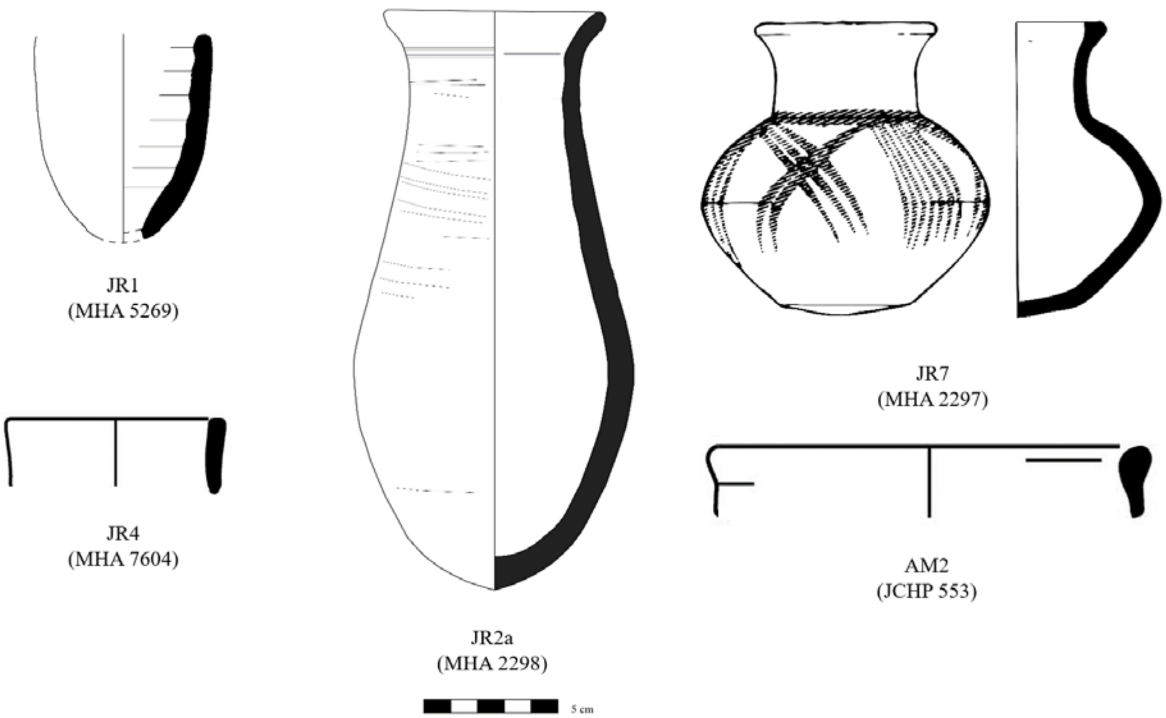
Appendix 10.2 Large Egyptian-style Bowls



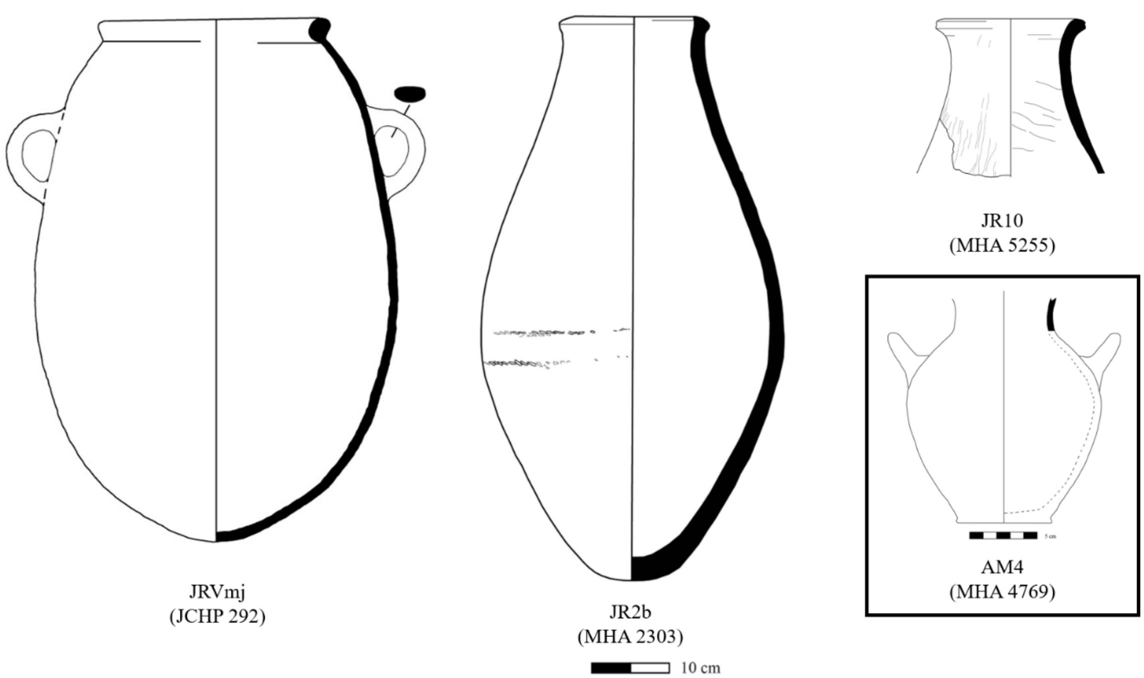
Appendix 10.3 Varia and Culinary Forms



Appendix 10.4 Small Closed Forms



Appendix 10.5 Large Closed Forms and a Type AM4 Amphora



Appendix 11. Ceramics Data and R Markdown File for the Ramesses Gate Area Ceramic Assemblage (Chapter 7)

This appendix provides access to the full dataset and analyses conducted within the ceramics study of the Ramesses Gate materials (Chapter 7), which are stored as a .zip file on the private server of the JCHP. It can be accessed through the JCHP database within OCHRE under the "Resources" tab and then under the child item "JCHP Shared Data", as well as using the following UID, which will automatically download the file:

https://pi.lib.uchicago.edu/1001/org/ochre/ade98e97-af00-4d50-accc-f111e7c1ca0b

The file, "Damm_2021_Appendix_11.zip", contains four files. For the analyses, the R Project file "RG_Final.rproj" serves as the work environment for all analyses conducted in the text, with the R Markdown file "RG_Final.rmd" containing the coding packages for all calculations and analyses conducted within the text. Moreover, it includes prose descriptions for all coding decisions. There are three data tables—all Microsoft Excel sheets—that were used during calculations. "Master_RG_Optimized.xlsx" provides the data recorded from every sherd in the assemblage. "Phase_Summary_Opt.xlsx" contains the proportional breakdown for raw sherds, base EVEs, and rim EVEs by type for each phase. Finally, "Subphase_Summary_Opt.xlsx" contains the same information, albeit broken down by subphase rather than phase. For a detailed description of the variables, especially those that appear in "Master_RG_Optimized.xlsx", see Section 6.3.2.

Appendix 12. Phase-level Description of the Assemblages from the Ramesses Gate Excavation Area (Chapter 7)

The following section provides the ceramics data for each phase of the Ramesses Gate area as discussed in Chapter 7. This includes all tabular data, EVE counts, and proportions used in the composition of the main text. The raw data and R Markdown file for these figures are in Appendix 11. The separation of this section is to ensure adequate data description in support the assertions made in the main body of the text.

Appendix 12.1 Description of the Level VI Late Ceramic Assemblage

The Level VI Late garrison kitchen has been subjected to extensive analysis by Krystal Lords Pierce (2013), and I defer to her conclusions with some small caveats. First, her work was composed prior to the JCHP's recovery of short-lived botanical samples during the 2013 excavation season, and therefore the operative understanding of the chronology of Jaffa has changed extensively. Therefore, in Pierce's dissertation, the Level VI Late assemblage was analyzed collectively with materials contemporary with JCHP Phase RG-4a (Pierce 2013, 458), though the JCHP now treats the two assemblages separately. This revises the presence/absence understanding of this assemblage as it appeared in her work, as well as the general quantitative picture of type frequencies. It does not however change her overall conclusions, which largely remain valid. The main effect is that a number the vessels from her original analysis cannot be definitively associated with the kitchen context, but rather originate elsewhere within Kaplan's excavation in the Ramesses Gate area. Given the temporal longevity of many Egyptian-style forms, this is not necessarily a situation that can be resolved intuitively. Consequently, this study will only highlight vessels from known contexts in the kitchen, specifically those associated with the following loci: **304**, **305**, **308**, **309**, **310**, **311**, **316**, **318**, **319**, and **320**. Forms which are typologically associated with this assemblage but are not securely assigned stratigraphically are excluded from the quantitative study. Instead, they are mentioned only with respect to their presence.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP6b	Cypriot	1	0.009	0	0.000	0	0.000
CYP8b	Cypriot	1	0.009	0	0.000	0	0.000
Cypriot Totals		2	0.018	0	0.000	0	0.000
BL	Egyptian	5	0.044	2.45	0.056	0	0.000
BL *varia*	Egyptian	1	0.009	1	0.023	0	0.000
BL1a	Egyptian	9	0.079	2.2	0.050	2.07	0.061
BL1b	Egyptian	1	0.009	1	0.023	0.55	0.016
BL3	Egyptian	1	0.009	0	0.000	0.065	0.002
BL5a	Egyptian	2	0.018	1	0.023	0.9	0.027
BL5c	Egyptian	5	0.044	1	0.023	1.045	0.031
BL5d	Egyptian	9	0.079	5.5	0.125	6.145	0.181
BL6	Egyptian	1	0.009	0	0.000	0.16	0.005
DB2	Egyptian	1	0.009	1	0.023	0	0.000
FP	Egyptian	20	0.175	17.25	0.393	11.475	0.338
JR	Egyptian	2	0.018	0	0.000	0	0.000
JR1	Egyptian	2	0.018	1	0.023	0	0.000
JR2	Egyptian	3	0.026	0	0.000	0	0.000
JR2a	Egyptian	5	0.044	2.5	0.057	2.375	0.070
JR2b	Egyptian	2	0.018	1	0.023	1.58	0.047
JR7	Egyptian	3	0.026	2	0.046	1	0.029
JR10	Egyptian	2	0.018	0	0.000	0.2	0.006
PS1	Egyptian	6	0.053	0	0.000	1.35	0.040
PS2	Egyptian	3	0.026	0.3	0.007	0.26	0.008
RB2	Egyptian	1	0.009	0	0.000	0	0.000
Egyptian Totals		84	0.737	39.2	0.894	29.175	0.860
CB1	Levantine	2	0.018	0.5	0.011	0.15	0.004
CB2	Levantine	1	0.009	0	0.000	0.03	0.001
CP1	Levantine	4	0.035	1	0.023	1.365	0.040
DEC	Levantine	3	0.026	0	0.000	0	0.000
JT	Levantine	1	0.009	1	0.023	0	0.000
LB1	Levantine	4	0.035	1.8	0.041	1.55	0.046
LB5	Levantine	1	0.009	0	0.000	0.05	0.001
LB10	Levantine	3	0.026	0.2	0.005	0.205	0.006
LM	Levantine	1	0.009	0	0.000	0.05	0.001

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
PT	Levantine	1	0.009	0	0.000	0.225	0.007
RB1	Levantine	1	0.009	0.15	0.003	0	0.000
SJ1	Levantine	4	0.035	0	0.000	0.6	0.018
SJ2	Levantine	2	0.018	0	0.000	0.51	0.015
Levantine Totals		28	0.246	4.65	0.106	4.735	0.140
Overall Totals		114	1.000	43.85	1.000	33.91	1.000

Table 10: Summary of the Level VI Late assemblage.

The assemblage from the Level VI Late kitchen comprises 114 diagnostic sherds and restorable vessels across 36 distinct types (see Table 10). Testimony to the suddenness of the destruction and the original density of the objects in this area is the fact that this phase produced the highest overall EVE rating out of any at Jaffa, with 43.6 base EVEs and 34.16 rim EVEs. The high frequency of vessels for which a full profile is restored makes it possible to offer more refined classifications of the material than is possible in the Lion Temple area, where the bulk of the assemblage came from non-restorable examples. Consequently, typologically ambiguous elements such as generic disc bases (type DB)—which are conservatively associated with the Levantine tradition—can be more confidently assigned to an Egyptian or Levantine cultural provenance. The overall effect is subtle, but generally results in an assemblage that is even more Egyptian in character. Regardless of quantitative method, the Level VI Late assemblage consists of a majority of Egyptian-style and imported Egyptian vessels. By raw sherd count, forms from the Egyptian tradition comprise 73.7% of the overall assemblage (n = 84), followed by Levantine forms at 24.6% (n = 28), and then finally Cypriot imports, which are attested by only two body sherds (1.8%). When EVEs are considered, the picture becomes starker, with Egyptian forms being 89.4% of the base EVE assemblage (39.200 of 43.600 EVEs) and 86.0% of the rim EVE assemblage (29.175 of 34.160 EVEs).

Uniquely for Jaffa, tableware is not the dominant category of object from this phase, an unsurprising outcome since this context that is clearly centered around the production of foodstuffs.[403] Regardless, Egyptian-style forms are still the majority within this category across raw sherd count (67.6%, n = 25), base EVE (79.4%, 9.650 of 12.150 EVEs), and rim EVE (70.7%, 4.790 of 6.775 EVEs). The two imported Cypriot forms that are attested are both body sherds from tableware categories, one from the Cypriot Monochrome tradition (CYP6b) and the other from the Cypriot Bichrome (CYP8b) tradition. They could be either residual or contemporary with the kitchen assemblage, with both types being known in the late Middle Bronze Age and continuing into the Late Bronze Age (Artzy 2019a, 341). The Egyptian-style material spans several types, including small-to-medium sized simple bowls (types BL varia, BL1a, and BL1b), shallow everted rim bowls (type BL3), large bowls (types BL5a and BL5c), and a single example of large carinated bowl with red-painted upper half (type BL6)—likely indicating a table service. Most of the Levantine tableware forms are analogous to those in the Egyptian-style tableware tradition, albeit with a few conspicuously different types. In the former category are several Levantine large bowls with a diameter between 29 and 35 cm, which are spread across three rim morphologies: plain (type LB1), inverted (type B5), and everted (type LB10). In addition to these there are several smaller type LB1 bowls, which are the exact Levantine counterpart to the Egyptian-style type BL1a bowl. All these forms are readily differentiated from their Egyptian counterparts based on fabric, being produced from a completely different clay source and lacking organic temper. Forms that lack a clear counterpart in the Egyptian-style tradition are carinated bowls from the Levantine type CB tradition (types

[403] Contextually, large Egyptian-style bowls (type BL5 family) should—in this context—likely be associated with food preparation rather than serving.

CB1 and CB2), for although the Egyptian-style type BL6 bowl is carinated, the Levantine examples are notable for their more exaggerated carination and finer construction.

Only a single example from the Levantine tableware tradition, a type LB10 bowl with red slip (**MHA 5851**), is decorated. The form is extremely unusual, with the rim morphology resembles that of a type LB2 bowl but with the rim orientation being sharply everted.[404] Unfortunately, the form was heavily burned and therefore both the extent of the decoration and its fabric classification were unclear. In contrast, decoration was popular on Egyptian-style tableware forms. When considering just vessel rims, 31.2% of all Egyptian-style tableware bears some form of decoration (1.495 of 4.790 EVEs), which is split between the lipstick rim (50.2%, 0.750 of 1.495 EVEs) and the red-slipped bowls of type BL *varia* (49.8%, 0.745 of 1.495 EVEs).[405] With respect to tableware bases, 34.7% bear some form of decoration (3.000 of 8.650), which is split evenly between red-splash decorated bowls and type BL *varia* red-slipped bowls (1.500 of 3.000 EVEs for both). It should be noted that another type BL *varia* example (**MHA 5219**) that lacks an exact context should likely be associated with the garrison kitchen for chronological reasons, and therefore it would seem that this vessel type and mode of decoration were fairly popular at Late Bronze Age IB Jaffa. Similarly, other fragments of red-splash decorated bowls are known from the area (e.g., **MHA 5327**) and should be considered part of this assemblage. Given these examples, it is likely that decoration was even more common than

[404] This rim morphology is not unknown in the southern Levant though it is rare. It is attested at Late Bronze Age IB/LB IIA Tel Batash (Panitz-Cohen and Mazar 2006, Pls. 16:18, 27:8) and Late Bronze Age IIA Lachish (Tufnell, Inge, and Harding 1940, Pl. XLIIB:135).

[405] It is worth noting that one of the bowls with red-splash decoration also has a red lipstick rim (**MHA 5322**). This is a common variation on this mode of decoration (Martin 2011b, 120) and likely was the case for most bowls of this type at Jaffa. However, it is only evident on this example because the full profile is preserved.

the figures here suggest, since many of the Egyptian-style bowls which could not be associated with a specific context were decorated.[406]

The Level VI Late garrison kitchen provides the largest culinary assemblage of any phase at Jaffa, with this functional category contributing the single largest element to the overall assemblage. Cooking over (in)direct heat was accomplished in Levantine triangle rim cooking pots, which are attested by two near-complete examples (**MHA 2214** and **MHA 2310**). The remaining culinary forms include the Egyptian-style flowerpot, which is attested in at least 20 examples ranging from complete to near-complete, as well as several large, perforated bowls (type BL5d).[407] The former were found in an open firing pit adjacent to the kitchen, seemingly in the midst of firing at the time of the kitchen's destruction. The latter are attested both as a complete example (**MHA 2301**) and as reconstructed wasters (e.g., **MHA 5130**), indicating that they were also produced in this area. Consequently, while there is an overwhelming majority of Egyptian-style culinary forms, it is likely that rather than competing, each cultural tradition of culinary vessel represents separate activity spheres producing distinctive products.

The container assemblage from this context is remarkable given the extreme rarity of forms from the Levantine tradition, a stark contrast wall other phases at Jaffa. Only eight fragments—and no restorable vessels—are known from Levantine container vessels, and six of these are small rim fragments from either the ubiquitous type SJ1 or SJ2 storage jars. The other

[406] Pierce noted that 54% of all Egyptian-style bowls were decorated in some capacity (Pierce 2013, 472). this number is based off a much larger assemblage than that reviewed here. While some of these additional vessels can be associated with the gate destruction materials excavated by Kaplan, the rarity of decorated forms within the JCHP excavations there suggests that a number likely belong to the Level VI Late kitchen. Only 11.3% of Egyptian-style bowl rims are decorated in Phase RG-4a, which goes up to 27.6% in Phase RG-3b, and 29.6% in Phase RG-3a.

[407] The type BL5d is not original to Martin's typology but was created for the purposes of this study. Morphologically, all examples identical to the type BL5a, bearing either a simple rim or an everted rim. The only differentiating feature of the type BL5d is its perforated base.

two are a rim fragment from a large pithos (type PT), as well as an unusual flaring juglet base (type JT) that has no known parallel in either the Levantine or Egyptian-style Late Bronze Age ceramic repertoire.[408] While the presence of pithoi is atypical in southern Levantine coastal assemblages, this lone example is not particularly unusual given Jaffa's maritime connections and the likelihood that this fragment came from an opportunistically reused maritime transport container. Locally manufactured Egyptian-style jars at Jaffa are attested across at least four types, each in a different size range. These include small, drop-shaped jars (type JR1), medium and large ovoid jars (types JR2a and JR2b), and the large *zīr* (type JR10). In addition, there were several collections of restored body segments of jars that could not be associated with any specific type, indicating a much larger assemblage. To this list can be added the only known imported Egyptian container, the type JR7 small carinated jar, of which elements from at least three were found in the Level VI Late kitchen assemblage (**MHAs 2216**, **2297**, and **5211**).[409]

The final category for consideration is that of varia, which applies in this phase specifically to a fragment of a lamp (type LM) and a series of pot stands (types PS1 and PS2). For the former, it is interesting to note its presence since it is purely Levantine in character. The latter group of stands is of greater interest, as they represent an unusual density of forms that are otherwise only rarely attested in the southern Levant. Furthermore, in this case they can be incontrovertibly associated with the Egyptian-style tradition based on context and fabric. The stands come in two categories, a tall stand with a rough, conical rim/foot (type PS1) and a simpler, low ring stand (type PS2). Six large fragments—some restorable—of the tall stand were recovered from the garrison kitchen, indicating the presence of several examples from this

[408] Levantine juglet bases are either round, pointed, or flattened, and there is no true juglet form in the Egyptian repertoire. This juglet may have been mistakenly attributed to this level, potentially dating to a later period.

[409] These vessels were confirmed to be imports from Egypt via petrographic analysis (Ownby Forthcoming).

unusual type. The ring stand, which is more ambiguous with respect to an Egyptian or Levantine cultural affiliation, produced three examples.[410]

Appendix 12.2 Description of the Phase RG-4a Ceramic Assemblage

Of the last three phases of the gate complex, the Phase RG-4a assemblage is by far the largest, consisting of 454 identifiable objects, including 31 restorable or partially restorable vessels.[411] Every vessel is from the Egyptian-style or Levantine tradition except for three body sherds from Mycenaean vessels which, by this point, are almost certainly residual. As can be seen in Table 11, locally produced Egyptian-style forms compose the majority of the assemblage—71.1% by raw sherd count (n = 323), 58.6% by base EVE (18.435 of 36.520 EVEs), and 59.6% by rim EVE (18.435 of 30.940 EVEs). This majority is heavily affected by the frequency of the type BL1a bowl, which comprises 35.2% of the overall assemblage by sherd count (n = 159) and 29.2% by rim EVE (9.020 of 30.940 EVEs). Similar weight comes from the generic type BL bowl base, which comprises 31.1% of the base EVE assemblage (11.365 of 36.520 EVEs). This bias is counterbalanced by the Levantine type SJ1 store jar, which forms 25.1% of base EVEs (9.150 pf 36.520 EVEs) and 20.4% of rim EVEs (6.300 of 30.940 EVEs). Consequently, the skew from these two types makes comparisons within functional categories especially necessary.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
BB	Egyptian	1	0.002	1	0.027	0	0.000
BL	Egyptian	53	0.118	11.365	0.311	0	0.000
BL1a	Egyptian	159	0.353	3.075	0.084	9.02	0.292
BL1b	Egyptian	8	0.018	2	0.055	0.99	0.032
BL2	Egyptian	40	0.089	0	0.000	1.76	0.057
BL2a	Egyptian	3	0.007	1.25	0.034	1.365	0.044

[410] One example, **MHA 5121**, can be associated with the Egyptian-style manufacturing tradition based on its fabric.

[411] The number of restorable vessels elides what was almost certainly a much larger assemblage given the EVE counts reported in Table 11. Due to the collapse of the gate many sherds—notably Egyptian-style bowl bases and Levantine store jar bases—could not be restored to the massive assemblage of unquantified body sherds.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
BL3	Egyptian	47	0.104	0	0.000	2.13	0.069
BL3a	Egyptian	2	0.004	1.3	0.036	1.24	0.040
BL5a	Egyptian	1	0.002	0	0.000	0.355	0.011
CU	Egyptian	6	0.013	0	0.000	0.575	0.019
JR	Egyptian	1	0.002	0.075	0.002	0	0.000
JRVmj	Egyptian	2	0.004	1.35	0.037	1	0.032
Egyptian Totals		323	0.716	21.415	0.586	18.435	0.596
CB1	Levantine	3	0.007	0	0.000	0.18	0.006
CB2	Levantine	6	0.013	0	0.000	0.585	0.019
CB3	Levantine	1	0.002	1	0.027	0.575	0.019
CJ	Levantine	1	0.002	0	0.000	0.1	0.003
CP1	Levantine	6	0.013	0	0.000	0.225	0.007
CP3	Levantine	1	0.002	0	0.000	0.06	0.002
DB1	Levantine	1	0.002	0.225	0.006	0	0.000
DB2	Levantine	3	0.007	1.195	0.033	0	0.000
JG1	Levantine	2	0.004	0	0.000	0.28	0.009
JG3	Levantine	1	0.002	1	0.027	0	0.000
JT	Levantine	2	0.004	0.2	0.005	0.4	0.013
JT1	Levantine	1	0.002	1	0.027	1	0.032
KR1	Levantine	2	0.004	0	0.000	0.07	0.002
KR4	Levantine	1	0.002	0	0.000	0.125	0.004
LB1	Levantine	7	0.016	0	0.000	0.64	0.021
LB2	Levantine	22	0.049	1	0.027	1.235	0.040
LB4	Levantine	5	0.011	0	0.000	0.155	0.005
LB5	Levantine	4	0.009	0	0.000	0.13	0.004
LB6	Levantine	1	0.002	0	0.000	0.05	0.002
LB8	Levantine	1	0.002	0	0.000	0.05	0.002
LB9	Levantine	1	0.002	0	0.000	0.075	0.002
RB1	Levantine	2	0.004	0.335	0.009	0	0.000
SJ1	Levantine	48	0.106	9.15	0.251	6.3	0.204
SJ2	Levantine	2	0.004	0	0.000	0.25	0.008
SV	Levantine	1	0.002	0	0.000	0.02	0.001
Levantine Totals		125	0.277	15.105	0.414	12.505	0.404
MYC	Mycenaean	3	0.007	0	0.000	0	0.000
Mycenaean Totals		3	0.007	0	0.000	0	0.000
Overall Totals		451	1.000	36.52	1.000	30.94	1.000

Table 11: Summary of the Phase RG-4a assemblage.

Tableware is by far the largest single functional category present during this phase (82.5%, n = 372 sherds). The abundance of generic type BL bases and BL1a rims ensures that this assemblage is overwhelmingly Egyptian-style in character, however the density of various restorable forms from the Egyptian-style bowl assemblage suggests that the high number of sherds from the type BL family is likely an accurate reflection of their original frequency. Using rim EVEs, Egyptian-style bowls comprise 83.5% of the tableware assemblage (18.990 of 22.745 EVEs), with base EVEs only slightly moderating the proportion to 81.3% (3.870 of 20.730 EVEs). As already noted, most Egyptian-style bowls within this phase stem from the type BL1a, which included five partially complete to complete examples (**JCHPs 390**, **498**, **511**, **562**, and **584**). Also attested are fragments and partially restorable examples of type BL1b small simple bowls, type BL2a straight-sided bowls, type BL3a shallow everted rim bowls, and most of a large type BL5a bowl, all suggestive of the presence of a complete Egyptian-table service. Levantine tableware forms substantially lower in frequency, though several restorable examples are present, and a number of rim morphologies are attested. That main component of the Levantine tableware assemblage is represented by smaller sherds from the passageway floor, likely representing incidental garbage. The collective assemblage includes three variations on the carinated bowl (types CB1-3), seven different simple bowl rim morphologies (types LB1, LB2, LB4-6, LB8, LB9), two krater varieties (types KR1 and KR4), and numerous disc and ring bases (generic type DB and RB).[412] The broad assemblage belies the rarity of Levantine types among the restorable forms in the gate destruction debris, which include a type CB2 decorated carinated bowl (**JCHP 369**), a type CB3 bowl with high carination (**JCHP 510**), two type LB1 simple bowls with plain rim (**JCHP 306** and **581**), and two type LB2 simple bowls with interior thickened rims (**JCHP 303** and **589**).

[412] By this point, it is not useful to separate the Levantine base morphologies aside as Egypto-Levantine due to the presence of organic temper, as organic temper has become so common by this point that it can no longer be considered an Egyptian practice (Martin 2011b, 98).

Figure 65: Hybrid type LB2 bowl (**JCHP 303**). Note the interior thickened rim in profile, the flat, string-cut base, the deep scrape marks, as well as the high organic content and low firing temperature evident in the fabric.

One of the type LB2 bowls (**JCHP 303**) is an unquestionable hybrid vessel. The bowl perfectly replicates the type LB2 rim morphology, which is completely absent from the Egyptian-style tradition. The lower portion of the vessel, with its flat, string-cut base and exterior scrape marks is wholly Egyptian-style, as are its lower firing temperature and the clay recipe—the latter being from the same fabric group as other Egyptian-style vessels at Jaffa (see Figure 65).

Decorated tableware forms are attested in both restorable vessels and smaller sherds across both cultural traditions. In Phase RG-4a, decoration is sparsely attested among the Levantine tableware forms (13.7%, n = 8), with most examples only having a simple red band on the rim. Otherwise, one krater fragment has an interior cream slip (**JCHP 582**) and two of the carinated bowls are decorated with both a red rim and red, interior concentric bands (**JCHP 369** and **Reg. Sherd 1372.001**). White slips are not unusual within the Levantine or Egyptian ceramic tradition, though the placement on the vessel interior is strange. Red concentric circles, however, while rare at Jaffa, are a common motif throughout the Late Bronze Age southern Levant (Killebrew 2005a, 132). Among Egyptian-style bowls, only 11.4% bear some form of decoration (1.920 of 16.860 EVEs). Of these, nearly all examples bear the red lipstick rim, with only a single sherd possibly representing a type BL1a bowl with red slip.[413] Notably, lipstick decoration is not attested on any of the restorable forms, therefore the frequency of decorated forms within the gate might be artificially depressed for contextual reasons.

Culinary forms are rare within this phase and—with one exception—are only attested among smaller sherds that represent the garbage that had accumulated within the gate passageway. The exception is the base of an Egyptian-style type BB beer jar (**JCHP 326**), which was likely in secondary use as a funnel. The remaining culinary forms are all from the Levantine tradition, which includes rim fragments from triangle rim cookpots (type CP1), a cookpot variation with a grooved rim (type CP3), a cooking jug rim fragment (type CJ), and a fragment from a strainer spout (type SV). Despite the unsurprising rarity of culinary vessels in the gate complex, it is clear that a diverse array of culinary practices are attested at the site.

The container assemblage is overwhelmingly Levantine in character due to the abundance of elements from type SJ1 store jar elements. Proportionally, the container assemblage is 88.9% Levantine by base EVE (11.350 of 12.775 EVEs) and 83.9% by rim EVE (8.230 of 9.805 EVEs), though in both cases more than 75% of the Levantine forms comes the type SJ1 store jar alone. The presence of several restorable type SJ1 jars (**JCHPs 315**, **355**, **364**,

[413] The sherd in question (**Reg. Sherd 1414.002**) was highly degraded, and it was therefore difficult to clearly identify if a slip was present on the whole sherd. Regardless, this mode of decoration was rare at Jaffa.

372, and **391**) within the gate destruction debris—especially in the ruins of the upper story—indicates that they were found in their primary context. The Levantine container assemblage also includes fragments and restorable vessels from the medium- (types JG1 and JG3) and small-size ranges (generic type JT and type JT1). Notable among these is **JCHP 373**, a painted piriform juglet that likely contained some sort of previous commodity, and **JCHP 499**, a high-necked jug that likely bore decoration but was so badly burned in the conflagration that the surface treatment was only preserved as a flaking, bright orange coating. Two general categories of Egyptian-style container forms are present: locally manufactured Egyptian-style vessels from the type JR family and imported Egyptian container vessels. The former is known only from a single base fragment that could not be identified to a specific subtype, however imports are attested in the form of the type CU handled-cup and the type JRVmj meat jar.[414] The former is attested by a partially restorable rims from at least two different vessels, whereas the latter includes one near-complete example (**JCHP 262**) and a large, restorable body portion from a second (**JCHPs 328** and **552**).

Appendix 12.3 Description of the Phase RG-3b Ceramic Assemblage

The Phase RG-3b gate assemblage is smaller than its predecessor (n = 238); see Table 12 below). The assemblage can be broken down as follows. By raw sherd count, there are 64.3% Egyptian-type ceramics (n = 153), 34.9% Levantine ceramics (n = 83), and finally two body sherds from imported Mycenaean vessels—almost certainly residual by this point (see Table 20). This is moderated by rim EVEs, which falls to 53.3% Egyptian-style ceramics (6.245 of 11.725 EVEs) and 46.7% Levantine forms (5.480 of 11.725 EVEs). Finally, it is inverted by the base EVE count, where Levantine forms occupy 62.6% of the assemblage (3.275 if 5.235 EVEs) and Egyptian-style only 37.4% (1.960 of 5.235 EVEs).

[414] Both types were proven to be Egyptian imports by petrographic analysis (Ownby Forthcoming).

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
AM2	Egyptian	1	0.004	0	0.000	0.1	0.009
BL	Egyptian	7	0.029	1.785	0.341	0	0.000
BL1a	Egyptian	88	0.370	0	0.000	3.595	0.307
BL2	Egyptian	34	0.143	0	0.000	1.57	0.134
BL3	Egyptian	21	0.088	0	0.000	0.95	0.081
BL5a	Egyptian	1	0.004	0	0.000	0.03	0.003
JR	Egyptian	1	0.004	0.175	0.033	0	0.000
Egyptian Totals		153	0.643	1.96	0.374	6.245	0.533
CB1	Levantine	1	0.004	0	0.000	0.05	0.004
CB2	Levantine	3	0.013	0	0.000	0.12	0.010
CP1	Levantine	9	0.038	0	0.000	0.43	0.037
CP2	Levantine	1	0.004	0	0.000	0.05	0.004
DB2	Levantine	4	0.017	1.875	0.358	0	0.000
DEC	Levantine	1	0.004	0	0.000	0	0.000
JG1	Levantine	1	0.004	0	0.000	0.2	0.017
JG2	Levantine	4	0.017	0	0.000	0.5	0.043
KR1	Levantine	1	0.004	0	0.000	0.05	0.004
KR2	Levantine	1	0.004	0	0.000	0.075	0.006
LB1	Levantine	3	0.013	0	0.000	0.175	0.015
LB2	Levantine	19	0.080	0	0.000	1.075	0.092
LB3	Levantine	1	0.004	0	0.000	0.04	0.003
LB4	Levantine	5	0.021	0	0.000	0.22	0.019
LB5	Levantine	1	0.004	0	0.000	0.03	0.003
LB7	Levantine	3	0.013	0	0.000	0.12	0.010
RB1	Levantine	1	0.004	0.2	0.038	0	0.000
RB2	Levantine	1	0.004	0.2	0.038	0	0.000
SJ1	Levantine	21	0.088	1	0.191	2.195	0.187
SJ2	Levantine	2	0.008	0	0.000	0.15	0.013
Levantine Totals		83	0.349	3.275	0.626	5.48	0.467
MYC	Mycenean	2	0.008	0	0.000	0	0.000
Mycenaean Totals		2	0.008	0	0.000	0	0.000
Overall Totals		238	1.000	5.235	1.000	0	1.000

Table 12: Summary of the Phase RG-3b assemblage.

Interestingly, the higher frequency of Levantine forms in this phase is not due to the type SJ1 store jar. While the type BL1a bowl is still the largest contributor to the overall assemblage at 37.0% (n = 88 sherds), the surge in Levantine base EVEs is derived from the increase in large fragments of Levantine bowl base morphologies (generic types RB and DB). The increase in rim

EVEs comes from the higher overall frequency of Levantine type LB2 bowl rims. While the type SJ1 is still the largest overall contributor to the Levantine assemblage by raw count and rim EVE, its frequency is more commensurate with other forms from the Levantine tradition. As such, the examination of the assemblage at a functional level rather than a generic level is even more important in the case of Phase RG-3b.

As is usual, tableware comprises the largest overall assemblage from the gate passageway and depending on how this material is calculated dictates whether there is a majority of Egyptian-style or Levantine forms. When base EVEs are calculated, Levantine forms are the majority at 56.0% (2.275 of 4.060 EVEs), though if rim EVEs are used Egyptian-style forms occupy 75.9% of the assemblage (6.145 of 8.100 EVEs). Collectively, the Egyptian-style assemblage consists of the ubiquitous type BL1a simple bowl (58.5%, 3.595 of 6.145 rim EVEs), the shallow, straight-sided type BL2 bowl (25.5%, 1.570 of 6.145 rim EVEs), the shallow everted rim type BL3 bowl (15.5%, 0.950 of 6.145 EVEs), and finally, a single sherd of a large type BL5a bowl. Consequently, it is only possible to say with confidence that the types BL1a, BL2, and BL3 are present during this phase, with the type BL5a sherd potentially being residual.

In contrast, the Levantine tableware assemblage is attested across a wide variety of forms, including two types of carinated bowl (type CB1 and CB2), two types of deep krater (types KR1 and KR2), and six different rim morphologies of the simple bowl (types LB1-LB5, LB7). If we are to apply the same logic as was done above to the type BL5, the types with low frequencies might also be residual. It is crucial to note however that the Levantine type LB2 bowl occurs with greater frequency than the Egyptian-style type BL3, the first time a Levantine bowl type has eclipsed one of the more common Egyptian-style forms. While the picture from the base EVEs is somewhat difficult to interpret given the smaller sample size of bowl bases in this phase, when combined with the overall higher frequency of Levantine bowl rims it seems plausible that there was an increase in the consumption of Levantine bowls during Phase RG-3b.

Decoration remains rare on Levantine forms, being attested only three sherds, with one burnished type KR1 rim (**Reg. Sherd 1304.004**), one type LB2 rim with red paint (**Reg. Sherd 1206.005**), and one type LB4 rim decorated with perpendicular, pre-firing incisions (**Reg. Sherd 1299.006/7**). As per usual, decoration remains far more common on Egyptian-style tableware, with 27.6% of all rims bearing some type of decoration (1.695 of 6.145 EVEs), almost all of which being the red lipstick rim.[415] Given the larger sample size of the preceding Phase RG-4a where the lipstick rim was rarer, it is unclear if the higher frequency in this phase is the product of residual sherds or if this mode of decoration was actually more common. The presence of a near-complete bowl with a lipstick rim from the succeeding Phase RG-3a destruction indicates that this motif was almost certainly still in use during Phase RG-3b. If this frequency can be taken at face value, it is interesting to note that the proportional dip in Egyptian-style tableware is accompanied by a greater frequency of decorated forms.

Culinary wares are only attested from the Levantine tradition, with the type CP1 and CP2 cookpot rims both being represented. Of these, nine rim sherds of the former were recovered in comparison to one of the latter, and therefore it can only be said with certainty that the type CP1 was likely in use during this phase. Given the extreme rarity of Egyptian-style culinary wares in the previous phase, it is unclear whether their absence in Phase RG-3b is related to contextual reasons or the genuine rarity of the form at Jaffa by this point. Obviously, the presence of type CP sherds indicates that some culinary forms regularly appeared within the garbage deposited in

[415] A single sherd from a type BL2 bowl (**Reg. Sherd 1304.006**) bears a red slip on both the interior and exterior of the vessel, again indicating the presence—but extreme rarity—of this mode of decoration at Jaffa.

the gate. However, the chunkier, larger bases of the type BB beer jar are by far their most diagnostic element, and it is distinctly possible that these more identifiable pieces would not have lingered in a high traffic area. Therefore, while it is plausible to suggest Egyptian-style culinary forms are rarer during this phase, it cannot be regarded as certain.

Container forms from the Egyptian-style tradition are similarly uncommon, being attested only in a single, locally produced jar base (**Reg. Sherd 1202.001**) and a fragment of an imported amphora (type AM) rim (**JCHP 553**). Both can plausibly be regarded as residual given their low frequency, though the presence of a near-complete, imported Egyptian container in the following Phase RG-3a means that the importation of commodities from Egypt was potentially still ongoing during Phase RG-3b. However, the Egyptian-style jar fragment is the last attested sherd that can be associated with this type family in the Ramesses Gate area, therefore the question of its residuality cannot be clarified. In comparison, Levantine container forms are not only present, but also attested across both large storage jars (types SJ1 and SJ2) as well as small-to-medium sized jugs (types JG1 and JG2). While the assemblage size is small, here too it may be plausible to suggest that as with culinary forms, this phase witnesses a downturn in the frequency of Egyptian-style container forms.

Appendix 12.4 Description of the Phase RG-3a Ceramic Assemblage

The final phase of the gate complex has the smallest assemblage of its three phases (n = 129) due in no small part to its smaller exposure. Phase RG-3a, however, ended in a violent destruction, and therefore several restorable, near-complete forms assist in interpreting the degree which residuality might affect the character of the assemblage. The assemblage is composed of a majority of Egyptian-type pottery regardless of calculation methods (see Table 13), being 71.3% Egyptian-type based on raw sherd count (n = 92), which increases to 75.4% with base EVEs

(4.225 of 5.600 EVEs) but is slightly moderated to 65.0% using rim EVEs (5.820 of 8.960 EVEs).[416] Both type BL1a bowls and type SJ1 jars exert outsized influence on the character of the assemblage, which can only be rectified by closely examining the functional categories, which reveal subtle patterns underlying the majority of Egyptian-style forms.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
BL	Egyptian	3	0.023	0.975	0.174	0	0.000
BL1a	Egyptian	52	0.403	2.25	0.402	3.475	0.388
BL2	Egyptian	20	0.155	0	0.000	1.165	0.130
BL2a	Egyptian	2	0.016	0	0.000	0.405	0.045
BL3	Egyptian	13	0.101	0	0.000	0.6	0.067
BL6	Egyptian	1	0.008	0	0.000	0.175	0.020
CU	Egyptian	1	0.008	1	0.179	0	0.000
Egyptian Totals		92	0.713	4.225	0.754	5.82	0.650
CB2	Levantine	2	0.016	0	0.000	0.125	0.014
CP1	Levantine	5	0.039	0	0.000	0.155	0.017
JG1	Levantine	1	0.008	0	0.000	0.06	0.007
KR1	Levantine	1	0.008	0	0.000	0.075	0.008
LB2	Levantine	6	0.047	0	0.000	0.24	0.027
LB4	Levantine	2	0.016	0	0.000	0.065	0.007
PB	Levantine	1	0.008	0.175	0.031	0	0.000
SJ1	Levantine	18	0.140	1.2	0.214	2.42	0.270
Levantine Totals		36	0.279	1.375	0.246	3.14	0.350
MYC	Mycenaean	1	0.008	0	0.000	0	0.000
Mycenaean Totals		1	0.008	0	0.000	0	0.000
Overall Totals		129	1.000	5.6	1.000	8.96	1.000

Table 13: Summary of the Phase RG-3a assemblage.

Tableware is by far the largest component of the assemblage, comprising 79.8% (n = 103) of all the forms. Egyptian-style forms reach their highest proportion of any phase at Jaffa, comprising either 94.9% of the total tableware assemblage by base EVE calculation (3.225 of 3.400 EVEs) or 92.0% by rim EVEs (5.820 of 6.325 EVEs). Despite their high numbers,

[416] The only sherd from outside of the Levantine or Egyptian-type tradition is a single body sherd from an imported Mycenaean vessel, which as with all previous such examples from the gate complex is residual.

Egyptian-style bowls are only attested across four types: the type BL1a simple bowl, the type BL2 straight-sided bowl, the type BL3 shallow bowl with everted rim, and a single example of a type BL6 carinated bowl. It is important to note that in this case the type BL6 (**JCHP 551**) is of an unusually small diameter (20 cm) in comparison to other Egyptian-style carinated bowls from Jaffa, and therefore it stands to reason large Egyptian-style bowls were no longer produced at Jaffa by this point. The range of types available from the Egyptian-style tableware tradition, therefore, was severely truncated. The added variation stemming from the presence of a type BL6 bowl is subject to caution, because as with most examples of this type from the southern Levant, the typological tradition of carinated bowls within the Egyptian-style tradition lacks internal coherency. Despite being a clear product of the Egyptian-style ceramic industry, it is morphologically ambiguous and potentially may represent a hybrid form or experimentation on the part of the potter. That being said, the presence of multiple restorable tableware forms from the Egyptian-style tradition, including type BL1a simple bowls (**JCHPs 471**, **472**, and **475**) and type BL2a straight-sided bowls (**JCHPs 476** and **570**) indicate that these two forms—which also occupy the highest frequency within the assemblage—were still commonly produced at Jaffa.

The Levantine tableware tradition is sparsely attested in this phase across a handful of types, including a variety of carinated bowl (type CB2), the deep krater (type KR1), two rim morphologies of the simple bowl (types LB2 and LB4), and finally, a new type of base, the pedestalled bowl base (type PB). Of these, only the type LB2—the simple bowl with an interior thickened rim—is present with any real quantity (n = 6). The type PB base is notable due to its rarity in the Late Bronze Age. During this period, it is mostly found on chalices, though it is more rarely attested on bowls and kraters. No chalices are known from Jaffa, and therefore it is plausible that this example represents an unusual base morphology from the Levantine tableware tradition, potentially a product of experimentation by Levantine potters during this phase.

Decorated Levantine forms remain rare, attested only in a type LB4 bowl rim decorated with a white slip (**Reg. Sherd 1032.017**) and a type CB2 bowl with a red painted rim and concentric red bands on its interior (**Reg. Sherd 1019.003**). By contrast, 29.6% of Egyptian-style bowls were decorated with a lipstick rim (1.725 of 5.820 EVEs), which in this phase is the only decorative style in evidence. It is important to note that in this phase a near-complete type BL1a bowl with lipstick decoration was found within the assemblage (**JCHP 471**), which likely indicates that this mode of decoration was still being applied in the final stage of the Egyptian occupation.

Culinary wares are extremely rare and are only attested among Levantine forms—this time by just five rim sherds of the type CP1 triangle rim cooking pot. Even still, the type CP1 can be regarded as a consistent presence in all phases. When coupled with the rarity or absence of any Egyptian-style culinary forms over the final three phases of the gate, is highly suggestive that if Egyptian culinary practices persisted in Jaffa during this period, they were being conducted at a much smaller scale and/or in a location that precluded their presence as garbage within the gate passageway. A similar picture is visible from the container assemblage, where not a single fragment of a locally produced Egyptian-style jar is attested. The only container form from the Egyptian tradition is a near-complete, imported type CU handled-cup (**JCHP 464**) found in the destruction assemblage. Unsurprisingly then, the container assemblage is almost exclusively Levantine, though in this case it is only attested by the type SJ1 store jar, a group that includes a single near-complete example from the destruction debris (**JCHP 460**). The complete lack of small-to-medium store jars from the Levantine tradition means that it is difficult to interpret this phase with respect to storage vessel preferences during the final phase of the Egyptian occupation.

Appendix 13. Ceramics Data and R Markdown File for the Lion Temple Area Ceramic Assemblage (Chapter 8)

This appendix provides access to the full dataset and analyses conducted within the ceramics study of the Lion Temple area materials (Chapter 8), which are stored as a .zip file on the private server of the JCHP. It can be accessed through the JCHP database within OCHRE under the "Resources" tab and then under the child item "JCHP Shared Data", as well as using the following UID, which will automatically download the file:

https://pi.lib.uchicago.edu/1001/org/ochre/2d86e1ab-3374-4012-8445-a5af0068558e

The file, "Damm_2021_Appendix_13.zip", contains four files. For the analyses, the R Project file "LT_Final.rproj" serves as the work environment for all analyses conducted in the text, with the R Markdown file "LT_Final.rmd" containing the coding packages for all calculations and analyses conducted within the text. Moreover, it includes prose descriptions for all coding decisions. There are three data tables—all Microsoft Excel sheets—that were used during calculations. "Master_LT.xlsx" provides the data recorded from every sherd in the assemblage. "Master_EVE_Table_Phase.xlsx" contains the proportional breakdown for raw sherds, base EVEs, and rim EVEs by type for each phase. Finally, "Master_EVE_Table _AG.xlsx" contains the same information, albeit broken down by assemblage group rather than phase. For a detailed description of the variables, especially those that appear in "Master_LT.xlsx", see Section 6.3.2.

Appendix 14. Phase-level Description of the Assemblages from the Lion Temple Excavation Area

The following section provides a descriptive narrative of the ceramics data for each phase of the Lion Temple area as discussed in Chapter 8 This includes all tabular data, EVE counts, and proportions used in the composition of the main text. The raw data and R Markdown file for these figures is in Appendix 13. The separation of this section is to ensure adequate data description in support the assertions made in the main body of the text.

Appendix 14.1 Description of the Phase LT-10 Ceramic Assemblage

The description of the Phase LT-10 ceramic assemblage is divided into assemblage groups to separate the earlier fills (assemblage group LT-10.1) from occupational and destruction debris (assemblage group LT-10.2). As such, they will be presented as separate entities here.

Appendix 14.1.1 Assemblage Group LT-10.1: Fills beneath the Occupational Debris

Assemblage group LT-10.1 is too small (n = 7) for robust quantitative analysis (see Table 14). Its principal value lies in demonstrating that locally produced Egyptian-style ceramics were present at the site in construction fills directly underneath the first clear phase of Late Bronze Age architecture, even if only in small quantities. Furthermore, one of the two Egyptian-style bowls bears the red-painted "lipstick rim" (**MHA 3709**), indicating that this method of decoration was present in the earliest known levels of the garrison.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
BL1a	Egyptian	2	0.286	0	0.000	0.105	0.677
Total Egyptian		2	0.286	0	0.000	0.105	0.677
JG4	Levantine	1	0.143	0.5	0.500	0	0.000
KR3	Levantine	1	0.143	0	0.000	0	0.000
LB5	Levantine	1	0.143	0	0.000	0.050	0.323
RB1	Levantine	1	0.143	0.325	0.325	0	0.000

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
SJ1	Levantine	1	0.143	0.175	0.175	0	0.000
Total Levantine		5	0.714	1.000	1.000	0.050	0.323
Overall Totals		7	1.000	1.000	1.000	0.155	1.000

Table 14: Summary of Assemblage Group LT-10.1.

Appendix 14.1.2 Assemblage Group LT-10.2: Occupational and Destruction Debris

Assemblage group LT-10.2 offers a relatively small assemblage of 68 diagnostic sherds, as Kaplan only produced a limited exposure of this occupational debris from this phase (see Table 15 below). It is, however, still possible to report several patterns for what is clearly one of the earliest occupational phases of the garrison.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2a	Cypriot	8	0.118	0	0.000	0	0.000
CYP4a	Cypriot	1	0.015	0	0.000	0	0.000
CYP5a	Cypriot	1	0.015	0	0.000	0	0.000
CYP5b	Cypriot	1	0.015	0	0.000	0	0.000
CYP9a	Cypriot	1	0.015	0	0.000	0	0.000
CYP11a	Cypriot	1	0.015	0	0.000	0	0.000
Cypriot Totals		13	0.191	0	0.000	0	0.000
BL	Egyptian	5	0.074	1.375	0.420	0	0.000
BL1a	Egyptian	25	0.368	0	0.000	1.105	0.473
BL1b	Egyptian	4	0.059	0	0.000	0.225	0.096
BL3	Egyptian	2	0.029	0	0.000	0.055	0.024
FP	Egyptian	2	0.029	0	0.000	0.125	0.054
JR	Egyptian	1	0.015	1	0.305	0	0.000
Egyptian Totals		39	0.574	2.375	0.725	1.51	0.647
CB1	Levantine	2	0.029	0	0.000	0.065	0.028
CB2	Levantine	1	0.015	0	0.000	0.1	0.043
CP1	Levantine	2	0.029	0	0.000	0.09	0.039
DEC	Levantine	1	0.015	0	0.000	0	0.000
JG1	Levantine	1	0.015	0	0.000	0.25	0.107
JT	Levantine	1	0.015	0	0.000	0.125	0.054
LB2	Levantine	2	0.029	0	0.000	0.12	0.051
RB1	Levantine	3	0.044	0.9	0.275	0	0.000
SJ1	Levantine	1	0.015	0	0.000	0.075	0.032
Levantine Totals		14	0.206	0.9	0.275	0.825	0.353

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
MYC	Mycenaean	2	0.029	0	0.000	0	0.000
Mycenaean Totals		2	0.029	0	0.000	0	0.000
Overall Totals		68	1.000	3.275	1.000	2.335	1.000

Table 15: Summary of Assemblage Group LT-10.2.

The overall cultural affiliation falls across four distinct groups: locally manufactured Egyptian-style ceramics, locally manufactured Levantine ceramics, imported Cypriot ceramics, and imported Mycenaean ceramics. By raw count, Egyptian-style ceramics make up most of the assemblage at 57.4% (n = 39), followed by Levantine (22.1%, n = 15), Cypriot (19.1%, n = 13), and Mycenaean (2.9%, n = 2). The calculation of EVEs is somewhat more complicated, since the imported ceramics are known only from body sherds and therefore cannot be accounted for using this technique.[417] Thus, these sherds can serve only in a presence-absence capacity to indicate the presence and consumption of these ware groups at Jaffa during this period. Even still, forms from the Egyptian and Levantine ceramic traditions dominated.

Within the assemblage, tableware provides the largest category of objects for analysis. Egyptian-style bowls are attested across three specific types: BL1a, BL1b, and BL3, as well as generic bases (type BL). Open tableware forms from the Levantine tradition are attested in smaller quantities but across three distinct types: CB1, CB2, and LB2. Quantitatively, Egyptian-style bowls comprise the bulk of the tableware assemblage, with an overall EVE rating of 1.385 across all three types, of which 79.9% stems from the type BL1a bowl (1.105 EVEs). Only five sherds from Levantine bowls were recovered (0.290 EVEs), with the proportions falling relatively evenly across the three types. The picture is somewhat mitigated by looking at the typologically ambiguous bowl bases. The Egyptian-style flat, string-cut base (generic type BL)

[417] Unfortunately, the two rims from imported Cypriot vessels, a type CYP9a bowl rim (**MHA 4705**) and a type CYP11a bowl rim (**MHA 4706**), could not be located and therefore do not factor into EVEs.

occupies only slightly more than half of all bowl bases (1.375 of 2.275 EVEs) in comparison to Levantine ring bases (generic type RB, 0.900 of 2.275 EVEs). Regardless, it is safe to say that the earliest Egyptian presence at the site already produced multiple elements of the table service. Additionally, nine of the Egyptian-style type BL1a bowl rims are decorated with the red "lipstick" rim, constituting 31.8% of examples of that type (0.44 of 1.385 EVEs). This is the only attested decoration any tableware form from this phase, indicating that this mode of decoration likely was relatively common even at the earliest stages of the garrison.

The other functional categories are substantially rarer. For culinary wares, the Levantine tradition is represented by two rim fragments of the classic type CP1 triangle rim cookpot, and from the Egyptian tradition are two fragments of a flowerpot (type FP) rim. Despite the small sample, this replicates patterns seen elsewhere at the site—the only evidence for (in)direct heat cooking is in the form of Levantine cookpots, whereas the Egyptian culinary forms are those destined for culinary tasks unique to the Egyptian repertoire. Only four fragments are known from storage containers in this phase, each from substantially different classes of vessel. Fragments of a juglet rim (type JT), rounded jug rim (type JG1), and storage jar rim (type SJ1) provide examples of container forms from the Levantine tradition that reflect several different storage behaviors. The only storage form from the Egyptian tradition is the base of a locally produced storage jar (generic type JR), with its thick walls and profile curvature suggesting a larger variant. As such, it can be regarded as a true storage jar rather a smaller variant that straddles the division between serving and storage forms. Consequently, this jar fragment provides the earliest evidence for the local manufacture of Egyptian-style storage forms at Jaffa.

Appendix 14.2 Description of the Phase LT-9 Ceramic Assemblage

The description of the Phase LT-9 ceramic assemblage is divided into assemblage groups to separate the earlier fills (assemblage group LT-9.1) from the floors covering them over (assemblage group LT-9.2). These are further separated from the main elements of Phase LT-9, which constitutes another layer of fills (assemblage group LT-9.3), the main sequence of floors associated with **Wall 735** that cap these fills (assemblage group LT-9.4), and finally, the final subphase of floors on the southern side of **Wall 735** that are associated with the construction of **Wall 972** (assemblage group LT-9.5).

Appendix 14.2.1 Assemblage Group LT-9.1: Fills beneath the Earliest Laminations

The construction fills corresponding to assemblage group LT-9.1 produced 73 diagnostic sherds across 27 distinguishable types (see Table 16 below). By raw sherd count, the material from this assemblage group is more balanced between Levantine (46.6%, n = 34) and locally produced Egyptian-style (45.2%, n = 33) material, with the remainder of the assemblage being imported Cypriot forms (8.2%, n = 6). However, these numbers simplify a more complex picture that is better demonstrated through EVEs. Base EVEs reveal an assemblage that is more Levantine than Egyptian-style (69.7%, 10.000 of 14.350 EVEs), whereas rim EVEs show an Egyptian-style majority (54.0%, 2.015 of 3.730 EVEs), a product of the overrepresentation of Levantine type SJ1 bases and Egyptian-style type BL1a rims. It is, therefore, especially prudent to examine functional categories in relation to one another.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP1a	Cypriot	2	0.027	0	0.000	0	0.000
CYP2a	Cypriot	1	0.014	0	0.000	0	0.000
CYP5a	Cypriot	1	0.014	0	0.000	0	0.000
CYP6a	Cypriot	2	0.027	0	0.000	0.15	0.040
Cypriot Totals		6	0.082	0	0.000	0.15	0.040

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
BL	Egyptian	10	0.137	2.9	0.202	0	0.000
BL *varia*	Egyptian	1	0.014	1	0.070	0	0.000
BL1a	Egyptian	12	0.164	0	0.000	0.685	0.184
BL1b	Egyptian	1	0.014	0	0.000	0.25	0.067
BL3b	Egyptian	1	0.014	0.3	0.021	0.3	0.080
BL5a	Egyptian	1	0.014	0	0.000	0.06	0.016
BL5c	Egyptian	2	0.027	0	0.000	0.12	0.032
FP	Egyptian	2	0.027	0.15	0.010	0.05	0.013
JR	Egyptian	2	0.027	0	0.000	0.375	0.101
JR4	Egyptian	1	0.014	0	0.000	0.175	0.047
Egyptian Totals		33	0.452	4.35	0.303	2.015	0.540
CB1	Levantine	2	0.027	0	0.000	0.15	0.040
CP1	Levantine	1	0.014	0	0.000	0.05	0.013
DB1	Levantine	3	0.041	1.45	0.101	0	0.000
DEC	Levantine	1	0.014	0	0.000	0	0.000
JG5	Levantine	1	0.014	0.325	0.023	0	0.000
JT	Levantine	1	0.014	0	0.000	0	0.000
KR3	Levantine	1	0.014	0	0.000	0	0.000
LB2	Levantine	1	0.014	0	0.000	0.05	0.013
LB5	Levantine	1	0.014	0	0.000	0.05	0.013
LB7	Levantine	1	0.014	0	0.000	0.14	0.038
LM	Levantine	2	0.027	0	0.000	0.2	0.054
RB1	Levantine	7	0.096	5.275	0.368	0	0.000
SJ1	Levantine	12	0.164	2.95	0.206	0.925	0.248
Levantine Totals		34	0.466	10	0.697	1.565	0.420
Overall Totals		73	1.000	14.35	1.000	3.73	1.000

Table 16: Summary of Assemblage Group LT-9.1.

For tableware, proportions vary depending on whether rim or base EVEs are considered. For base EVEs, Levantine bowls form most of the assemblage (61.6%, 6.725 of 10.925 EVEs), followed by locally produced Egyptian-style vessels at 38.4% (4.200 of 10.925 EVEs). Rim EVEs invert the picture, with Egyptian-style bowls accounting for 70.6% of the assemblage (1.295 of 1.835 EVEs), Levantine occupying 21.3% (0.390 of 1.835 EVEs), and Cypriot imports at 8.1% (0.150 of 1.835). Within the Egyptian-style tradition, the common type BL1a and BL1b simple bowls are present, as is the shallow, everted-rimmed plate (type BL3b), a large simple bowl with a plain rim (type BL5a), and small, red-slipped fine ware bowl with a ring base (type BL *varia*). Tableware from the Levantine tradition is attested across a similarly broad series of types, which include carinated bowls (type CB1), the classic interior-thickened rim bowl (type LB2), bowls with an in-turned rim (type LB5), and bowls with an exterior thickened rim (type LB6). Finally, two fragments of a Cypriot monochrome bowl with a slightly everted rim (type CYP6a) provide an example of an imported form that would have stood out as a distinctive addition to an individual's serving ware repertoire.

Decoration is relatively rare among tableware forms. The red-slipped bowl (type BL *varia*) was already mentioned, with the only other decorated example from the Egyptian ceramic tradition being a single fragment of a type BL1a bowl with a lipstick rim. A body sherd from a Levantine biconic krater (**MHA 7509**) is the only example of a decorated form from the Levantine tableware tradition in this phase. This type is extremely rare at Jaffa, with only a handful of sherds known from the site.[418] Like all other sherds of this type known from Jaffa, this example bears a geometric metope decoration rather than the more elaborate figural depictions common to the form elsewhere. The greatest variation within decorative motifs found on serving wares comes from the Cypriot tradition, wherein body and rim sherds attest to the presence of vessels from the White Painted, White Slipped, Base Ring, and Monochrome ware groups. Since the bulk of these sherds have no measurable qualities to produce EVEs, they can only serve to mark presence.

Culinary wares are sparse but present. A single fragment from both the base and rim of a flowerpot (type FP) attest to Egyptian-style culinary forms. Likewise, a single rim sherd from a

[418] This is not out of keeping with other coastal sites, with most examples being known from sites farther inland and to the north such as Megiddo and Beth Shean (Mullins and Yannai 2019, 163–64).

Levantine triangle rim cookpot (type CP1) indicates cooking traditions from the Levantine sphere. As for Levantine storage forms, the storage jar (type SJ1) is well represented, and a single fragment from a jug ring base (type JG5) attests to the presence of smaller storage vessels that straddle the line between storage and serving wares. In addition, a handle from a juglet (type JT) was recovered, which is a rare attestation for this common Levantine form at Jaffa. While it cannot be said with certainty due to the size of the handle, it potentially comes from a dipper juglet, a common form from the Levantine repertoire that has no analogue within the Egyptian tradition.[419] Locally produced Egyptian-style storage forms are also attested, though the ambiguous nature of Egyptian-style jar rims means that the simple everted rims from this assemblage group cannot be associated with a more specific type—hence their designation with the generic type JR. However, one rim (**MHA 7604**) was of the high, funnel variety (type JR4). This form, which is only known in the southern Levant from contexts in the Late Bronze Age IIB and later, is unusual for its early context at Jaffa. However, it is known from contemporary mid-18th Dynasty contexts in Egypt (Martin 2011b, 62). With its rim diameter of 8 cm, the narrow, high rim from the Jaffa example better resembles later examples, though its unusually coarse manufacture might render the search for exact parallels in the 18th Dynasty moot. Regardless, it provides the first clear example of a small- to medium-sized Egyptian store jar at Jaffa. One final object worth noting from this assemblage group is a single fragment of a spouted lamp, a form lacking typological parallels within the Egyptian tradition (Martin 2011b, 259).

[419] Dipper juglets are attested as imports and as locally manufactured ceramics at Middle Kingdom and Second Intermediate Period Tell el-Dabʿa, albeit in association with the presence of Levantine populations (Kopetzky 2002). They are not attested during the period of the New Kingdom (Bushnell 2013, 293–94). The only possible exception is the rare presence of Cypriot White Shaved juglets in Egypt, which were designed in imitation of the Levantine dipper juglet (Bergoffen 1991, 69; Akar 2017). While the exact function of dipper juglets is disputed, the interpretation generally falls between the mundane need to dip into and retrieve the liquid contents of store jars or, given their common association with mortuary deposits, a ritual function (see Bushnell 2013; Akar 2017).

Appendix 14.2.2 Assemblage Group LT-9.2: Early Floors without Architectural Association

In contrast with the construction fills of assemblage group LT-9.1, the floors from assemblage group LT-9.2 provide less evidence for ceramics of the Levantine tradition (see Table 17 below). The assemblage is approximately the same size (n = 74), which breaks down as follows: Egyptian-type (81.1%, n = 60), Levantine (14.9%, n = 11), and imported Cypriot ceramics (4.1%, n = 3). EVEs produce a similar picture, with ceramics from the Egyptian tradition forming the majority by both base EVEs (84.0%, 5.250 of 6.250 EVEs) or rim EVEs (69.4%, 1.745 of 2.515 EVEs). The presence of a residual body sherd of Red, White and Blue ware (**MHA 7563**)—a rare type from the Middle Bronze Age IIC (Maeir 2002)—bears comment since it marks one of the few residual Middle Bronze Age sherds in this excavation area. In truth, it is one of the few sherds found in a Late Bronze Age level at Jaffa that predates the Late Bronze Age, implying a limited impact of residuality on the Late Bronze Age IB assemblages at Jaffa.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2a	Cypriot	1	0.014	0	0.000	0	0.000
CYP2b	Cypriot	1	0.014	0	0.000	0.05	0.020
CYP9b	Cypriot	1	0.014	0	0.000	0	0.000
Cypriot Totals		3	0.041	0	0.000	0.05	0.020
AM4	Egyptian	1	0.014	1	0.160	0	0.000
BL	Egyptian	15	0.203	3.025	0.484	0	0.000
BL *varia*	Egyptian	1	0.014	0.225	0.036	0	0.000
BL1a	Egyptian	34	0.459	0	0.000	1.325	0.527
BL3	Egyptian	5	0.068	0	0.000	0.175	0.070
BL5a	Egyptian	2	0.027	0	0.000	0.07	0.028
JR	Egyptian	2	0.027	1	0.160	0.175	0.070
Egyptian Totals		60	0.811	5.25	0.840	1.745	0.694
CB1	Levantine	1	0.014	0	0.000	0.07	0.028
CP1	Levantine	2	0.027	0	0.000	0.1	0.040
CP2	Levantine	1	0.014	0	0.000	0.05	0.020
JT	Levantine	2	0.027	1	0.160	0.15	0.060
LB10	Levantine	1	0.014	0	0.000	0.05	0.020

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
RWB	Levantine	1	0.014	0	0.000	0	0.000
SJ1	Levantine	3	0.041	0	0.000	0.3	0.119
Levantine Totals		11	0.149	1	0.160	0.72	0.286
Overall Totals		74	1.000	6.25	1.000	2.515	1.000

Table 17: Summary of Assemblage Group LT-9.2.

The general proportions are further exaggerated in the tableware category. Egyptian-style forms comprise 90.2% of the tableware assemblage by rim EVEs (1.570 of 1.740 EVEs), and the only attested bases are from the Egyptian-style assemblage. The locally produced Egyptian-style forms continue the examples from preceding phases (types BL1a, BL3, BL *varia*, and BL5a), indicating an array of forms and functional distinctions within the Egyptian-style table service. Likewise, the much higher EVE count for Egyptian-style bowl bases (generic type BL) bolsters the low rim EVE count for Egyptian-style bowls in this phase, showing that they were overall quite common. Bowls from the Levantine tradition are only attested by a single rim sherd from a carinated bowl (type CB1) and another from an everted rim bowl (type LB10). Though the exposure of this assemblage group was limited, tableware from the Levantine tradition is almost completely absent—including chunky types with a high survivability rate like ring and disc bases (types RB and DB, respectively). Fragments of bowls from the Cypriot Base Ring (type CYP2b) and White Slip II (CYP9b) were recovered, signifying the availability of these conspicuously foreign elements to consumers at Jaffa.

In addition to the Cypriot forms, decoration is attested on the tableware forms from the Egyptian-style tradition. The lipstick decoration is attested on both type BL1a rims and a single BL3 rim, comprising 21.0% of all Egyptian-style bowl rims from this assemblage group (0.330

of 1.570 EVEs).[420] With respect to bowl bases from the Egyptian-style tradition, these showcase two additional decorative styles. One base from a red-slipped type BL *varia* was found, and in addition, this assemblage group marks the first unambiguous attestation of the red-splash decorated bowl in the Lion Temple area. Of these two styles, the one type BL *varia* accounts for 6.9% of the Egyptian-style bowl bases in this assemblage group (0.225 of 3.250 EVEs), whereas 30.8% bear the red-splash decoration (1.000 of 3.250 EVEs). Again, despite the small sample, several decorative styles were not only available on Egyptian-style tableware, but also seem to have been desirable given their relative abundance.

The only attested culinary forms are two fragments of the triangle rim cookpot (type CP1), as well as a single rim fragment from a related variant of the Levantine tradition, the everted rim cookpot (type CP2). No forms that can be associated with specific Egyptian culinary practices were recovered. The evidence for container forms is slightly more robust, with examples from the Levantine tradition including fragments of both juglets (type JT) and storage jars (type SJ1). From the Egyptian tradition, there are several base and rim fragments from locally manufactured jars (generic type JR) as well as a near-complete imported type AM4 amphora (**MHA 4769**). The assemblage of container forms is so small that little can be made of the proportion of Egyptian types to Levantine, especially since the near-complete amphora overwhelms the EVE count in favor of Egyptian vessels. Consequently, it is better to focus on the presence of these vessels as providing more general insight into the character of practices at Jaffa rather than as quantitative indicators for the frequency or intensity of those practices.

[420] All Egyptian-style bowls are lumped together for this metric, though type BL5 bowls are rarely decorated, with only a handful of examples with either the red lipstick rim or a red slip being known (Martin 2011b, 121).

Appendix 14.2.3 Assemblage Group LT-9.3: Fills in Preparation for the Main Construction in Phase LT-9

Though assemblage group LT-9.3 is derived from fills, it echoes patterns visible in both the preceding and succeeding floors (see Table 18 below). With respect to the proportions, the over-abundance of Egyptian-style type BL1a bowls and Levantine type SJ1 storage jars cause EVE assessments to vary substantially. From the raw count of sherds (n = 63), locally produced Egyptian-style ceramics constitute 54.0% of the assemblage (n = 34), followed by Levantine forms at 34.9% (n = 22) and imported Cypriot forms at 11.1% (n = 7). With base EVEs, however, only locally produced Egyptian-style forms are attested (generic type BL bowls and JR jars). If anything, this effectively demonstrates that pitfalls of relying on just rims or bases to produce assemblage-level characterizations. From rim EVEs, there is a Levantine majority at 68.2% (2.030 of 2.975 EVEs), followed by Egyptian-style ceramics at 28.4% (0.845 of 2.975 EVEs), and Cypriot at 3.3% (0.100 of 2.975 EVEs). However, 51.2% of the total rim EVE assemblage comes from type SJ1 jar rims (1.525 of 2.975 EVEs), which means caution must be taken.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2a	Cypriot	2	0.032	0	0.000	0	0.000
CYP2e	Cypriot	1	0.016	0	0.000	0	0.000
CYP5a	Cypriot	1	0.016	0	0.000	0	0.000
CYP6a	Cypriot	2	0.032	0	0.000	0.1	0.034
CYP10a	Cypriot	1	0.016	0	0.000	0	0.000
Cypriot Totals		7	0.111	0	0.000	0.1	0.034
BL	Egyptian	8	0.127	2.02	0.802	0	0.000
BL1a	Egyptian	21	0.333	0	0.000	0.72	0.242
BL3	Egyptian	1	0.016	0	0.000	0.025	0.008
BL5a	Egyptian	1	0.016	0	0.000	0.025	0.008
BL5c	Egyptian	1	0.016	0	0.000	0.05	0.017
FP	Egyptian	1	0.016	0	0.000	0.025	0.008
JR	Egyptian	1	0.016	0.5	0.198	0	0.000

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
Egyptian Totals		34	0.540	2.52	1.000	0.845	0.284
CP2	Levantine	1	0.016	0	0.000	0.04	0.013
JG1	Levantine	1	0.016	0	0.000	0.075	0.025
LB2	Levantine	1	0.016	0	0.000	0.05	0.017
LB4	Levantine	2	0.032	0	0.000	0.09	0.030
LB7	Levantine	1	0.016	0	0.000	0.05	0.017
LB10	Levantine	2	0.032	0	0.000	0.2	0.067
SJ1	Levantine	14	0.222	0	0.000	1.525	0.513
Levantine Totals		22	0.349	0	0.000	2.03	0.682
Overall Totals		63	1.000	2.52	1.000	2.975	1.000

Table 18: Summary of Assemblage Group LT-9.3.

Since the material is not occupational, the small assemblage renders proportional discussion—even with functional groups—dubious. More than half of this assemblage group is comprised of tableware, therefore this category will be discussed briefly. As mentioned, the only tableware bases from this assemblage group come from the Egyptian-style tradition (generic type BL), and while this is suggestive of a generally high frequency, little can be said other than that the deposits from which this construction fill originated likely characterized by the primary and/or secondary refuse deposition of mostly Egyptian-style tableware. The majority of Egyptian-style tableware is also maintained when rims are examined, with 62.4% coming from four types of this tradition (0.820 of 1.310 tableware EVEs), compared to 29.8% Levantine forms across four types (0.390 of 1.310 tableware EVEs), and two sherds from the Cypriot tradition (7.6%, 0.100 of 1.310 tableware EVEs). Levantine bowl types include several that have already been encountered (types LB2, LB7, and LB10), as well as one new variation, a bowl with an everted rim that is shaped into a flange (type LB4). This type was never common at Jaffa, being known from only eight examples across all phases. One of the two examples of this type from this assemblage group is decorated with a red-painted rim, as is one of the type LB10 everted bowl rims, which also bore a red line on the interior of the vessel suggesting interior concentric circles. For Egyptian-style tableware, 44.5% of bowl rims have the red lipstick rim (0.365 of 0.820 EVEs) and 24.8% of the bowl bases have the red-splash decoration (0.500 of 2.020 EVEs), indicating that both styles remained common up to this point. As with all preceding phases, the limited representation of Cypriot forms indicates yet another option for self-expression via conspicuous dining practices.

With respect to both culinary and storage wares, much of what is present echoes what has been seen previously, and frequencies are sufficiently low that little significance can be derived from quantitative patterns—a problem magnified by the over-representation of the type SJ1 storage jar. Despite low frequencies, culinary forms from the Egyptian-style (type FP, n = 1) and Levantine (type CP2, n = 1) are attested. A similar picture emerges with storage forms where—apart from the type SJ1—low frequency diversity is attested across both cultural traditions. One unusual storage form is a large body sherd from an imported Cypriot pithos (type CYP10a), which judging by the wall thickness and modelled ridges stems from the medium-sized Group II family of vessels (Keswani 2009, 111). Such a form is unlikely to be a trade good unto itself due to its massive size, though it was possibly left behind by a ship that utilized such large vessels as cargo containers (e.g., Pulak 1998, 203, Fig. 17).

Appendix 14.2.4 Assemblage Group LT-9.4: The First Series of Floors Associated with Wall 735

The occupational debris of assemblage group LT-9.4 produced an assemblage at 115 total diagnostic sherds (see Table 19 below). Egyptian-type vessels form 65.2% of the assemblage by raw sherd count (n = 75), followed by Levantine ceramics at 20.9% (n = 24), then imported Cypriot ceramics at 7.8% (n = 9), and a single fragment of a hybrid Egypto-Levantine bowl base (0.9%). Base EVEs transform the picture substantially, with Egyptian-style vessels forming 45.0% of the assemblage (3.170 of 7.045 EVEs), Levantine vessels comprising 40.8% (2.875 of

7.045 EVEs), and the hybrid Egypto-Levantine bowl base 14.2% (1.000 of 7.045 EVEs). Rim EVEs increase the Egyptian-type majority to 68.8% of the overall rim assemblage (4.240 of 6.165 EVEs). After, they are followed by forms from the Levantine (29.0%, 1.785 of 6.165 EVEs) and Cypriot (2.3%, 0.140 of 6.165 EVEs) traditions.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2a	Cypriot	2	0.017	0	0.000	0	0.000
CYP2b	Cypriot	2	0.017	0	0.000	0.065	0.011
CYP8b	Cypriot	3	0.026	0	0.000	0	0.000
CYP9a	Cypriot	1	0.009	0	0.000	0.075	0.012
CYP10a	Cypriot	1	0.009	0	0.000	0	0.000
Cypriot Totals		9	0.078	0	0.000	0.14	0.023
AM1/2	Egyptian	1	0.009	0	0.000	0.1	0.016
BL	Egyptian	13	0.113	2.42	0.344	0	0.000
BL1a	Egyptian	49	0.426	0.5	0.071	2.64	0.428
BL1b	Egyptian	2	0.017	0	0.000	0.05	0.008
BL2	Egyptian	2	0.017	0	0.000	0.11	0.018
BL5c	Egyptian	2	0.017	0	0.000	0.075	0.012
FP	Egyptian	3	0.026	0.25	0.035	0.165	0.027
JR	Egyptian	1	0.009	0	0.000	0.1	0.016
JR10	Egyptian	1	0.009	0	0.000	0	0.000
PS	Egyptian	1	0.009	0	0.000	1	0.162
Egyptian Totals		75	0.652	3.17	0.450	4.24	0.688
RB2	Egypto-Levantine	1	0.009	1	0.142	0	0.000
Egypto-Levantine Totals		1	0.009	1	0.142	0	0.000
CP1	Levantine	6	0.052	0	0.000	0.365	0.059
DB1	Levantine	2	0.017	0.5	0.071	0	0.000
LB2	Levantine	2	0.017	0	0.000	0.065	0.011
LB5	Levantine	1	0.009	0	0.000	0.075	0.012
RB1	Levantine	3	0.026	1.25	0.177	0	0.000
RWB	Levantine	1	0.009	0	0.000	0	0.000
SJ1	Levantine	14	0.122	1	0.142	1.28	0.208
SJ2	Levantine	1	0.009	0.125	0.018	0	0.000
Levantine Totals		30	0.261	2.875	0.408	1.785	0.290
Overall Totals		115	1.000	7.045	1.000	6.165	1.000

Table 19: Summary of Assemblage Group LT-9.4.

Most of the assemblage—by sherd count, base EVE, and rim EVE—is composed of tableware forms. Base EVEs break down as follows: Egyptian-style (51.5%, 2.920 of 5.670 EVEs), Levantine (35.3%, 2.000 of 5.670 EVEs), and hybrid Egypto-Levantine (17.6%, 1.000 of 5.670 EVEs). The hybrid form (type RB2) merits discussion, as its identification stems from the combination of its pronounced ring base, a characteristic of Levantine bowls, and its execution in a fabric with a high density of organic temper—a manufacturing technique of the Egyptian ceramic tradition. While ring bases are known on larger Egyptian-style bowls from the type BL5 family, their base diameters tend to fall between 11 and 19 cm (Martin 2011b, 41). The Jaffa example, which preserves the complete diameter, is 6 cm. Consequently, it seems that this type RB2 example constitutes a hybrid, a vessel that was morphologically Levantine but adapted some manufacturing characteristics from the Egyptian tradition. While this type of technological crossover is known from other Levantine sites (Martin 2011b, 98-99), it is rare at Jaffa. A rim EVE calculation for tableware dramatically increases the share of the Egyptian-style assemblage, raising it to 91.1% (2.875 of 3.155 EVEs), with Levantine and Cypriot forms comprising 4.4% (0.014 of 3.155 EVEs) each. The discrepancy between the rim and base EVE calculations indicates the incomplete nature of the data, but it is clear from both that most tableware at Jaffa from this assemblage group comes from the Egyptian-style tradition. With respect to decoration, none of the Levantine tableware forms exhibit decoration, though a substantial proportion of Egyptian-style forms do. Of the Egyptian-style bowl rims, 64.7% have the red lipstick rim (1.860 of 2.875 EVEs) and 36.0% of the Egyptian-style bowl bases (1.050 of 2.920 EVEs) bear the red-splash decoration. The continued presence of the familiar family of Cypriot tableware rounds out the picture of a diverse series of possibilities, though preference seems to have been for forms from the Egyptian tradition.

Culinary wares are represented both by Levantine triangle rim cookpot fragments (type CP1) and Egyptian-style flowerpot fragments (type FP), which by this point seem to represent complimentary elements of a hybrid culinary system. Of the container types that are present, only rim EVEs provide a substantial sample, and the result is overwhelmingly dominated by the type SJ1 store jar (86.5%, 1.280 of 1.480 EVEs). However, Egyptian container forms continue to be present, with several types that merit further comment. First among these is a body sherd form a *zīr* (type JR10 jar), identifiable due to its peculiar manufacturing tradition wherein the clay grain changes direction where the neck is attached to the body. While not quantifiable using EVEs, this sherd offers the first evidence for this vessel type in the Lion Temple excavation area. Also attested for the first time in the area is a rim from an imported Egyptian amphora, likely from the type AM1 or AM2 family. Chronologically speaking, a type AM1 is most probable since the type AM2 and its subvariants are not known to appear earlier than the late 18th Dynasty in Egypt. However, neither type is well known in the southern Levant prior to the Late Bronze Age IIA, and the forms are impossible to differentiate based on rim fragments alone (Martin 2011b, 73-77). It should however be noted that the well-known amphora categories from 18th dynasty deposits in Egypt contemporary to this example at Jaffa closely resemble the "Canaanite Store Jars" which they originally imitated, complete with externally rolled rims (Aston 2004, 188, Fig. 6; Knapp and Demesticha 2017, 66–70). The example from this assemblage group has the interior rolled rim common to amphorae from later periods (e.g., Aston 2004, 189, Fig. 7:e). Regardless of the exact typological identification the Jaffa example offers another clear, early example for the importation of commodities from Egypt. Also notable is another body sherd from a Cypriot pithos (type CYP10), though it is possible that this is a residual fragment from the same vessel from assemblage group LT-9.3. One final vessel of note from the varia category specifically relates to storage vessels. It is a near-complete pot stand (type PS), either purposefully made or repurposed from a broken store jar neck. The form is constructed from the same fabric as Egyptian-style vessels at Jaffa, complete with large quantities of straw temper, and so regardless of its original construction it should be associated with that tradition.

Appendix 14.2.5 Assemblage Group LT-9.5: Floors Associated with the Dividing Wall (Wall 972)

Assemblage group LT-9.5 has an appreciable assemblage (n = 93) that, like the preceding assemblage group, is mostly comprised of locally produced Egyptian-style sherds (see Table 20 below). By raw sherd count, Egyptian-style vessels occupy 76.6% of the overall assemblage (n = 72), Levantine forms 16.0% (n = 15), followed by imported Cypriot (6.3%, n = 6) and Mycenaean (1.1%, n = 1) sherds. Regardless of whether base (94.7%, 3.545 of 3.745 EVEs) or rim (76.6%, 2.765 of 3.635 EVEs) EVEs are used, the assemblage is overwhelmingly Egyptian-style in character. Levantine ceramics never comprise more than a quarter of the overall assemblage. Much of this stems from the extreme abundance of Egyptian-style bowls, which occupy more than half of the total assemblage by raw count, base EVE, and rim EVE.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2a	Cypriot	4	0.043	0	0.000	0	0.000
CYP5a	Cypriot	1	0.011	0	0.000	0	0.000
CYP8b	Cypriot	1	0.011	0	0.000	0	0.000
Cypriot Totals		6	0.064	0	0.000	0	0.000
BL	Egyptian	11	0.117	2.445	0.653	0	0.000
BL1a	Egyptian	48	0.511	0	0.000	2.08	0.572
BL1b	Egyptian	1	0.011	0	0.000	0.025	0.007
BL2	Egyptian	2	0.021	0	0.000	0.09	0.025
BL3	Egyptian	2	0.021	0	0.000	0.1	0.028
BL3a	Egyptian	2	0.021	0	0.000	0.34	0.094
BL5c	Egyptian	1	0.011	0	0.000	0.03	0.008
FP	Egyptian	4	0.043	0.1	0.027	0.1	0.028

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
JR	Egyptian	1	0.011	1	0.267	0	0.000
Egyptian Totals		72	0.766	3.545	0.947	2.765	0.761
CB1	Levantine	1	0.011	0	0.000	0.04	0.011
CP1	Levantine	1	0.011	0	0.000	0.05	0.014
KR1	Levantine	1	0.011	0	0.000	0.03	0.008
LB1	Levantine	1	0.011	0	0.000	0.05	0.014
LB2	Levantine	1	0.011	0	0.000	0.025	0.007
LB4	Levantine	2	0.021	0	0.000	0.065	0.018
LB7	Levantine	1	0.011	0	0.000	0.05	0.014
LM	Levantine	1	0.011	0	0.000	0.05	0.014
RB1	Levantine	1	0.011	0.2	0.053	0	0.000
SJ1	Levantine	5	0.053	0	0.000	0.51	0.140
Levantine Totals		15	0.160	0.2	0.053	0.87	0.239
MYC	Mycenaean	1	0.011	0	0.000	0	0.000
Mycenaean Totals		1	0.011	0	0.000	0	0.000
Overall Totals		94	1.000	3.745	1.000	3.635	1.000

Table 20: Summary of Assemblage Group LT-9.5.

This majority of Egyptian-style ceramics is reflected in the tableware tradition. Almost the entire assemblage, and especially the tableware assemblage (91.1%, 2.665 of 2.925 rim EVEs), comes from the Egyptian-style bowl tradition—especially the type BL1a simple bowl. However, the overwhelming presence of type BL1a bowls obfuscates a broader diversity of tableware forms—12 distinct rim morphologies—than has been present in any of the preceding phases. This includes at least six types from the Egyptian-style tradition (types BL1a, BL1b, BL2, BL3, BL3a, and BL5c) and six from the Levantine tradition (types LB1, LB2, LB4, LB7, CB1, and KR1). While only present in small quantities, the Levantine vessel fragments provide a much more diverse picture of the Levantine tableware tradition than has previously been attested in this area. The robust bowl assemblage also allows for a close look at tableware decoration. Outside of the Egyptian tradition, one of the Levantine type LB4 rims bears red paint that was applied with a brush, marking another rare instance of this mode of decoration on a Levantine form at Jaffa. In addition, the continued presence of fragments of imported Cypriot Base Ring, generic White Slip, and Bichrome wares and the single decorated Mycenaean sherd (**MHA 7606**) implies the continued presence of these conspicuously foreign tableware elements, though the Bichrome sherd is likely residual. The Egyptian-style tableware assemblage is more telling, with 70.9% of all type BL bowl rims bearing the red lipstick decoration (1.890 of 2.665 EVEs), compared with only 8.2% of type BL bases (0.200 of 2.445 EVEs) bearing the red-splash decoration—with the latter likely indicating a diminished popularity for red-splash decorated bowls later in the Late Bronze Age IB.

As for the other functional categories, the relatively small assemblage size hampers quantitative analysis and much of what can be said is dependent on simple presence. Levantine culinary wares are represented by a single fragment of a triangle cookpot rim (type CP1) and Egyptian-style culinary ceramics by three flowerpot rim fragments and another fragment of a flowerpot base (type FP). For containers, while there is technically a higher EVE count for Egyptian-style ceramics, little can be made of this since the EVE rating of 1.000 for Egyptian-style jars comes from generic type JR base and the 0.510 rating for Levantine container forms comes from five rim fragments of type SJ1 storage jars. The exact harmonization of these two numbers is impossible, though it can be said that for what was exposed on these floors, there is no evidence for small to medium sized Levantine storage wares from types JG or JT and therefore it is possible that most of the small-to-medium sized storage needs were fulfilled by vessels from the Egyptian tradition. From the category of varia, the presence of a single fragment of a lamp (type LM) indicates the continued presence of this purely Levantine form alongside assemblages predominantly characterized by Egyptian-style ceramics.

Appendix 14.3 Description of the Phase LT-8 Ceramic Assemblage

The description of the Phase LT-8 ceramic assemblage is divided into assemblage groups to separate the earlier fills (assemblage group LT-8.1) from subsequent construction activities that cut into the fills (assemblage group LT-8.2). This is separated by the main use-life of the Lion Temple, which constitutes its floors and their occupations debris (assemblage group LT-8.3).

Appendix 14.3.1 Assemblage Group LT-8.1: The Retaining Wall 848 and Levelling Fills

The main levelling operation for the construction of the Lion Temple is characterized by a large, unquantifiable body of material—a massive assemblage of non-diagnostic body sherds from storage vessels and/or transport amphorae. Without typological delineation or quantifiable rims/bases, these sherds cannot be utilized within the analytical methods applied here. With respect to diagnostic ceramics, the assemblage is dominated by the Egyptian-style type BL1a bowl and Egyptian-style ceramics in general, which by raw count comprise 65.8% (n = 75) of the overall assemblage by sherd count (see Table 21). They are followed by Levantine ceramics (21.1%, n = 24) and then Cypriot (13.2%, n = 15). The picture is unchanged with EVE calculations, with Egyptian-style forms being dominant in both base (53.7%, 2.375 of 4.425 EVEs) and rim EVE (66.3%, 2.915 of 4.395 EVEs) calculations. However, as with the previous phase, this image blurs the degree of diversity within the various functional categories.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2a	Cypriot	5	0.044	0	0.000	0	0.000
CYP2b	Cypriot	1	0.009	0	0.000	0.025	0.006
CYP2e	Cypriot	1	0.009	0	0.000	0	0.000
CYP5a	Cypriot	6	0.053	0	0.000	0	0.000
CYP6a	Cypriot	1	0.009	0	0.000	0.05	0.011
CYP8b	Cypriot	1	0.009	0	0.000	0	0.000
Cypriot Totals		15	0.132	0	0.000	0.075	0.017
BL	Egyptian	8	0.070	1.8	0.407	0	0.000
BL1a	Egyptian	56	0.491	0	0.000	2.005	0.456

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
BL1b	Egyptian	2	0.018	0	0.000	0.08	0.018
BL3	Egyptian	4	0.035	0	0.000	0.225	0.051
BL3a	Egyptian	2	0.018	0.4	0.090	0.355	0.081
BL5c	Egyptian	1	0.009	0	0.000	0.025	0.006
FP	Egyptian	2	0.018	0.175	0.040	0.225	0.051
Egyptian Totals		75	0.658	2.375	0.537	2.915	0.663
RB2	Egypto-Levantine	1	0.009	0.3	0.068	0	0.000
Egypto-Levantine Totals		1	0.009	0.3	0.068	0	0.000
CB1	Levantine	2	0.018	0	0.000	0.1	0.023
CP1	Levantine	2	0.018	0	0.000	0.125	0.028
CP4	Levantine	1	0.009	0	0.000	0.14	0.032
JG1	Levantine	3	0.026	0	0.000	0.25	0.057
JG5	Levantine	1	0.009	1	0.226	0	0.000
KR1	Levantine	1	0.009	0	0.000	0.025	0.006
KR2	Levantine	1	0.009	0	0.000	0.025	0.006
LB2	Levantine	2	0.018	0	0.000	0.08	0.018
LB5	Levantine	1	0.009	0	0.000	0.05	0.011
LB10	Levantine	2	0.018	0	0.000	0.125	0.028
RB1	Levantine	1	0.009	0.25	0.056	0	0.000
SJ1	Levantine	6	0.053	0.5	0.113	0.485	0.110
Levantine Totals		23	0.202	1.75	0.395	1.405	0.320
Overall Totals		114	1.000	4.425	1.000	4.395	1.000

Table 21: Summary of Assemblage Group LT-8.1.

Egyptian-style bowls form the overwhelming majority of tableware types (84.9%, 2.690 of 3.170 EVEs), though it should be noted that type BL1a bowls alone are 62.3% of the overall tableware assemblage (2.005 of 3.170 EVEs). Calculating via base EVE repeats the same picture, with 80.0% of the tableware being from the Egyptian-style tradition (2.200 of 2.750 EVEs). The Egyptian-style tableware assemblage maintains the expression seen in the preceding Phase LT-9, comprising types BL1a, BL1b, BL3 and BL5c. Levantine forms are similarly diverse, including the type LB2, LB5 LB10, CB1, KR1, and KR2, all of which are expressed across multiple size groups. Fragments from open forms in the Cypriot tradition (types CYP2b, CYP5a, and CYP6a) attest to their continued presence, though at no point do they become common. The most notable patterns with respect to tableware decoration are the continued importance of lipstick bowls within the Egyptian-style tradition (64.7% of all Egyptian-style bowls; 1.740 of 2.690 EVEs) and the disappearance of red-splash decoration.[421] That a construction fill completely lacks examples of the red-splash decoration is highly suggestive of their diminishing popularity already in the previous phase, from which the fill material was likely derived. Finally, a single fragment of a hybrid ring bowl base with large quantities of organic temper (type RB2) provides another rare attestation of technological crossover.

Figure 66: Image of **MHA 7582** (**Photo MHA_7582d**) detailing an unusual cookpot morphology.

[421] There is also a single sherd of a red-slipped Egyptian-style type BL1a where the slip is only on the vessel interior, meaning that it is not an example of the type BL *varia* bowl. This decorative style is present in many phases, but always in low frequencies as its popularity at Jaffa seems to have been limited.

As per usual, forms from other functional categories are rare, but present. As usual, culinary wares are attested in the Levantine type CP1 triangle rim cookpot and Egyptian-style flowerpot (type FP). In addition, this assemblage group provides evidence for an unusual form that seems to be related to the Levantine cookpot tradition, but for which there are no firm parallels (**MHA 7582**, type CP4). The vessel mouth is 24 cm in diameter and the preserved portion consists of the inward sloping wall of the upper part of the vessel—suggesting carination—and a rim that consists of a simple rim with two triangular shaped ridges modelled underneath it (see Figure 66). The ridges were separately applied as plastic decoration, which marks them as especially unusual in comparison to other Levantine cookpot forms with ridged necks.[422] While the fabric of this form still follows the general pattern of Late Bronze Age cookpots in that it contains large inclusions to avoid fracturing during repeated heating/cooling events, the fabric is of a much lighter color than that of the more common type CP1 examples known from Jaffa. Consequently, this form is unusual in many ways, suggesting either a special instance of local manufacture, perhaps an experiment, or the importation of a form from off-site. Shifting to container forms, as previously noted they are well-attested by large, non-diagnostic body sherds, though diagnostic elements are surprisingly rare. The only diagnostic forms are from the Levantine tradition, including elements of smaller jugs (types JG1 and JG5) and larger store jars (type SJ1). While forms from the Egyptian-style jar family (generic type JR) are never common, their total absence from this material speaks more to the point of origin for these fills rather than prevailing trends in ceramic consumption at the site given, as this type family remains common in subsequent assemblage groups.

[422] Levantine cookpots with ridged necks are a rare variant within the Late Bronze Age Levantine cookpot tradition and are mostly known from the Late Bronze Age IIB (e.g., James and McGovern 1993b, vol. II, Fig. 26:5)—though these examples do not parallel to the form from Jaffa.

Appendix 14.3.2 Assemblage Group LT-8.2: The Construction of the Lion Temple

Much like the levelling fills of the preceding assemblage group, the construction efforts related to assemblage group LT-8.2 comprise layers incorporating a high volume of large body sherds, likely debitage from Jaffa's port. Across multiple pottery buckets (e.g., **PB 1974.031**), especially in the stone substratum to the Lion Temple's floor (**Locus 1210)**, there was an enormous assemblage of storage jar body sherds from a variety of types and fabrics. While these were mostly derived from Levantine transport amphorae quite a few also bore the characteristic marl cream slip and fabric of imported Egyptian jars.[423] In addition to these sherds, this assemblage group presents a robust assemblage that includes several new, important types (see Table 22). Most forms are still from the Egyptian-style tradition, which comprises 67.0% by sherd count (n = 69) and 58.5% by rim EVE (2.180 of 3.725 EVEs). The overall base EVE calculation moderates the picture somewhat, with Egyptian-style forms occupying 49.7% of the overall assemblage (3.760 of 7.560 EVEs), followed by Levantine at 38.0% (2.875 if 7.560 EVEs) and hybrid Egypto-Levantine at 12.2% (0.925 of 7.560 EVEs).

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2b	Cypriot	2	0.019	0	0.000	0.15	0.040
CYP5a	Cypriot	4	0.039	0	0.000	0	0.000
CYP6a	Cypriot	1	0.010	0	0.000	0.05	0.013
CYP9a	Cypriot	1	0.010	0	0.000	0.025	0.007
Cypriot Totals		8	0.078	0	0.000	0.225	0.060
BB	Egyptian	1	0.010	0.225	0.030	0	0.000
BL	Egyptian	16	0.155	3.535	0.468	0	0.000
BL1a	Egyptian	35	0.340	0	0.000	1.36	0.365
BL1b	Egyptian	1	0.010	0	0.000	0.075	0.020
BL2	Egyptian	2	0.019	0	0.000	0.1	0.027
BL3	Egyptian	2	0.019	0	0.000	0.065	0.017

[423] The cream slip visible on Egyptian imports during the Late Bronze Age is a distinct surface finish that has no real parallel from any other contemporary ceramic tradition. While the body sherds by themselves cannot be associated with a specific type, they can at least be used as indicators for the presence of direct trade with Egypt (Martin 2006a).

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
BL5c	Egyptian	3	0.029	0	0.000	0.16	0.043
FP	Egyptian	9	0.087	0	0.000	0.42	0.113
Egyptian Totals		69	0.670	3.76	0.497	2.18	0.585
DB2	Egypto-Levantine	3	0.029	0.925	0.122	0	0.000
Egypt-Levantine Totals		3	0.029	0.925	0.122	0	0.000
CP1	Levantine	1	0.010	0	0.000	0.025	0.007
DEC	Levantine	3	0.029	0	0.000	0	0.000
JG1	Levantine	1	0.010	0	0.000	0.1	0.027
KR1	Levantine	1	0.010	0	0.000	0.05	0.013
KR2	Levantine	1	0.010	0	0.000	0.025	0.007
LB1	Levantine	1	0.010	0	0.000	0.025	0.007
PT	Levantine (?)	1	0.010	0	0.000	0.06	0.016
RB1	Levantine	1	0.010	0.575	0.076	0	0.000
SJ1	Levantine	13	0.126	2.3	0.304	1.035	0.278
Levantine Totals		23	0.223	2.875	0.380	1.32	0.354
Overall Totals		103	1.000	7.56	1.000	3.725	1.000

Table 22: Summary of Assemblage Group LT-8.2.

The tableware group continues the well-established pattern of locally produced Egyptian-style wares dominating both in rim (84.4%, 1.760 of 2.085 EVEs) and base EVEs (70.2%, 3.535 of 5.035 EVEs). Interestingly, tableware from the Levantine tradition occupies third position with respect to both rim and base EVEs, falling after Cypriot forms in the case of rims and a hybridized variation on the disc base (type DB2) for bases—a previously unattested low frequency for Levantine forms. The Egyptian-style tradition falls across the same types as evidenced in previous phases (types BL1a/b, BL2, BL3, and BL5c), though the low frequency of Levantine forms also brings a lower overall diversity of types (types LB1, KR1, and KR2). The type DB2, a disc base of Levantine morphology executed in the same fabric as Egyptian-style vessels at Jaffa, is also rare, with the three examples from this assemblage group coming from at least two different vessels. Only forms from the Egyptian-style tradition are decorated and of these, only the red lipstick rim and the red slip decoration are present. Approximately a third of the bowls—all types BL1-3—are decorated (30.4%, 0.535 of 1.760 EVEs), and of these, 90.7% bear the lipstick rim (0.485 of 0.535 EVEs) and 9.3% are decorated with red slip (0.050 of 0.535 EVEs). Given the reduced frequency in comparison to previous phases, as well as the continued decrease in red lipstick rims in subsequent phases, it seems likely that the downturn in the popularity of Egyptian-style decorated forms begins in Phase LT-8.

Culinary forms are rare, though the Levantine triangle rim cookpot (type CP1) and the Egyptian-style flowerpot (type FP) are attested in small quantities. It is here we first see the appearance the so-called Egyptian-style "beer jar" or "beer bottle" (type BB), which is thought to replace the flowerpot in the Egyptian culinary repertoire beginning in the late 18th Dynasty/Levantine Late Bronze Age IIA (Martin 2011b, 51–55). Only a fragment of a base was recovered, and while beer jar and flowerpot bases are extremely similar with respect to their rough finish, deep finger impressions, and perforation in the center, this example is clearly identifiable as a beer jar due to its small diameter of 7 cm, which is well outside the attested 9-12 cm range for flowerpots (Martin 2011b, 48).

Container forms are exclusively attested from the Levantine tradition, with neither imported nor locally manufactured Egyptian-style jars present amongst the diagnostic sherds, though body sherds from Egyptian imports were present within the larger assemblage of non-diagnostic elements. The absence of any evidence for locally produced Egyptian-style jars is unusual, though their presence in assemblage group LT-8.3 renders it unlikely that the pattern is meaningful. In accordance with the abundance of body sherds from storage jars, it is unsurprising that the bulk of the identifiable container assemblage consists of rims and bases of the type SJ1. One unusual container form present in the assemblage is a rim fragment of a large pithos (type PT), a rare Levantine storage form that is not generally known this far south.[424] While the fragment is small, it came from an enormous vessel with a 34 cm rim diameter, more than three times the diameter of a typical Levantine storage form. The presence of such an unusual vessel may, like the Cypriot pithoi fragments from Phase LT-9, possibly point to its incidental presence in relation to broader maritime trade.

Appendix 14.3.3 Assemblage Group LT-8.3: The Lion Temple

As the largest single-phase Late Bronze Age exposure by Kaplan in the Lion Temple area, assemblage group LT-8.3 comprises use-life of the Lion Temple and provides the largest assemblage from the area (n = 229; see Table 23 below). Egyptian-type sherds form the majority of the assemblage by raw sherd count (71.1%, n = 163), mostly due to the 105 fragments of type BL1a bowls that were recovered. This is followed by Levantine forms (17.4%, n = 40), imported Cypriot forms (10.9%, n = 25), and one body sherd from an imported Mycenaean vessel (0.004%). The raw counts are reflected in the EVE calculations, where forms from the Egyptian tradition dominate by both base (74.8%, 6.475 of 15.650 EVEs) and rim (72.9%, 6.815 of 9.350 EVEs) calculations.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2a	Cypriot	6	0.026	0	0.000	0	0.000
CYP2b	Cypriot	4	0.017	0	0.000	0.195	0.021
CYP2c	Cypriot	2	0.009	0	0.000	0	0.000
CYP2d	Cypriot	1	0.004	0.3	0.019	0	0.000
CYP3a	Cypriot	2	0.009	0	0.000	0	0.000
CYP4a	Cypriot	1	0.004	0	0.000	0	0.000
CYP5a	Cypriot	6	0.026	0	0.000	0	0.000
CYP6a	Cypriot	1	0.004	0	0.000	0.025	0.003
CYP7a	Cypriot	1	0.004	0	0.000	0	0.000
CYP8a	Cypriot	1	0.004	0	0.000	0.075	0.008

[424] The classic Late Bronze Age pithos is widely known in the northern Levant, though the distribution does not seem to extend south of Hazor (Mullins and Yannai 2019, 160–61).

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
Cypriot Totals		25	0.109	0.3	0.019	0.295	0.032
AM	Egyptian	1	0.004	0	0.000	0.05	0.005
BL	Egyptian	24	0.105	6.475	0.414	0	0.000
BL1a	Egyptian	105	0.459	0.5	0.032	4.43	0.474
BL1b	Egyptian	2	0.009	0	0.000	0.15	0.016
BL2	Egyptian	5	0.022	0	0.000	0.16	0.017
BL3	Egyptian	11	0.048	0	0.000	0.35	0.037
BL3a	Egyptian	1	0.004	1	0.064	0.94	0.101
BL5a	Egyptian	4	0.017	0.25	0.016	0.245	0.026
BL5b	Egyptian	1	0.004	0	0.000	0.03	0.003
FP	Egyptian	5	0.022	0.175	0.011	0.51	0.055
JR	Egyptian	4	0.017	3.3	0.211	0	0.000
Egyptian Totals		163	0.712	11.7	0.748	6.865	0.734
CB1	Levantine	1	0.004	0	0.000	0.025	0.003
CP1	Levantine	6	0.026	0	0.000	0.245	0.026
CP2	Levantine	1	0.004	0	0.000	0.025	0.003
JG1	Levantine	3	0.013	0	0.000	0.2	0.021
KR1	Levantine	1	0.004	0	0.000	0.05	0.005
LB1	Levantine	2	0.009	0	0.000	0.21	0.022
LB2	Levantine	1	0.004	0	0.000	0.025	0.003
LB4	Levantine	1	0.004	0	0.000	0.05	0.005
LB5	Levantine	1	0.004	0	0.000	0.05	0.005
LB6	Levantine	1	0.004	0	0.000	0.025	0.003
LM	Levantine	3	0.013	0	0.000	0.15	0.016
RB1	Levantine	3	0.013	0.4	0.026	0	0.000
SJ1	Levantine	16	0.070	3.25	0.208	1.135	0.121
Levantine Totals		40	0.175	3.65	0.233	2.19	0.234
MYC	Mycenaean	1	0.004	0	0.000	0	0.000
Mycenaean Totals		1	0.004	0	0.000	0	0.000
Overall Totals		229	1.000	15.65	1.000	9.35	1.000

Table 23: Summary of Assemblage Group LT-8.3.

Tableware is almost exclusively from the Egyptian tradition, whether by base (95.3%, 8.225 of 8.625 EVEs) or rim (88.7%, 6.305 of 7.110 EVEs) EVEs. Yet again, this is due to the overwhelming quantities of the Egyptian-style type BL1a bowl, which comprises 62.3% of the total tableware assemblage (4.443 of 7.110 rim EVEs). In addition to the type BL1a, the Egyptian-style tableware assemblage also included types BL1b, BL2, BL3. BL3a, BL5a, and

BL5b. The type BL5 bowls are especially interesting. Martin's typology of the type BL5 is split into three groups, with the division between subtypes a and b being whether the rim is thickened. In the type BL5a bowl, where the rim is not thickened, there are a number of different possible rim orientations, though the most common is the simple rim (Martin 2011b, 41). In this phase, examples of both the simple (**MHA 4780**) and everted (**MHA 4729**) variants of the type BL5a are attested, which when one includes the lone type BL5b example, attests to the simultaneous presence of several variations on the Egyptian-style large bowl. Despite the overwhelming quantity of forms from the Egyptian-style assemblage, there is still a wide variety of Levantine tableware forms present. Of the eight sherds related to forms from the Levantine tradition, seven typological variants are attested. This includes five rim morphologies from the simple bowl tradition (types LB1, LB2, LB4, and LB5), a carinated bowl fragment (type CB1), and a krater fragment (type KR1). Further variation is indicated by the presence of fragments from multiple types of Cypriot vessels, which offer the only examples of decoration outside of the Egyptian tradition.[425] From the Egyptian tradition, there is a single bowl base fragment (generic type BL) with red-splash decoration, which by this point is clearly residual. Additionally, 28.0% of the Egyptian-style bowl rims are decorated (1.765 of 6.305 EVEs), of which 98.6% have the lipstick rim (1.740 of 1.765 EVEs) and one example bears a red slip. Given that the base is not preserved, it cannot be said if this is a residual red-slipped, ring base bowl (type BL *varia*) or a sherd from a red-slipped type BL1a bowl, which are occasionally attested before their peak popularity in the Late Bronze Age IIB (Martin 2011b, 119–20). Regardless, the diminished

[425] The type KR1 rim sherd potentially bears a badly degraded white slip, though whitish concretions are not unusual on the exterior surface of sherds in this excavation area. Of the Cypriot ceramics, the presence of a rim sherd of Red-on-Black (type CYP7a) ware is a rare instance of a Middle Bronze Age residual sherd in the Lion Temple excavation area.

proportion of lipstick bowls within the Egyptian-style bowl tradition is interesting, given that at most sites in the southern Levant they increase in popularity over time.

Despite the assemblage size, culinary forms remain rare, with cookpot rims from the Levantine tradition (types CP1/2) and base and rim fragments from Egyptian-style flowerpots (type FP) attested, again attesting to their simultaneous presence. The sizeable container assemblage offers more clarity, however, with base EVEs being roughly split between Egyptian-style (48.2%, 3.300 of 6.850 EVEs) and Levantine forms (47.4%, 3.250 of 6.850 EVEs). Rim EVEs are impossible to factor in since no rims of Egyptian-style jars (generic type JR) are attested apart from a single rim fragment of an imported Egyptian amphora (type AM1 or AM2). This is the first time where there is any sense of parity between the two traditions, as the general ubiquity of the Levantine type SJ1 ensures that it is often the only container type present.

Appendix 14.4 Description of the Phase LT-7 Ceramic Assemblage

The discussion of ceramics associated with this phase is for the sake of completion, as the only forms recovered in assemblage group LT-7.1 are derived from fills of an unclear relationship to the main architectural feature of the phase.

Appendix 14.4.1 Assemblage Group LT-7.1: Fills Associated with Phase LT-7

The ambiguity of this assemblage group and the small size of the diagnostic assemblage (n = 58) makes it difficult to characterize it in any meaningful way (see Table 24). Even still, of the material that was recovered is congruent with the phases preceding it. By raw sherd count there is a majority of Egyptian-style sherds (55.2%, n =32), which is reflected in the rim EVE calculation (59.1%, 2.370 if 4.005 EVEs) but inverted in the calculation of base EVEs, where Levantine forms occupying the majority of the assemblage (58.3%, 2.800 of 4.800 EVEs). Given the limited utility of calculating the proportional cultural affiliation of an assemblage, these ambiguous results say little without qualification by functional types.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2a	Cypriot	1	0.017	0	0.000	0	0.000
CYP5b	Cypriot	2	0.034	0	0.000	0	0.000
CYP7b	Cypriot	1	0.017	0	0.000	0	0.000
Cypriot Totals		4	0.069	0	0.000	0	0.000
BL	Egyptian	4	0.069	1	0.208	0	0.000
BL1a	Egyptian	19	0.328	1	0.208	1.64	0.409
BL1b	Egyptian	1	0.017	0	0.000	0.05	0.012
BL2	Egyptian	2	0.034	0	0.000	0.075	0.019
BL3	Egyptian	2	0.034	0	0.000	0.185	0.046
FP	Egyptian	1	0.017	0	0.000	0.08	0.020
JR	Egyptian	2	0.034	0	0.000	0.24	0.060
JR4	Egyptian	1	0.017	0	0.000	0.1	0.025
Egyptian Totals		32	0.552	2	0.417	2.37	0.592
CB1	Levantine	2	0.034	0	0.000	0.225	0.056
CP1	Levantine	1	0.017	0	0.000	0.075	0.019
JG5	Levantine	1	0.017	0.275	0.057	0	0.000
LB1	Levantine	2	0.034	0	0.000	0.1	0.025
LB10	Levantine	1	0.017	0	0.000	0.05	0.012
LM	Levantine	1	0.017	0	0.000	0.06	0.015
RB1	Levantine	2	0.034	0.525	0.109	0	0.000
SJ1	Levantine	12	0.207	2	0.417	1.125	0.281
Levantine Totals		22	0.379	2.8	0.583	1.635	0.408
Overall Totals		58	1.000	4.8	1.000	4.005	1.000

Table 24: Summary of Assemblage Group LT-7.1.

Given the small size of the assemblage, the recurring issue of an overrepresentation of the Egyptian-style type BL1a bowl and Levantine type SJ1 storage jar results in an even greater skew than normal. For instance, that approximately a third of the overall assemblage comprises just the type BL1a bowl renders the unsurprising conclusion that the majority of the tableware assemblage is Egyptian-style in character. It is more prudent to note that what we see of the Egyptian-style tableware assemblage is still spread across at least four types (types BL1a, BL1b, BL2, BL3, and generic type BL), and the Levantine assemblage across at least three (types CB1, LB1, LB10, and generic type RB). Similarly, the container assemblage for both traditions is spread across multiple types, with at least two rim morphologies attested within the Egyptian-style tradition (generic type JR and type JR4) and multiple size groups within the Levantine family (types SJ1 and JG5). Consequently, despite its small size, the assemblage still demonstrates a great deal of variation despite some key absences (e.g., type BL5 bowls from the tableware assemblage), indicating the continued coexistence of both ceramic traditions. The only potentially meaningful, quantifiable pattern within the assemblage is the proportion of decorated Egyptian-style bowls, since this remains the largest category of any single type. In this phase, 23.8% of the bowls are decorated (0.465 of 1.95 EVEs), all with the red lipstick rim. This proportion is in keeping with the previous phase, suggesting the continued—but slightly reduced—presence of this mode of decoration on Egyptian-style ceramics.

Appendix 14.4.2 Assemblage Group LT-7.2: Foundation Trenches and Architecture of Kaplan's Fortress B

This assemblage group, which represents the foundation trenches of the Phase LT-7 fortress, produced few ceramics (n = 23). The presence of residual sherds from the Late Bronze Age IB present within this assemblage group means that there is no reason to assume that the assemblage is derived from a discrete period. For instance, the presence of several fragments of flowerpots (type FP) should not be taken to indicate their presence, but rather that their ubiquity in earlier periods ensures their residuality. The small size of the assemblage means no analyses are conducted, but see Table 25 for a summary.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2c	Cypriot	2	0.087	0	0.000	0	0.000
CYP2e	Cypriot	1	0.043	0	0.000	0	0.000
CYP4a	Cypriot	1	0.043	0	0.000	0	0.000

Cypriot Totals		4	0.174	0	0.000	0	0.000
BL	Egyptian	1	0.043	0.175	0.200	0	0.000
BL1a	Egyptian	6	0.261	0	0.000	0.19	0.264
BL3	Egyptian	1	0.043	0	0.000	0.025	0.035
BL5b	Egyptian	1	0.043	0	0.000	0.025	0.035
FP	Egyptian	2	0.087	0.2	0.229	0.06	0.083
Egyptian Totals		11	0.478	0.375	0.429	0.3	0.417
CP1	Levantine	2	0.087	0	0.000	0.045	0.063
DEC	Levantine	1	0.043	0	0.000	0	0.000
LB10	Levantine	1	0.043	0	0.000	0.025	0.035
SJ1	Levantine	4	0.174	0.5	0.571	0.35	0.486
Levantine Totals		8	0.348	0.5	0.571	0.42	0.583
Overall Totals		23	1.000	0.875	1.000	0.72	1.000

Table 25: Summary of Assemblage Group LT-7.2.

Appendix 14.5 Description of the Phase LT-6 Ceramic Assemblage

As with Phase LT-7, the assemblage for Phase LT-6 is sparse due to the lack of stratified deposits associated with the Phase LT-6 fortress. Consequently, the separation of assemblage groups here relates to events in the construction of the fortress, with assemblage group LT-6.1 relating to the foundation trenches of the fortress and assemblage group LT-6.2 relating to the materials removed from bricks within the fortress's walls.

Appendix 14.5.1 Assemblage Group LT-6.1: The Construction of Kaplan's Fortress A

Of the assemblage groups associated with Phase LT-6, this is by far the most important since it provides the only clearly sealed, stratified material from the phase. However, it is of limited utility for reconstructing contemporary ceramics since it stems from foundation trenches. It contains several residual forms, namely fragments of an imported Cypriot Red-on-Black (RoB) bowl (type CYP7a/b), several body sherds from the Cypriot Bichrome tradition (CYP8b), as well as sherds of Cypriot Monochrome (type CYP6a/b). Of these, the first is a rare type that went out of use in the terminal Middle Bronze Age (Artzy 2019b, 146), and the latter two both appear within the terminal Middle Bronze Age and continue into the Late Bronze Age, but only

Monochrome is present by the Late Bronze Age IIB (Artzy 2019a, 341). Given that Phase LT-6 must post-date the destruction of the Phase RG-4a gate, Cypriot ceramics should be regarded as residual due to the presumed cessation of major maritime trade networks during the 12th century BCE (A. Sherratt and Sherratt 1991, 373–75). Given the longevity of forms within the Egyptian-style assemblage and the similar conservatism within certain forms of the Levantine tradition (e.g., type SJ1), it is impossible to parse out whether these sherds are contemporary with the construction activities. Much like Phase LT-7, this problem is exacerbated by the fact that these foundation trenches cut stratified material from earlier phases, meaning that the assemblage need not represent contemporary elements. Despite this cautionary note, some brief comments will be made after the summary Table 26.

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
CYP2a	Cypriot	9	0.136	0	0.000	0	0.000
CYP4b	Cypriot	1	0.015	0	0.000	0	0.000
CYP5b	Cypriot	1	0.015	0	0.000	0	0.000
CYP6a	Cypriot	1	0.015	0	0.000	0.1	0.034
CYP6b	Cypriot	1	0.015	0	0.000	0	0.000
CYP7a	Cypriot	1	0.015	0	0.000	0.05	0.017
CYP7b	Cypriot	1	0.015	0	0.000	0	0.000
CYP8b	Cypriot	1	0.015	0	0.000	0	0.000
Cypriot Totals		16	0.242	0	0.000	0.15	0.052
BL	Egyptian	7	0.106	0.96	0.264	0	0.000
BL1a	Egyptian	19	0.288	1	0.275	1.445	0.498
BL2	Egyptian	1	0.015	0	0.000	0.05	0.017
BL3	Egyptian	4	0.061	0	0.000	0.155	0.053
BL5a	Egyptian	1	0.015	0	0.000	0.025	0.009
BL5b	Egyptian	1	0.015	0	0.000	0.05	0.017
BL5c	Egyptian	1	0.015	0	0.000	0.09	0.031
Egyptian Totals		34	0.515	1.96	0.539	1.815	0.626
CB1	Levantine	3	0.045	0	0.000	0.13	0.045
CP1	Levantine	2	0.030	0	0.000	0.08	0.028
JG1	Levantine	2	0.030	0	0.000	0.325	0.112
KR1	Levantine	1	0.015	0	0.000	0.025	0.009
LB10	Levantine	1	0.015	0	0.000	0.025	0.009

Type	Cultural Affiliation	Raw Count	Raw Proportion	Base EVE	Base EVE Proportion	Rim EVE	Rim EVE Proportion
RB1	Levantine	2	0.030	0.3	0.083	0	0.000
SJ1	Levantine	5	0.076	1.375	0.378	0.35	0.121
Levantine Totals		16	0.242	1.675	0.461	0.935	0.322
Overall Totals		66	1.000	3.635	1.000	2.9	1.000

Table 26: Summary of Assemblage Group LT-6.1.

The assemblage (n = 66) is predominantly Egyptian-style by sherd count (51.5%, n = 34). While the number of Cypriot sherds is anomalously high and equivalent to the number of Levantine sherds (24.2%, n = 16), the cessation of Cypriot trade makes it unlikely that this pattern is meaningful but rather is testimony to the mixed character of this assemblage. The material from this assemblage group is dominated by fragments of type BL1a bowls and type SJ1 jars, thereby skewing the EVE counts and rendering them of dubious utility. However, specific vessels of note from these families include a near-complete Egyptian-style type BL1a bowl (**MHA 4771**) and a painted type SJ1 jar rim. The former provides solid evidence for the continued production and use of Egyptian-style ceramics during the last phase of the Egyptian occupation, which echoes the evidence from the much better understood Phase RG-3a in the Ramesses Gate complex. The latter offers a rare attestation at Jaffa for a decorated storage form from the Levantine tradition, a popular item at other Late Bronze Age sites that—like other decorated Levantine forms—is conspicuously rare at Jaffa. Due to the problematic nature of this phase, quantitative analysis is of limited value. Again, the largest group that is present are Egyptian-style bowls, and within this group there is the continued pattern wherein approximately a third bear the red lipstick rim (31.1%, 0.565 of 1.815 EVEs). As with Phase LT-7, the patterns visible here should be treated cautiously, and for the terminus of Egyptian occupation at Jaffa we should defer to the better understood Ramesses Gate assemblages.

Appendix 14.5.2 Assemblage Group LT-6.2: Kaplan's Fortress A

As with Fortress B of Phase LT-7, Fortress A in LT-6 is only attested architecturally. This assemblage group is therefore derived solely from sherds found within bricks. This comprises two sherds, a fragment of a wishbone handle from a Cypriot White Slip bowl (subclassification unknown), and a portion of a disc base from a Levantine style bowl (type DB).

Appendix 15. Ceramics Data and R Markdown Text for Combined Ramesses Gate/Lion Temple Area Ceramics Analyses (Chapter 9)

This appendix provides access to the full dataset and analyses conducted in the concluding Chapter 9, wherein the Ramesses Gate and Lion Temple areas are combined within a single dataset. These are stored as a .zip file on the private server of the JCHP. It can be accessed through the JCHP database within OCHRE under the "Resources" tab and then under the child item "JCHP Shared Data", as well as using the following UID, which will automatically download the file:

https://pi.lib.uchicago.edu/1001/org/ochre/3a34e8aa-670d-4d7e-aa06-7f57b51df0ae

The file, "Damm_2021_Appendix_15.zip", contains three files. For the analyses, the R Project file "Appendix_15.rproj" serves as the work environment for all analyses conducted in the text, with the R Markdown file "Appendix_15.rmd" containing the coding packages for all calculations and analyses conducted within the text. Moreover, it includes prose descriptions for all coding decisions. There is one data table, the Microsoft Excel file "Master_Data_ADJ.xlsx", which contains all recorded data from every sherd in both excavation areas. It comprises the combined master tables from appendices 11 and 13, retaining all the original variable structures therein.

Appendix 16. Preliminary Discussion of Residue Analysis Results for Select forms from Jaffa

This appendix provides a preliminary discussion of the gas chromatography/mass spectrometry (GC/MS) residue analysis study conducted ceramics from Jaffa.[426] A more substantive treatment of these samples is forthcoming (Damm Forthcoming c), however some early insights will be provided here. Generally speaking, the field of residue analysis is in a constant state of flux as both methods and our knowledge of biomarkers improves, as has been shown in disputes over several well-established interpretive conventions (cf. Drieu et al. 2020; McGovern et al. 2021). Therefore, the results here are the product of a conservative interpretive methodology, and while developments in the field cannot be anticipated, these should stand at the time of final publication.

Appendix 16.1 The Residue Study at Jaffa

The residue analysis study at Jaffa had two main objectives. First, to glean as much information from Jacob Kaplan's excavations as possible. Second, it was implemented alongside the renewed JCHP excavations to increase our understanding of daily life at the garrison. For this study, samples were selected from forms associated with foodways, totaling 55 samples across eight different vessel types, though of these only a few will be discussed here. Special consideration was given to imports from Egypt: handled cups (type CU) and meat jars (type JRVmj). In addition, flowerpots were emphasized, given that their function remains ambiguous. With respect to these forms specifically, no previous analytical work has been conducted to delineate their function. While this makes any results relevant, it also means that there is nothing against which

[426] My sincerest thanks go to Hans Barnard of the Cotsen Institute of Archaeology (UCLA) and Kym Faull of the Pasarow Mass Spectrometry Laboratory (UCLA) for their constant assistance and tutelage. Without their generosity, both with respect to time, equipment, and instruction, this work would have been impossible.

these results can be compared. Therefore, lacking large sample sizes it cannot be assumed that the residues detected in any of these forms constitute their normative use patterns across all contexts. Similarly, it is difficult to differentiate anomalous chemical profiles that indicate multiple use episodes.

Appendix 16.2 Materials

The samples for each group will be discussed separately, however some general comments will be made here. In all cases where it was possible (i.e., fragmented vessels), a fragment was removed to be processed at the Pasarow Mass Spectrometry Laboratory.[427] When this could not be done, a scraping was removed from the interior wall of the vessel using sterile tools. In either case, the immediate surface was removed from the vessel via abrasion to minimize surface contaminants, after which the sample was removed. With respect to closed forms, all efforts were made to ensure that the samples were taken from the lower third of the vessel. Unfortunately, it was impossible to run an associated soil sample alongside each sample to demonstrate possible background noise.

Appendix 16.3 Methods[428]

The extraction and analysis methods used here were developed specifically to optimize lipid analysis for vessels with unknown contents. For the purposes of this experiment, only new glassware was utilized, as previous experimentation had demonstrated inconsistent

[427] The removal of samples was under IAA Export Permits nos. 14203 and 14290, with all samples classified as destructive and not to be returned.

[428] The methods described here were originally developed by Hans Barnard and Kym Faull and are adapted here from their original composition.

contamination issues with solvent-cleaned glassware.[429] For those samples that were taken from vessel sherds, the surface was cleaned via abrasion and then the remaining sherd matrix was crushed with a mortar and pestle.[430] Afterwards, 500 mg samples were transferred directly into borosilicate glass vials for solvent extraction. 2 mL of chloroform and methanol (2:1, v:v) were added to each tube, after which they were briefly vortexed (30 seconds) and then sonicated (15 min.). Samples were then placed in a centrifuge at 1500 RCF (30 min.). The supernatant was transferred to another glass tube, and the remaining sediment was subjected to the same extraction procedure a second time using 1 mL of the chloroform/methanol mixture. The supernatant from this second extraction was combined with the first, after which an internal standard of 2 μg of Nonadecanoic acid (C19:0) in 200 μL of the chloroform/methanol mixture was added to the supernatant from each sample. The final volume of each sample at the time of analysis is 100 μL, with 1 μL injections into the instrument ensuring that each injection contain 20 ng of internal standard. The decision to add the internal standard to the supernatant after solvent extraction rather than to the powdered sample before is to ensure the quantitative utility of the internal standard. If the intent of the internal standard is to provide a fixed quantity for calibrating the relative abundance of detected lipids, then adding the internal standard to the sample pre-extraction introduces a needless variable—that is, whether all the internal standard is recovered in the pooled supernatant. The physical limitations of extracting the supernatant from the sample after centrifugation ensure that some amount of the extraction solution is left behind, and therefore, an unquantifiable amount of the internal standard. Consequently, if direct

[429] This experimentation was conducted over the course of the Summer and Fall 2019, and effectively demonstrated the necessity—especially in the case of the GC autosampler vials—to utilize new glassware. Solvent-cleaned glassware occasionally produced nonreplicable peaks, indicating irregular retention of contaminants.

[430] In between samples, the mortar and pestle were cleaned first with water, then acetic acid, and then acetone.

quantification of the results is desired, then it is necessary to introduce the internal standard to the supernatant (contra Oudemans and Boon 2007). After the addition of the supernatant, the solvent was evaporated in a Speed-Vac.

After evaporation, the sample was taken up in 200 µL of ethyl acetate and transferred to a 1.5 mL V-shaped autosampler vial, and the ethyl acetate was then evaporated in a Speed-Vac. 100 µL of benzene was then added to the sample, which was then evaporated in the Speed-Vac to remove all traces of water. After this, 50 µL of methoxyamine HCl in pyridine (2%, wt/v) is added and the vial is capped and heated (60°C, 30 min.) for oximation of keto-groups. The sample is then dried in the Speed-Vac, after which 50 µL of ethyl acetate and 50 µL of N,O-bis(trimethyl)silyltrifluoroacetamide (BSTFA) with 10% trimethylchlorosilane (TMCS) are added. These are then capped and placed in the heating block (60°C, 30 min.), after which they can be loaded into the instrument autosampler. The instrument is a Thermo Q Exactive Hybrid Quadrupole-Orbitrap GC-MS, which provides excellent sensitivity for assays of ceramics with unknown organic contents.

For each sample, a 1 µL aliquot is injected onto a bonded-phase non-polar fused silica capillary column (Phenomenex ZB-5, phenyl/dimethylpolysiloxane 5/95, 60 m x 0.25 mm, 0.10 µm film thickness) and eluted with ultra-high purity helium (Thermo Scientific Trace 1310 GC system) over a 63-minute temperature ramp (min./°C; 0'/50, 3'/50, 53'/300, 63'/300). The end of the column, with the GC/EI-MS transfer line at 250°C, is directly inserted into the EI source (200°C, 70 eV) of a high resolution Orbitrap mass spectrometer (Thermo Scientific Q Exactive GCMS), scanning from m/z 40-2000 (0.9 sec/scan at a resolution of 30,000) with a 15-minute solvent delay. Data are collected with instrument manufacturer-supplied software (Thermo Xcalibur). Identifications are based on comparison of spectra averaged over the width of the GC peaks within the total ion chromatogram (TIC) with background subtraction to the NIST 2014 Mass Spectral Library (version 2.2). These were based on NIST match factors of at least 750, indicating strong concordance between the unknowns and the library spectra, and acceptable visual concordance between the unknown and library spectra. Quantitative analysis was conducted by calculating the area under the peak of interest and comparing with the area under the peak of the internal standard. In addition to the samples, a methods blank was also prepared and after every fifth sample an instrument blank of ethyl acetate was run to provide continuous indications of the instrument's performance.

Appendix 16.3 Some Preliminary Discussion of Results

The Jaffa samples have specific difficulties with respect to their analysis. For the forms from Kaplan's excavations, these have been stored in non-ideal conditions in the storage magazines of the local antiquities museum for more than fifty years. As for the samples excavated by the JCHP, while residue analysis sample collection protocols were in place during their excavation, their difficulties are one of context. All samples come from destruction layers associated with the burning of the phase RG-4a and RG-3a gates, and therefore each vessel was subject to intensive thermal modification at the time of deposition. Therefore, I discuss the preliminary results with this in mind. Indeed, one of the key preoccupations with the final report on the Jaffa samples will be disentangling the taphonomic effects of high-temperature thermal modification on organic residues.

There are two general methods for interpreting GC/MS residue analysis results: biomarkers and the ratios between several key fatty acids. The former is regarded as the safest method of the two, and fundamentally centers on identifying the presence of diagnostic markers that can only be associated with a limited number of possible progenitors (Evershed 2008).

However, while biomarkers tend to provide safer overall criteria for interpreting results, there is no guarantee that they will be present in a sample. Even when they are present, there is no guarantee that they reach a detectable threshold for the instrument (Eerkens 2007, 92). Consequently, it has been argued that the ratios between more common fatty acids can be equally diagnostic. However, even for the proponents of this method, it is recognized that both anthropogenic and taphonomic modification of residues must be accounted for, with the post-depositional degradation of residues being the most problematic issue.[431] Generally speaking however, those who apply the method do so assuming that degradative rates between fatty acids of similar carbon chain lengths or with identical quantities of double-bonds are largely equivalent (Eerkens 2005; 2007; Malainey 2007). Of these, four main ratios have been proposed based on GC/MS analysis of fresh foods, cooked foods, and foodstuffs that have been subjected to simulated degradation. They are as follows: (C15:0 + C17:0)/C18:0, C16:1/C18:1, C16:0/C18:0, and C12:0/C14:0 (Eerkens 2005).

However, the diagnostic power of this method is somewhat difficult to articulate given its variable and inconsistent application. For instance, it has been argued that if the C16:0/C18:0 ratio is greater than 1, a plant source can be assumed (Namdar et al. 2015, 7). However, the study upon which this argument is based examined the pyrolytic transformation of plant oils as illuminants (Copley et al. 2005), and its results cannot be taken as constants for all degradative processes. Furthermore, as shown by the fatty acid biplots produced by Jelmer Eerkens, both fresh and degraded foodstuffs sourced from animals have a significantly larger range of possibilities than assumed within Dvory Namdar's study, with the C16:0/C18:0 ratio of

[431] A great deal of literature has been devoted to this subject, with disputes ion methodology being ongoing (see Evershed et al. 1992; Barnard and Eerkens 2007; Barnard 2011; McGovern and Hall 2016).

terrestrial mammals, seeds and nuts, roots, and berries all overlapping (2005, Table 2). Others have argued that a ratio of 5 is necessary for the clear identification of plant-derived oils (Regert 2007, 69). While ratio-based analyses require a greater deal of study, both methods will be applied here, with ratios being especially useful for vessel classes that did not produce robust evidence for biomarkers.

Appendix 16.3.1 Egyptian-style Flowerpots (type FP)

The function of flowerpots is disputed (see chapters 7 and 8) and to date no analytical methods have been applied to the form. Given that the assumption is that this vessel class was used for either the manufacture of bread or beer, it is possible that GC/MS might assist in narrowing down or eliminating proposed functions. Some of the greatest uncertainty within the archaeological community regarding biomarkers for ancient vessel function specifically relates to fermentation, however, with recent work raising more questions than answers and effectively dispelling many of our previously held assumptions about secure biomarkers.[432] With these difficulties in mind, the main concern of this discussion relates to whether we can determine if this class of vessel was used for a single function or if it was a multifunctional vessel. This provides a minimum baseline for understanding its purpose within the Egyptian-style assemblage at Jaffa. Since none of the samples analyzed at Jaffa (n = 18) produced a definitive biomarker indicating their possible function, the fatty acid ratio method was applied.

Sample ID	C16:0/C18:0	C12:0/C14:0	(C15:0+C17:0)/C18:0
RS-10	3.565	10.090	0.332
RS-12	1.933	0.931	0.092
RS-15	1.861	0.758	0.063
RS-16	1.605	0.892	0.388

[432] This has been demonstrated in the published proceedings of a recent conference (Stockhammer and Fries-Knoblach 2019) and an even more recent article (Drieu et al. 2020; but see McGovern et al. 2021). For beer specifically, calcium oxalate has been proposed as a plausible marker (Michel, McGovern, and Badler 1992), though it—along organic markers—has proven temperamental (Homan 2004).

Sample ID	C16:0/C18:0	C12:0/C14:0	(C15:0+C17:0)/C18:0
RS-29	2.159	0.871	0.064
RS-32	2.201	1.198	0.120
RS-33	1.620	0.637	0.065
RS-41	1.977	0.948	0.096
RS-43	2.058	2.141	0.081
RS-45	1.896	0.285	0.068
RS-46	1.987	0.434	0.065
RS-47	2.292	1.108	0.132
RS-48	1.843	0.302	0.072
RS-49	2.026	0.483	0.155
RS-50	1.731	0.341	0.068
RS-51	1.953	0.526	0.050
RS-52	1.725	0.452	0.119
RS-53	1.789	0.188	0.063
RS-54	1.982	0.404	0.090

Table 27: Tabular summary of fatty acid ratios seen among samples of Egyptian-style flowerpots (type FP) at Jaffa.

Summary values for each of the major fatty acid ratios are provided above in Table 27, which are more usefully visualized as biplots to demonstrate possible outliers.[433]

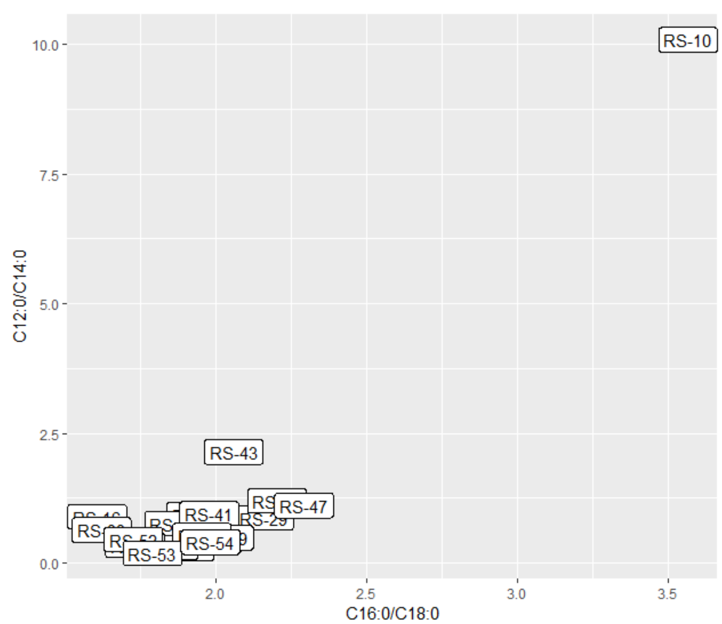


Figure 67: Biplot showing the C12:0/C14:0 ratio as it compares to the C16:0/C18:0 ratio. Note the outlier sample RS-10.

[433] All figures were generated using *ggplot2* within RStudio (RStudio Team 2015; Wickham 2016).

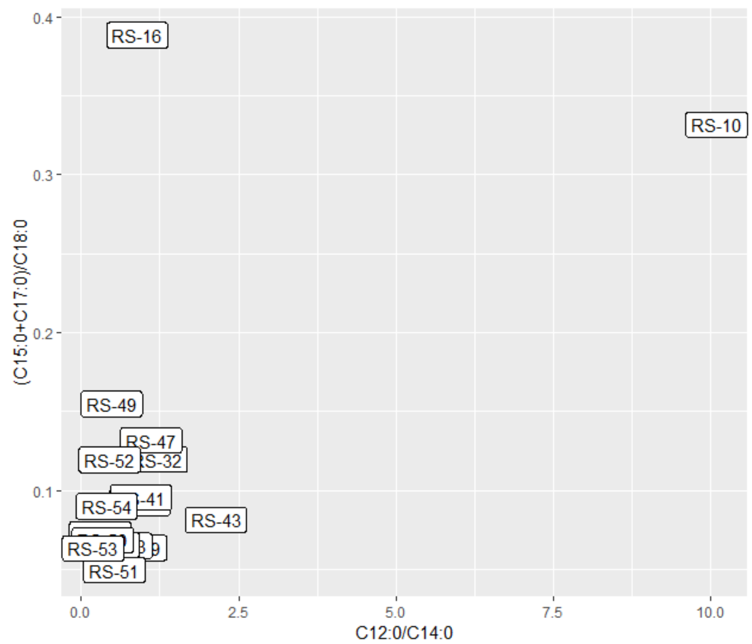


Figure 68: Biplot showing the (C15:0+C17:0)/C18:0 ratio as it compares to the C12:0/C14:0 ratio. Note the outlier samples RS-10 and RS-16.

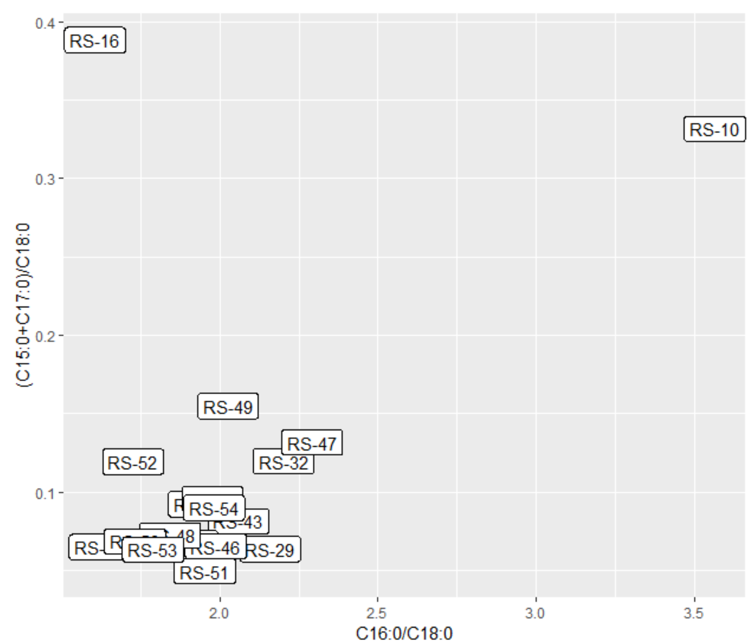


Figure 69: Biplot showing the (C15:0+C17:0)/C18:0 ratio as it compares to the C16:0/C18:0 ratio. Note the outlier samples RS-10 and RS-16.

As can be seen in Figure 67 through Figure 69, there are two clear outliers within group of samples: RS-10 and RS-16. With respect to the former, the C16:0/C18:0 is approximately five times any of the others, and C12:0/C14:0 ratio of the latter being three to four times what is attested within the remaining samples. Apart from these two values, the samples exhibit congruity across all ratios.

	C16:0/C18:0	C12:0/C14:0	(C15:0+C17:0)/C18:0
Range	1.620 - 2.292	0.188 - 2.141	0.050 - 0.155
Mean	1.943	0.706	0.860
SD Mean	0.177	0.478	0.029
CV Mean	0.091	0.677	0.341

Table 28: Summary table providing central tendency measures for each fatty acid ratio discussed above.

As can be seen in Table 28 above, the low coefficient of variation across all three major fatty acid ratio indicates a relatively tight clustering across the 16 samples subject to this measure. The only possible exception would be with respect to the C12:0/C14:0 ratio, for which there remains one value that is likely classifiable as an outlier (RS-43, see Figure 68 above). This value was not removed as it could not be classified as an extreme outlier like samples RS-10 and RS-16. Were it removed as well, the coefficient of variation would reduce by approximately two thirds. Regardless, comparison between the central tendency measures here and those published in the extensive summary table of Eerkens (2005, Table 2) indicate that there is no reason to assume that flowerpots at Jaffa were used for substantially different purposes, and that the form was likely unified by a single function. Given that Eerken's data is based fully on New World foodstuffs, it is important to note that my approach does not argue what that function was.[434] It is enough to say that the data suggests that the Egyptian desire to manufacture flowerpots locally in the southern Levant likely stemmed from their function as fulfilling a discrete culinary task.

[434] Currently, there is no published, agreed-upon set of fatty acid food ratios for ancient Near Eastern foodstuffs, or more broadly even Old-World foodstuffs. Thus, Eerkens' values can only be taken as approximations, with the uncritical application of New World data to Old World datasets specifically—and rightfully—having been criticized (see McGovern and Hall 2016).

Appendix 16.3.2 Imported Handled Cups (type CU)

As discussed in Chapter 7, the Egyptian handled cup has been hypothesized to be either a container for honey or luxury goods more generally. All examples of this vessel as encountered at Jaffa were tested (n = 4), including a near-complete example recovered from the Phase RG-3a destruction debris (**JCHP 464**, RS-58). While all the samples produced evidence for ancient residues, all were subjected to intense thermal modification at the time of deposition. None produced the expected biomarkers for either beeswax or honey, which does not necessarily mean they did not fulfill this function.[435] However, **JCHP 464** did produce a clear peak for the sterol cholesterol (RT 62.77), indicating the presence of animal-based fats. While this biomarker must be used with caution given that it can be imparted via handling (Evershed 1993, 80; Oudemans and Boon 2007, 109), this sample comes from an interior scraping of a near-complete vessel that was excavated using a protocol for sample optimization. Therefore, this risk is unlikely. In addition, other samples have unsaturated fatty acid profiles that are suggestive of plant-based oils, however this requires further research given the issue of thermal modification mentioned above. Regardless, for the time being it can be suggested with confidence that the form was a container for substances other than honey, and therefore the assertion by Martin that they should regarded as holding various luxury goods (Martin 2011b, 253) can be maintained. Indeed, a wide variety of compounded substances based in organic carrier oils should be regarded as plausible.

Appendix 16.3.3 Meat Jars (type JRVmj)

As with the association between honey and handled cups, the designation "meat jar" is derived from dockets indicating the contents of these vessels (see Chapter 7). However, to date, no form has been subject to analytical methods and therefore it is unclear if this exhausts their ancient

[435] For a discussion on biomarkers for either beeswax or honey, see Namdar et al. (2009).

function. Unfortunately, that also means that there is no comparative data for the relatively small sample from Jaffa (n = 3). Two such jars were recovered from the Phase RG-4a destruction, from which three samples were tested. All examples exhibit the same issues with thermal modification as outlined above. However, one sample (**JCHP 328**, RS-21) produced several curious biomarkers. While analysis is ongoing, high-confidence identifications were made of butanedioic acid (succinic acid), which has been associated in archaeological residues with vinegars (Pecci et al. 2013), though this identification merits further consideration since it—among most fermentation markers—has been subject to recent critique (Drieu et al. 2020). More telling is the presence of the sterol cholesterol, a likely marker for the presence of animal fats and an expected result should the jar have contained preserved meats. A more unusual result is the clear identification of the diterpenoid dehydroabietic acid (resin acid), commonly associated with coniferous resins (Cramp and Evershed 2015, 132–33). The presence of a coniferous resin liner is well-known from Egyptian maritime transport amphorae dating to this era (Serpico 2004), however to my knowledge it has never been associated with non-liquid commodities. That such a liner would impart a flavor to a liquid commodity is likely, as the continued persistence of resinated wines into the modern world attests. Whether it would have had the same effect on a preserved meat remains to be seen, however the notion that it played a role either in the preservation process or served as a flavoring agent cannot be dismissed. More samples of this vessel category are required to say anything definitive, however these first assays have offered interesting results.

Appendix 16.4 Concluding Remarks

The preliminary results presented here represent but a fraction of the work being conducted on samples from Jaffa, though they offer some useful commentary on these forms as they might relate to foodways. It can be argued with relative confidence that Egyptian-style flowerpots fulfilled a specific culinary task. Furthermore, forms like handled cups and meat jars represent the acquisition of unusual luxury items or commodities that were otherwise unavailable locally. For meat jars, this seems to have been a case of an imported, luxury foodstuff. The rarity of this form in the southern Levant means it should not be related to the replication of essential aspects of Egyptian identities via foodways. It could have been a luxury product consumed cross-culturally just as much as it could represent an Egyptian elite importing a comfort of home. More work needs to be done collectively on the topic of GC/MS residue analysis, both with respect to analyzing parallels to the forms at Jaffa as well as direct experimentation with taphonomic processes such as thermal modification. For the time being, the method shows promise for understanding foodways at Late Bronze Age sites.

Appendix 17. Radiocarbon Determinations from the Lion Temple Area

The following table provides the calibrated radiometric determinations for the samples taken from both Kaplan's and the JCHP excavations in the Lion Temple area. Samples from Kaplan's excavations are marked with an **MHA** or **JLT** number, whereas samples from the JCHP excavations were recorded based on their pottery bucket. Analysis was done by Brian Damiata of the Cotsen Institute of Archaeology (UCLA) using the Keck Carbon Cycle Accelerator Mass Spectrometry (AMS) Facility at University of California, Irvine. Calibration was completed using OxCal 4.3.2 (Ramsey 2001). Within this table, the column "Phase" refers to the phase of the locus from which the sample was recovered irrespective of the absolute date of the sample.

JCHP Reg. #	Locus	UCI Sample #	Phase	Calibrated Range (BCE)
MHA 7474	1216	159332	LT-10	1426 – 1374 BC (52.8%) 1348 – 1303 BC (42.6%)
MHA 7473	1226	159332	LT-9	1440 – 1387 BC (86.0%) 1339 – 1321 BC (9.4%)
PB 2138	10098	221609	LT-8	1441 – 1377 (73.4%) 1344 – 1306 (22.0%)
PB 2139	10098	221610	LT-8	1435 – 1374 (61.5%) 1350 – 1303 (33.9%)
PB 2133	10097	221605	LT-8	1432 – 1372 (55.6%) 1356 – 1302 (39.8%)
PB 2134	10097	221606	LT-8	1488 – 1485 (0.4%) 1452 – 1382 (83.8%) 1341 – 1311 (11.3%)
PB 2125	10095	221607	LT-8	1437 – 1375 (67.5%) 1345 – 1304 (27.9%)
PB 2126	10095	221608	LT-8	1488 – 1485 (0.4%) 1452 – 1382 (83.8%) 1341 – 1311 (11.3%)
MHA 7472	1205	159330	LT-8	1387 – 1340 (32.5%) 1310 – 1230 (62.9%)
JLT-23.2	1200	159333	LT-8	1660 – 1530 BC (95.4%)

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