TALL HISBAN: AN EXAMINATION OF THE MAMLUK SUGAR INDUSTRY IN FOURTHEENTH CENTURY TRANSJORDAN

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1971

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF ARTS
December 2003

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MAMLUK SUGAR INDUSTRY

FOURTEENTH CENTURY

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Thesis Approved:

Thesis Adviser

Dean of the Graduate College

ACKNOWLEDGEMENTS

The past three years represent an opportunity to finally complete a goal set long ago: to study history and work in a field close to my heart, archaeology. With the support and strength of my husband, Kerry B. Jones, I have been able to fulfill these dreams and aspirations. I dedicate this thesis to him because he is the consummate scholar in my life, a learned gentleman who daily demonstrates how knowledge and education can be used to create the true community of humanity. Because of him, I have never strayed too far from that erudite world so rich in tradition and excellence. I also wish to thank my two brilliant and wonderful children, Caroline and Patrick, for not just their support, but for drawing me into their world and allowing me to share in their lives. My experience as a mother has shown me what kind of teacher I want to be. I am so proud of them and what they have accomplished. They have been my teachers.

Few people have had the kind of family support that I have enjoyed. Dr. Craig Jones has not just been my father-in-law, but for the last twenty years, he has been my father and I am so grateful for the relationship we have. He loves books and reading as well as the pursuit of knowledge. Most importantly, he believes in sharing that knowledge with others. The thirst for knowledge was shared by my mother-in-law, Louise Jones, who passed away in 1997 without seeing me attain a goal I know she would have so enthusiastically supported. In a way, she served as a role model for me, having returned to school in later life and attaining both her bachelor's and master's

degrees. Today, Eleanor Jones is also part of that family group who has seen me through the challenges of completing this task.

My career in academic life owes much to Dr. Elizabeth Williams, who was serving as the graduate advisor the day I first called the department in 2000. After talking with her, I thought, well maybe I have not waited too long for my return to the classroom. She has been unstinting in her support and enthusiasm, as have the members of my graduate committee, Dr. L.G. Moses and Dr. Neil J. Hackett. Dr. Moses made a difference in my academic life the first time he walked into class and continues to be a source of wisdom and inspiration. Dr. Hackett suggested the ancient history topic for a paper that eventually turned out to be an award winning exercise in research and scholarship for me. While working on my master's at Oklahoma State, I have been privileged to be the teaching assistant for Dr. James F. Cooper, Jr. I could not have had a better mentor in the intricacies of classroom teaching and working with students. As well, Dr. Michael M. Smith and Dr. Joseph A. Stout, Jr. consistently offered me personal encouragement and friendship. All of these professors offer me a great challenge to meet their level of dedication, professionalism and scholarship.

One name is essential to completing the roster of those to whom I owe thanks. Without the support and assistance of Dr. Bethany J. Walker, the head of my committee and a preeminent Mamlukist, I would never have been put on the path of study and scholarship that I have undertaken. She has shown me what it means to be an archaeologist and how the fields of archaeology and history can work together to produce excellent research. At the same time, she has also instilled in me a love of the history and culture of the Middle East. She is a remarkable teacher and educator.

The History Department at Oklahoma State University has done everything they could for me. I value so much the kindness and friendship of Susan Oliver and Diana Hover. They were always there to help me along and remove the worries of being a graduate student. I must also mention the great group of graduate students with whom I have shared an office and worked along side for the last five semesters. I will never forget the friendship they extended to me and the sense of belonging that made this journey a wonderful graduate experience. Adrienne Sadovsky, thank you for the fun, the jokes, and the advice and especially the memories.

This thesis could not have been written without the tireless work of the staff in inter-library loan at both Oklahoma State University and OSU-Tulsa. I also wish to thank the librarian at the ACOR library in Amman, Jordan for the help with my research during my short few hours there this fall. I would also like to thank Charlotte Neller, my teacher and tutor for the Arabic language at Tulsa Community College. I am so grateful for all of those hours we spent together, not just learning Arabic, but sharing the beauties of the Near Eastern countries and their peoples.

In the summer of 2001, I took a trip that changed my life. I accompanied my advisor, Dr. Bethany Walker, on my first archaeological excavation to Jordan. I spent five weeks of living my dreams. In the process, I met a wonderful young man who is now a good friend, David Chaudoir. Over the years, since we first went to Jordan, we have been able to share many visits, trips and the accomplishment of our degrees. We both love the country of Jordan and the friends we have at Hisban. His family and mine have become good, close friends.

My only regret is that my parents, Walter and Barbara Nixon, could not join with me in this accomplishment. I know, however, that they would understand how much this degree means to me and the long road I have taken to get to this point. To the Kepharts, Spencers, Hortons, and Tabors, a heartfelt thank you for standing in as my parents. The love of my aunts and uncles continues to sustain me as I finish and look to the future.

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Introduction

Tall Hisban[1] is located approximately 22 km southwest of Amman, Jordan in the middle of the central plateau of the *el- Belqa (Balqa)* region. Seigfried H. Horn, the founder and director of the Heshbon Expedition, originally chose the site for a variety of reasons. As Paul Ray, Jr. notes in Chapter Two of *Hesban 6*, Horn selected the area "through a process of elimination of other sites." This was in addition to other circumstances "that made it a desirable place to excavate".[2] The Transjordan region was "less known and could contribute to the overall understanding of the Levant." Moreover, it appeared to offer a better opportunity for finding inscriptional evidence than the region of Palestine on the west bank of the Jordan.[3] In addition, the tribal elders of Hisban village were very friendly and welcomed Horn, the distinguished professor of Archaeology and History from Andrews University, and his staff. This cooperative attitude was key to creating a productive excavation environment. The excavation, postponed from 1967 because of the Six Day War began in 1968, with the expectation of confirming that Tall Hisban was indeed the location of the biblical Heshbon.[4] Eventually, Tall Hisban became part of the wider excavation work known as the Madaba Plains Project, a joint venture of a large consortium of Seventh-day Adventist colleges whose support has enabled Seigfried Horn's great work in Jordan to progress. The projects of the Madaba Plains group have benefited in countless ways from the cooperation of the Department of Antiquities of Jordan, The American Schools of Oriental Research in the United States and the American Center for Oriental Research in Amman, Jordan.[5]

However, by the early 1990's, with the excavation goals of the original Heshbon Expedition successfully completed, changes in research design dictated a new anthropological approach to further excavation at Hisban. A new "food systems theory" design, developed by Øystein LaBianca, the current Senior Director of the excavations at Tall Hisban replaced the old original focus on the Iron Age.[6] La Bianca defines a food system as "a complex unity consisting of all of the purposive, patterned (institutionalized), and interconnected activities carried out by a group of individuals in order to procure, process, distribute, prepare or consume food, and dispose of food remains."[7] Dr. Bethany Walker, Chief Archaeologist for the 2001 season at Tall Hisban, notes that the food systems research model is the "most appropriate research model for the excavations at Tall Hisban because it is: 1. multi-disciplinary, 2.capable of explaining long-term cultural change, 3. suited to hinterland studies..., 4. examines institutions related to land use..., and 5. considers the multi-layered interactions between the population and the environment..."[8] Throughout this thesis, these five important aspects of food systems theory will be central to my analysis of the sugar industry at Tall Hisban.

In 1998 and 2001, the field seasons at Tall Hisban focused on the Middle Islamic remains located at the top of the *tall*. During the 1998 season, a fourteenth century Mamluk citadel was identified that included a throne room, a bathhouse, and a series of barrel-vaulted rooms surrounding an open courtyard. Of particular interest was a long, narrow room adjacent to the *iwan* area that appeared to be for storage.[9] This storeroom was extremely well preserved and yielded a large assemblage of ordinary handmade and painted tablewares, enormous inscribed glazed bowls and chalices and a large cache of nearly complete sugar jars. In reviewing these finds, Dr. Bethany Walker comments in

her article in *The Bulletin of Middle East Medievalists* that, "The historical importance of this storeroom cannot be exaggerated.... Furthermore, the sugar jars attest to an active sugar industry in the area."[10]

The 2001 excavation season addressed questions concerning Mamluk administration on the region of Greater Syria during the fourteenth century and the significance of Tall Hisban to the local provincial administration of the Belqa in the Province of Damascus.[11] Part of that larger administrative question concerned the economics of the region and the interaction of the Mamluk state with the provinces of Greater Syria. One aspect of this is the role of the sugar industry in the area. The presence of sugar jars in the storage rooms at Tall Hisban lends support to the supposition of an active sugar industry in the area around Tall Hisban in the fourteenth century. Furthermore, many of the historical primary sources testify to the placement of water mills in the area of the Wadi Hisban and the Jordan River Valley. The archaeological record at Tall Hisban also supports the conclusion that the citadel was a distribution center for the surrounding abundant sugar production of the Jordan Valley.[12]

This thesis will focus on the role of Tall Hisban in the fourteenth century sugar industry in the Mamluk Empire. This study will address basic questions regarding the sugar industry such as the technology, marketing, and distribution during the height of Mamluk administration. This study will assess the value of the sugar that was contained at Hisban and the economic effects that such an industry produced for the region. This is an important archaeological examination of the provincial administration of the Mamluk *Sultanate* on the borders of Bilad al-Sham (Greater Syria) in light of the scholarship on

the economic decline and population shrinkage of the countryside within the *Sultanate* by the sixteenth century.

I will compare Tall Hisban to other archaeologically known sugar sites in Jordan. Numerous archaeological sources will be examined, including excavation reports from Tall Hisban; surveys of the region; and the location of other sugar production and distribution sites. My discussion will include a review of the historical, geographical and agricultural development of sugar in the medieval Middle East, along with the status of the research on the sugar industry in Mamluk history. Additional support will come from comparing the function and economic operation of Tall Hisban to other important excavations. A map of various sugar sites from Jordan will facilitate comparison of these sites as well as tracking of possible transport routes. Finally, theories concerning the decline of the Mamluk *Sultanate* will be applied to the findings at Hisban to test some of the new revisionist thinking about causes of the decline of the sugar industry in the Near East and its impact on life on the frontier of the empire.

Methodology

The research presented in this thesis is based on the on the theory of *la longe durée,* presented in the works of Fernand Braudel and the *Annales* school. Braudel's seminal work on the cycles of history and the application of "structure" and "conjucture" to these changes over time has done much to establish the study of history and anthropology as complementary disciplines.[13] Braudel divides history into increments of change. The basic level of history begins with man's relationship with his environment and the slow passage of time that imperceptibly alters the progress of life on earth. The

next level is the development of civilization through the social, economic and military struggles that, although slow and rather plodding, are still discernable. The last level considers the individual and the records of deeds performed within a society. It is at this level that Braudel cautions historians to be skeptical regarding conclusions drawn about historical events. These smaller and more passion-filled actions must be seen against the larger movements of societal development and the passage of time.

Field archaeology has profited much through the challenges issued by Braudel to "create a history that could be different from the one our masters taught us."[14] This thesis will address the importance of examining the decline of the Mamluk administration in the fifteenth century based not only on a Cairo-centered perspective, but also as it radiated across the empire and touched off reaction in the provinces of Bilad al-Sham. The work of Øystein LaBianca, the development of his model of food systems theory and new interest in the Islamic period provided the stimulus for the new field seasons at Tall Hisban in 1998 and 2001.[15] Using such a broad overview of the period of occupation (intensification and abatement) and applying this theory to the Islamic period specifically sheds new light on the function of the Mamluk provinces and essentially proves the veracity of the Braudelian approach of *la longue durée* when dealing with a wider and more diversified geographic area such as Bilad al-Sham. The current work at Tall Hisban emphasizes use of primary sources in elucidating the economic history at the height of Mamluk administration in the provinces. It is essential that charitable *waqf* documents, tax registers and land grants (*iqta'at)* from Cairo and local administrative levels are included in this research.[16]

The other prominent scholar who will inform my work in this thesis is the Jewish historian, S.D. Goitein. His study of the *Cairo Geniza* documents is one of the most important historical sources for not just the Jewish community of the Middle Ages, but also for the Islamic community as well. Goitein defines a medieval Hebrew *Geniza* as "a repository for discarded writings...just as the human body, having fulfilled its task as the container of the soul, should be buried, that is, preserved to await resurrection, thus writings bearing the name God, after having served their purpose, should not be destroyed by fire or otherwise, but should be put aside in a special room designated for purpose to await burial in a cemetery."[17] The antecedents for these ideas concerning the sanctity of such documents come from Persian and Arabic traditions of storehouse or treasure and the concept of burial. Goitein notes that the closest biblical meaning is an archive. The Jews considered the sacred language of Hebrew to be the language of God. Any documents set down in Hebrew were holy and required treatment in the tradition of *Geniza*. This practice was widespread over the medieval Muslim and Christian world. Eventually, any Jewish documents bearing the name of God were kept in secreted rooms usually attached to synagogues. The *Cairo Geniza*, a cache of documents dated from 956 to 1538 A.D. found in the Fustat (old Cairo) synagogue in 1890, is the most famous of these repositories.[18] The *Geniza* documents were found in a secret room discovered during the renovation of the old synagogue when the roof was torn off. These documents were left behind when the synagogue fell into declining use. The story of how the *Geniza* documents came to light in the late nineteenth century is a long and twisted tale involving dealers in stolen antiquities and unscrupulous treasure hunters who sold and circulated the material across the Near East and then finally into Europe. Solomon Schechter

recognized the value of the documents during a trip to the University Library at Cambridge. In 1896, Schechter received permission to enter the synagogue room from the Chief Rabbi and President of the Jewish community in Cairo. From that point on, scholars scoured the *Geniza* documents for political, social and historical information about the medieval Middle East. "For Islamic history...the Geniza is a primary source for social and economic history during the Fatimid and Ayyubid periods and, as far as European history is concerned, for the century preceding the Crusades and for Crusaders' time themselves."[19] Instead of only serving as a political history of the Fatimids or the Ayyubids, the *Geniza* documents offer a social commentary on the middle and lower classes at the time.[20] The types of documents within the *Geniza* are rich in social and economic content and contain a variety of information and facts about Cairo's economic life from the late tenth through the middle of the thirteenth centuries. These documents include letters, both personal and business, court records, contracts, accounts and declarations. The subject matter of these pages is not restricted, however, to just the activities and business of the Jewish community; they address as well a full array of literary subjects by all of the most important medieval authors, including Muslim scholars. These discarded pieces of paper allow the historian to enter into the world of medieval Cairo and be part of the daily lives of its citizens. The latter represent the middle and lower classes that require different kinds of source documents to tell their story or give any insight into how their society functioned. Consequently, the *Geniza* documents constitute a decisive source for the social and economic development of Mediterranean society.[21]

Goitein's volume, *The Economic Foundations*, provides significant information regarding trade and commerce in the years before the Mamluks came to power in Egypt. These were the formative years when the economy of the Arab world was being transformed by the impact of the Crusades, the rise of the Ayyubids, and the emerging interest of the West in Eastern wealth and goods. Information from the various contracts, practices, procedures, banking laws, finance, merchant relationships, types of commodities, trade routes and accounting confirm that the Arab world already had been engaged in a long and fruitful tradition of business.[22]

When first published, this revelation changed much of what past western historians had thought about the Middle East in the Middle Ages. The *Cairo Geniza* provides the intricate details of how agriculture and commerce worked in Egypt and how the Fatimid/Ayyubid economic system evolved into the framework that the Mamluks inherited in 1260. There are intimate details on the diet and eating habits of people during the years that sugar became a desired commodity in the Middle East and then in Europe. The *Geniza* also includes exact price lists of the spices traded in Egypt from the different networks of trade throughout the Middle East, especially from the Red Sea trade and the caravan routes coming directly through the Transjordan area. Understanding the nature and mechanism of this system is essential to the study of the sugar industries under the Mamluks in Bilad al-Sham during the fourteenth century. This lucrative trade fueled the economy of the Mamluk Empire and accounted for the significant investment in the region of the Belqa that in turn allowed the Mamluk sultans to finance their majestic building programs in Cairo, Damascus and Jerusalem.[23]

Primary Sources

The contemporary sources for the Middle Islamic period in Jordan are al-'Umari, Abu-l-Fida, al-Maqrizi, Baybars al-Dawadari, al-Qalqashandi and al-'Ayni.[24] These writers represent a wide array of historians, geographers, and secretaries who provide a wealth of information about the *Bahri* period in Mamluk history, especially regarding the reign of al-Malik al Nasir Muhammad ibn Qala'un, Sultan during the height of Mamluk rule. The period of al-Nasir Muhammad's rule stands out for three primary reasons. First, al-Nasir Muhammad's three attempts to ascend the throne between the years 1293-1341 A.D. covered almost half of the *Bahri* Mamluk period. Second, he maintained close ties with the bedouin in Bilad al-Sham during his lifetime. Their support was critical each time he reclaimed the throne. Finally, he was the impetus behind the *Nasiri* cadastral survey in Egypt and Syria that established the state financial structure that dominated almost half of the Mamluk period.[25]

One of the most significant sources is Abu-l-Fida (1273-1331 A.D.), the author of *al-Mukhtasar fi tarikh al-bashr*, a complete history of al-Nasir Muhammad's reign. He was born in 1273 A.D. in Hama, an Ayyubid principality in Syria. His family was from the royal house of Malik Nasir al-Din Ayyub and they were the heirs to the Principality of Hama in Syria. With his father and cousin, he participated in the last battles that drove the remaining Crusaders out of Mamluk territory. Because of his family was so distant from the court in Cairo, it was not until later years that he gained first hand knowledge of the sultan and his court when he was appointed governor and ultimately sultan of Hama after becoming a close friend of al-Malik al-Nasir. His works primarily deal with Syrian affairs and the problems with accession to the throne. He does not appear to have

plagiarized other Egyptian sources as was common to many of the other key historians of the Islamic Middle Ages.[26] His commentary provides much detail of royal affairs and the events in Syria that are key to the discussion of the economics of Syria and the role of al-Malik al-Nasir in the administration of that province.

Shihab al-Din Abu-l-'Abbas Ahmad Yahya ibn Fadl Allah al-'Umari authored an immense encyclopedia, entitled *Masalik al-absar fi mamalik al-amsar*. A contemporary of Abu-l-Fida, he died in 1348 A.D. The value of his encyclopedia lies in its accounting of historical developments from the time of the *hijra* to 1342-43 A.D. He was often a critic of al-Malik al-Nasir's policies and suffered imprisonment for various written outbursts against the sultan. Al-Umari's writings center on the information he acquired as the confidential secretary to the Mamluk government in Syria, a post similar to that held by his father to the Mamluk government in Egypt. The Syrian connection for al-Umari's annals is another good source for the study of the sugar industry at Tall Hisban.[27]

Baybars Rukn al-Din al-Dawadar al-Mansuri (d.1324-25 A.D.), also known as Baybars al-Dawadari, is another source that provides a glimpse into provincial events. He is one of the most authoritative authors of the Mamluk period and held one of the highest ranks for a Mamluk officer during the reign of al-Nasir Muhammad. His two annals, *Zubdat al-fikra* and *al-Tuhfa,* received much attention from later historians. There are questions about the sources of the information he presents about Syria and Damascus. Because of his location in Cairo, he could only have seen incoming information in a second-hand fashion. During the second reign of al-Nasir Muhammad (1293-94 A.D.), Baybars al-Dawadari received the highest rank in the mamluk army, that of an *amir*. He also rose to the post of the chief of the chancery, which placed him in charge of the

sultan's correspondence. During this period, he also performed special missions at the sultan's behest.[28] His strength, however, was that he did have access to the documents and correspondence arriving from foreign and domestic offices. His high rank gave him access to a wealth of information about affairs in the Mamluk state. For example, during his military career, he was stationed at the citadel in Kerak, and wrote an eyewitness account of the revolt of the son of Sultan Baybars against Sultan Qala'un in 1288 A.D.[29] In his early years, Baybars al-Dawadari participated as a soldier in military campaigns against the Crusaders, and the Mongols in Syria, Palestine and Asia Minor and was governor of the fortress of al-Kerak.[30] His main interest is in the politics of Mamluk government and such subjects as military, economic and diplomatic developments. He differs from most of the Mamluk historians because he just narrates the events and does not offer any insights into how and why the events occurred.[31]

Al-Maqrizi (d.1441-42 A.D.) is perhaps the most famous of the Egyptian historians. His major contribution to Islamic historiography is a monumental chronicle of Muslim Egypt that includes a geographical, historical and biographical section within it. Al-Maqrizi's background as a scribe, *qadi, imam,* teacher, *muhtasib* and the administrator of *waqfs* equipped him to discuss the political and economic world of Mamluk government in the late fourteenth to mid-fifteenth centuries. This crucial time of Mamluk history included the transition from the *Bahri Mamluks* to the sowing of the seeds of its decline under the *Burji Mamluks.* The origin of the decline is a matter of scholarly debate, but is crucial in any discussion of the sugar trade in Hisban. While al-Maqrizi does demonstrate some amount of bias in his writing, he far surpasses any other historian of the period in skill and organization of subject. His real contribution lies in information

he provides that had not been available earlier. He provides an excellent coverage of the Egyptian governmental administration in Cairo. His commentary contributes to our understanding of the status of the Mamluk feudal system and its function as the *Sultanate* grew weaker and fell on economic hard times. [32]

Al-Maqrizi's contemporary, Abu Muhammad Mahmud Ahmad ibn Musa Badr al-Din al-Aynī, (d.1451 A.D.) is another historian with a similar career as both a religious scholar and teacher as well as an official in a religious institution, but he was also an accomplished courtier.[33] Al-Aynī wrote another of the universal type of chronicles and is considered a rich source for the *Bahri* period, perhaps even more important than al-Maqrizi. This is because al-Aynī also functioned in a courtier capacity as well as the having a religious and bureaucratic background. Al-Aynī quotes his sources in his writings instead of paraphrasing them as al-Maqrizi did, thus allowing scholars to evaluate his information more closely as a valuable source for the period. While the content of his commentary is similar in coverage to Maqrizi's, al-Aynī's value lies in the corroboration he provides for other historical sources, instead of just paraphrasing them; he quotes directly from the source. He also names his sources, which provides a check against other information about the *Bahri* period.

The final primary source is Abu al-'Abbas Ahmad ibn 'Ali al-Qalqashandi (d. 1414 A.D.). His work is in the scribal or secretarial format for Islamic history and provides commentary on copies of documents pertinent to Mamluk administration. His *Suhb al-a'sha fi sina'at al-insha* is particularly valuable in the analysis of political, economic and bureaucratic structure of the *Sultanate* in the *Bahri* period.[34] He was a

contemporary of al-Maqrizi and his value is checking other histories of the period against what al-Qalqashandi wrote for accuracy.

Secondary Sources

The secondary sources for this thesis are those authors whose research has significantly affected the understanding of the economics of the Middle Islamic period (1200-1600 A.D.) and the Mamluk Empire, specifically. Eliyahu Ashtor, a pioneer in the field of social and economic history of the Near East in the Middle Ages broached this topic first. His work is extensive and he has produced some of the most significant scholarly work on Egyptian Mamluk trade and commerce. His research into the archives in Italy, detailing the facts and figures of Muslim trade with the Italian city-states such as Venice, Genoa and Pisa, his revelations about the decline of technology in the Near East in the Later Middle Ages, and his major focus on the Jewish role of trade in the Mediterranean all have injected a new vitality into the study of Mamluk economics and provided the basis with which these studies can go forward. His work will inform a large part of this thesis and his articles on the Levantine sugar industry will frame the discussion concerning the decline of the Mamluk Empire.

Hassanein Rabie is the other great scholar of the Medieval Islamic period. His monograph, *The Financial System of Egypt A.H. 564-741/A.D. 1169-1341* provides a well-written study of taxation, financial administration and currency in Egypt from the last years of the Fatimid caliphate through the Ayyubid era and the establishment and consolidation of the Mamluk *Sultanate*. His information has been critical in the ongoing research of Mamluk economy. Although this study is primarily for the region of Egypt

during the *Sultanate* and therefore needs additional investigation and broadening of the topic to include the province of Greater Syria, the scope and erudition of Rabie's work is unparalleled. Rabie's use of the primary sources and their documentation for the years of the Mamluk *Sultanate* has caused the tide of scholarship to go forward. The role of the provinces in the *Sultanate* can only be understood through Rabie's detailed examination of the function of Egyptian mamluk administration as it radiated outward from Cairo. Changes or disruptions in provincial government were a response to the administrative structure and practices of the Mamluk government in Cairo.

Sato Tsugitaka has also contributed much to the study of government in the Middle East in the Middle Ages. He builds on the previous work and research of both Ashtor and Rabie in his examination of the Egyptian financial system. His work *State and Rural Society in Medieval Islam* is fundamental in explaining the changes that took place from the tenth through the sixteenth century in the *iqta* system (the method of allocating land revenue to pay soldiers) and the evolution of Islamic society as a result. The impact of these changes forever altered the urban and rural setting in the lands that the Mamluks ruled and subsequent economic developments there. Tsugitaka's research on the cadastral surveys undertaken during the early Mamluk period, *al-Rawk al-Husami* (1298 A.D.) and *al-Rawk al-Nasiri* (1313-1325 A.D.), highlights the historical significance of these surveys and their long-term political and economic impacts and is important to the discussion of the decline of the Mamluks after the *Burji* Mamluks came to power in the fifteenth century.[35] The effects of Mamluk economic policies in Syria and Egypt have been the source for great debate in Middle Eastern scholarship; some aspects of this debate are presented in this thesis.

A significant of amount of research and writing has been done on the many facets of the Mamluk *Sultanate*: military, administrative, religious, social and economic, to name just a few. All of these, for the most part, have taken the macro approach to the region, however, without necessarily focusing on the role of the individual settlement, village or small administrative unit. For that reason, this aspect is a relatively new area of study in Middle Eastern history. Long-standing scholars of the area, as well as the new generation of scholars have begun to explore primary source documents located outside of the traditional Cairo focus, in localities such as Damascus, Jerusalem and Amman, with promising results for new insights.

This thesis serves as an overview of this new approach as applied to a site-specific study of the economic activities of the Mamluk period in the Tall Hisban area. As such, it synthesizes much of the current research and relies on newly available translations of some of these specific primary source documents, as well as secondary source materials for support. At its conclusion, I hope to demonstrate that many of the long-held factors regarding the decline of the Mamluk influence in the area were really far more complex than previously thought, with consequences that are even more complex for the region's future.

Endnotes

[1] Several variations of the name Hisban exist. Hisban is the modern name for the town in Jordan, but the biblical spelling is Heshbon and then a later spelling from the Roman and Byzantine period is Hesban.

[2] Paul J. Ray, Jr., *Tell Hesban and Vicinity in the Iron Age – Hesban 6.* (Berrien Springs, MI: Institute of Archaeology and Andrews University Press, 2001), 16.

[3] Ibid.

[4] Seigfried H. Horn, "My Life in Archaeology and the Early History of the Hesbon Archaeological Expedition," *Hesban After 25 Years,* ed. David Merling and Lawrence T. Geraty (Berrien Springs, MI: Institute of Archaeology/Siegfried H. Horn Archaeological Museum, 1994), 7.

[5] Oystein S. LaBianca and Lawrence T. Geraty, "Retrospects and Prospects," *Hesban After 25 Years,* ed. David Merling and Lawrence T. Geraty (Berrien Springs, MI: Institute of Archaeology/Siegfried H. Horn Archaeological Museum, 1994), 310.

[6] Bethany J. Walker, "Mamluk Administration of Transjordan: Recent Findings from Tall Hisban," *The Bulletin of Middle East Medievalists* 13 (October 2001): 2, 29.

[7] Øystein LaBianca, *Sedentarization and Nomadization – Hesban 1*(Berrien Springs, MI: Institute of Archaeology and Andrews University Press, 1990), 9.

[8] Bethany J. Walker and Øystein S. LaBianca, "The Islamic *Qusur* of Tall Hisban: Preliminary Report on the 1998 and 2001 Seasons," *Annual of the Department of Antiquities Jordan* 47 (Amman: Hashemite Kingdom of Jordan, 2003), 3 (forthcoming).

[9] Walker, "Mamluk Administration", 30.

[10] Ibid., 32.

[11] Ibid., 29.

[12] Malcolm B. Russell, "Hesban during the Arab Period: A.D. 645 to Present," *Hesban 3, Historical Foundations: Studies of Literary References to Hesban and Vicinity,* ed. Lawrence T. Geraty and Leona G. Running (Berrien Springs, MI: Institute of Archaeology and Andrews University Press, 1989), 29. Russell quotes the Arab geographer, *Abu al-Fida* who wrote about the Hisban region in his travels of the fourteenth century.

[13] Fernand Braudel, *The Mediterranean and the Mediterranean World in the Age of Philip II, Volume I*, trans. Sian Reynolds (New York: Harper and Row, 1972), 16.

[14] Braudel, *The Mediterranean*, 20.

[15] Øystein S. Labianca, Hesban 3, *Sedentarization and Nomadization: Food System Cycles at Hesban and Vicinity in Transjordan* (Berrien Springs, MI: Institute of Archaeology and Andrews University Press, 1990), 241. See also, Bethany J. Walker and Øystein S. LaBianca, "The Islamic *Qusur* of Tall Hisban: Preliminary Report on the 1998 and 2001 Seasons," *Annual of the Department of Antiquities Jordan* 47 (Amman: Hashemite Kingdom of Jordan, 2003) (forthcoming).

[16] Ibid., 4.

[17] S.D. Goitein, *A Mediterranean Society, the Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza, Volume I, Economic Foundations* (Berkeley, CA: University of California Press, 1967, 1.

[18] Ibid., 2

[19] Ibid., 19.

[20] Ibid.

[21] Ibid., 9-11.

[22] Ibid., 209.

[23] Bethany J. Walker, "Mamluk Investment in Southern Bilad Al-Sham in the Eighth/ Fourteenth Century: The Case of Hisban," *Journal of Near Eastern Studies* 62 (October 2003): 4, 244.

[24] Information presented in this section about the individual primary sources comes from Donald Presgrave Little, *An Introduction to Mamluk Historiography, An Analysis of Arabic Annalistic and Biographical Sources for the Reign of al-Malik an-Nasir Muhammad ibn Qala'un* (Montreal: McGill-Queen's University Press, 1970), inclusive. The author of this thesis has relied on translations and secondary information provided by the authoritative historians in their secondary works.

[25] Sato Tsugitaka, "The Proposers and Supervisors of *al-Rawk al-Nasiri* in Mamluk Egypt," *Mamluk Studies Review* 2 (1998): 73.

[26] Donald Presgraves Little, *An Introduction to Mamluk Historiography, An Analysis of Arabic Annalistic and Biographical Sources for the Reign of al-Malik an-Nasir Muhammad ibn Qala'un* (Montreal: McGill-Queen's University Press, 1970), 42-45.

[27] Little, *Mamluk Historiography*, 40.

[28] Ibid.

[29] Walker, "Mamluk Investment", 3.

[30] Little, *Mamluk Historiography*, 4.

[31] Ibid., 4-10.

[32] Ibid., 76- 80.

[33] Ibid., 80.

[34] Linda S. Northrup, "From Slave to Sultan, The Career of *al-Mansur Qalawun* and the Consolidation of Mamluk Rule in Egypt and Syria (678-689A.H./1279-1290 A.D.)" (Doctoral Dissertation, Freiberger Islammmstudien, (1998), 53, 58, 256.

[35] Sato Tusugitaka, *State and Rural Society in Medieval Islam* (Leiden: E.J. Brill, 1997), 235.

Chapter Two

Transjordan, Fourteenth Century

Origins of the Mamluk Institution

The word 'mamluk' means, "to possess." In the early Islamic period, Robert Irwin notes that the term probably referred to a "free client or a devoted follower of a ruler or an *amir*."[1] By the medieval and early modern period, 'mamluk' had come to mean a freed military slave. "Mamluk" does not have the same meaning as the institution of slavery connotes in the southern United States. Mamluk slaves did not perform menial tasks such as household duties. Their duties were to serve the ruler as administrators and expert fighting men.

The use of slaves as soldiers developed sometime in the eighth and ninth centuries during the Umayyad and Abbasid caliphates. The first of these mamluk slaves were probably from the region of modern day Iran. This fact changed as the armies of conquest crossed the borders of the Eurasian steppes and established a continuous frontier with the Turkish tribes on the northern edge of Arab territory. Turkish mamluks came to be preferred for several reasons. The Asian steppes were the home of large tribes of nomadic pastoralists who domesticated not only the camel, but also the horse by approximately 3000 B.C.[2] Over the succeeding millennium, these nomads developed into celebrated horsemen and expert archers. They were fierce warriors, greatly feared, their lives dedicated to raiding, booty and invasion.[3]

By the time of the Abbasid caliphate, about 900 A.D., Turkish mamluks predominated in the armies of the rulers. Mamluks were acquired in generally one of two

ways. They were either young males taken as prisoners of war, or the sons of families in the conquered territories who sold their young sons to augment the family income. These young male children grew to adulthood provided with an excellent education and superb military skills. Upon reaching the age of maturity, these slaves became the elite corps of an important *amir* or the caliph, himself.[4] Because these young slaves were not Muslims, they could be taken into slavery, educated and trained in military and administrative duties, and then at their majority converted to Islam and freed.[5] Gradually, over a period of time, these Turkish mamluk corps became the bodyguards of their patrons, loyal only to the particular benefactor who had provided for their education and training. The group of mamluks that had been raised together and trained together maintained a special bond with each other (*khushdashiyya*). By the rule of al-Salih Ayyub (1240-1249 A.D.), the last of the Ayyubid heads of state and the immediate predecessor of the Mamluk Sultanate, the Kipchak steppes, now subjugated by the Mongols of the Golden Horde, furnished the greatest number of mamluks to the state. Al-Salih Ayyub's "need for which [mamluks] had increased greatly with the wars..." against the Crusaders and the Mongols.[6]

Turkish mamluks dominated in the armies of the sultans by the time the Seljuk Turks made their appearance at the end of the tenth and beginning of the eleventh centuries and overthrew the Abbasid Caliphate. As Robert Irwin comments in his book, *The Middle East in the Middle Ages The early Mamluk Sultanate 1250-1382*, "The fact that the mamluks constituted a non-hereditary military caste ensured in principle that promotion from within their ranks would be based on merit rather than blood ties and also hindered them from accumulating land and fiscal wealth."[7] Mamluks received

compensation for their services through the granting of "*iqta'at*". This unique system allocated "tax revenues in money or in kind from a designated area of land or other revenue source for a limited period in return for administrative or military service."[8] When first implemented, this allocation was good only for the life of the mamluk receiving the benefit. Control of the finances and land remained securely in the hands of the head of state. Later, with the rise of the Mamluk Sultanate, the problem of political stability and loyalty would prove a great obstacle in the succession of the sultanate. The *iqta* system underwent major changes during the Ayyubid period; followed by another major overhaul in the early Mamluk Sultanate called the *al-Nasiri Rawk*, a cadastral survey that realigned the system for political purposes.[9]

The Mamluk Sultanate (1250- 1517 A.D.)

The Mamluk Sultanate (see Figure 1) officially began in 1260 after the defeat of the Mongols at the Battle of Ayn Jalut by al-Zahir Baybars who killed his rival Qutuz and became sultan. (See Figure 3) Civil war prevailed for ten years from 1250-1260 A.D. as the *Bahriyya* Mamluks of al-Salih Ayyub assumed control of Egypt and Syria in the political vacuum created by his death. Baybars founded and established the "characteristic political structure and institutions of the regime [Mamluk Sultanate]."[10] During his reign (1260-1277 A.D.), a relative peace settled over the Sultanate in Egypt and Baybars turned to the task of securing Syria by removing the last of the Crusaders from Mamluk territory. Baybars fought continuously to prevent assaults from the weakened Crusader states on Syrian the coast to the west and from the Ilkhan Mongols in Mesopotamia on the east.[11]

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In order to secure the borders of the new Sultanate, Baybars destroyed most of the established centers of trade and commerce on the coasts of Syria to prevent any future return of the Crusaders.. Within the Transjordan, he refortified key citadels such as Kerak and Hisban.[12] Baybars began building up the interior through the strengthening of the pilgrimage routes, the caravan routes and the creation of a postal system (*barid*). These important routes through the central region of the Belqa passed very close to Hisban in the southernmost district of Damascus province. Baybars also supported and encouraged intense investment in the agriculture of those areas of the Transjordan watered by tributaries of the Jordan River. The availability of water is basic to the cultivation of sugar cane, and the area around Hisban was excellent for sugar production. Hisban and the new Mamluk regime profited much from the establishment of these agricultural enterprises.[13]

The threat of the Ilkhanid Mongols continued throughout the early Sultanate until their last attack on the Mamluk state during the reign of al-Nasir Muhammad in 1313 A.D. The other Mongol state that assisted Baybars in his defense against the Ilkhanids was the Golden Horde Khanate of southern Russia, ruled by Berke Khan who had converted to Islam and continued to provide the Mamluk State with slaves from the Kipcak steppes.[14] Baybars never attained a lasting peace with the Ilkhan Mongols, but a usurper to his throne, al-Mansur Qala'un defeated them for a second time in the second battle of Himns in 1281 A.D.

In 1291 A.D., the final stronghold of the Crusaders, Acre, fell before the Mamluk armies. By that time, however, civil war among the various groups of mamluks who supported their own sultans had kept the Mamluk Sultanate politically unstable for

seventeen years.[15] In 1310 A.D., one of the grandsons of al-Mansuri Qala'un, al-Nasir Muhammad, assumed control of the Mamluk state after two previously unsuccessful attempts and many years in exile in Kerak castle in southern Jordan. Immediately, al-Nasir Muhammad secured his throne by killing his rivals and putting down a third abortive attempt by the Ilkhan Mongols to strike at Syria. He then began the great and important task of establishing an autocratic government by installing his own mamluks in the key positions of the sultanate.[16]

Mamluk Administrative Practices

The Mamluk administrative structure of *Bilad al-Sham* was broken down into six *mamlakas* (or provinces): Halab, Hama, Tripoli, Damascus, Safad and Kerak.[17] Each mamlaka consisted of *safaqas* (sections) which were then divided into *'amals* (districts). Each district had a capital, either a *wilaya* or a *niyaba,* according to the rank of its governor in the mamluk regime. This system is important in order to understand exactly how Hisban functioned during approximately a thirty year period when it was the *wilaya* or capital of the Belqa, the *'amal* of the southernmost *safaqa* of the *Mamlakat Dimashq.*[18] The uneven methods used to administrate the Transjordan kept the region unstable. The southern border of the *Mamlakat Dimashq* was constantly changing at critical periods within the Sultanate. Provinces were in a constant state of alteration and the designation of capitals became a favored tool of the state to settle any potential political strife in the region. However, *Bilad al-Sham* was of vital importance to the Mamluks because of its geographical, natural, and human resources.[19] The area served two purposes: 1) to provide the newly appointed *amirs* and the sultans with a lucrative agricultural base and

2) to use the region to solve complicated and demanding political problems through cronyism and the pacification of the *Bedouin* tribes. The entire Mamluk period in this region was one of intense political unrest and violence.

Mamluk Sugar Industry in the Transjordan

One of the most important agricultural investments by the Mamluks in the southern region was in the sugar industry.[20] There is ample proof of this industry throughout the Transjordan in this period. Surveys conducted in the area show widespread evidence of water mills and sugar jars. In the second part of the East Jordan Valley Survey (1976),[21] the authors indicate that the total number of sites visited for the Ayyubid/Mamluk period were 107 out of 225 in the entire Jordan Valley. Many of these sites were mill installations with masses of broken sugar pots scattered around the area. Most of these sites were on the Valley floor (the ghor) and in the area of the Zor, a secondary valley that the river has cut into floor of the main valley. The archaeological survey of the Hisban region performed by Robert Ibach and S. Douglas Waterhouse in 1973 expanded into the 1974 and 1976 field seasons of the Heshbon Expedition of Andrews University. The original survey objective was to have "a better understanding of Tell Hesban (also Tall Hisban) in its wider geographical context."[22] The characterization of the Ayyubid/Mamluk period produced 148 sites of which 52 had Ayyubid/Mamluk pottery associated with them. The presence of ten water-driven mills was detected on the banks of the Wadi Hesban, one of the tributaries that empty into the Jordan River. Site 41, Shunet Sukr, was of particular interest, because C.R. Condor identifies the site in his 1881 reports and confirms that it was still in operation at the time. The name *sukkar* in

place names supports the theory that the site was an industrial sugar site. However, none of these sites in the Wadi Hesban region is a sugar site conclusively.[23] The details of other sites that confirm sugar industry and production in the eastern Transjordan is examined in Chapter 3 of this thesis.

Mamluk Investment

Profits from Jordanian agriculture, including the large proceeds from sugar cane production, helped finance many of the intensive building programs of the Mamluk sultans. *Waqf* documents, legal instruments detailing the dedication of a particular mamluks' "*iqta*" holdings to be set aside as a charitable trust according to the tenets of the fourth pillar of faith (*zakat)* suggest that most of the income from these trusts supported *madrasas* (schools) in Cairo, Jerusalem and Damascus, as well as local institutions.[24] After the *al-Nasiri Rawk*, a major cadastral survey of land usage in all of the sultanate (1313-1325 A.D.), the popularity of this practice increased due to the requirements of the state that *iqta'* holdings had to be relinquished at the end of a period of service or an officer's retirement. Holdings, assigned to them during their career could be manipulated through these charitable trusts to allow the *amir* (officer) to permanently disrupt this process in favor of his heirs.[25] Carl Petry believes that these *Waqf* documents offer a rich primary source for economic study of the later Mamluk period.[26]

The location of these rural properties tended to be in well-watered areas close to the *wadi* systems, or the Jordan River Valley itself. In addition, these sites were near major travel routes such as the various pilgrimage routes or the postal route that crisscrossed the Transjordan. The most obvious types of financially sound investment

were orchards or sugar cane plantations, and the region of the Transjordan provided the most favorable conditions for such activities.

Part of the problem of researching the investment practices of the Mamluk regime in Syria is that the primary sources do not address any specific motivation for this investment activity.[27] The strongest evidence supporting a direct connection during the third reign of al-Nasir Muhammad (1310-1341 A.D.) is those sources that describe or allude to his close relationship with the tribes of southern Syria.[28] All of these sources, such as Abu al-Fida, al-Yunini and al-Jazari, provide just small insights into the area during the early fourteenth century because they have not been edited yet or only fragments of the original works remain.[29] The theories of such imminent scholars as Eliyahu Ashtor and Sato Tsugitaka regarding the decline of the Mamluk state in the fifteenth century connect to the politicization of Mamluk agricultural investment in the fourteenth century. [30] Most of these theoretical discussions are connected to the programs of al-Nasir Muhammad and his method of rule by using *Bilad al-Sham* and its local government as tools of the state. The role of Tall Hisban was prominent in the political framework of al-Nasir Muhammad's government in *Bilad al-Sham* for about thirty years during the early part of his third reign. The small citadel received attention from the sultan as a reward to the southern tribes that had sustained him in his third attempt to re-take the throne in Cairo (1310-1341 A.D.). Hisban served as the provincial capital of the *Belqa* from 1308-1356 A.D., again a reward to those *amirs* who served him faithfully.[31]

Tall Hisban

During the 1998 field season at Tall Hisban, two connected rooms were uncovered at the basement level of the governor's residence on the summit of the *tall* (manmade hill). (See Figure 4) These rooms were located in Field L and were designated Square One and Square Two for the excavation in 1998 and 2001. It was during the 2001 season that these rooms were fully excavated and the function of these two rooms became clear. They were actually one long and narrow room, covered with a low vaulted ceiling with an entry on the east side of the room through a small door, and its entry hall. This room was intended for use as a storage room. Additional rooms to the south of the room in Square One and Square Two, just inside the citadel's southern fortification wall, will be the focus of another season's work. These storerooms were built in three phases during the fourteenth century and show signs of re-use by squatters after the initial abandonment of the *tall* somewhere in the middle of the fourteenth century. There was massive earthquake destruction in this storeroom, and evidence of fire from the charred remains of wooden structures thought to be storage shelves. It is from Squares One and Two that a multitude of sugar jars, both whole and fragmented, were found, as well as thousands of glazed pottery sherds, pinch lamps, painted jars and jugs. All of the destruction in this area suggests that one of the many earthquakes that occurred throughout the region in the fourteenth century damaged Tall Hisban. Sugar jar fragments were numerous throughout the site, but were found in the greatest amounts in Squares One and Two, the storeroom.[32]

History of Sugar

The origins of the sugar cane industry are to be found in southern Asia. In this region, there is evidence that wild or cultivated sugar cane was chewed by the natives and through that habit a primitive process evolved of producing *gur*, the thick mass of sugar cane juice that is formed from the boiling process which makes this gooey liquid that is easier to transport for use in cooking.[33] Andrew Watson, in his extensive work on the Medieval Green Revolution, suggests that sugar cane originated in Southeast Asia and Malaysia and was "ennobled" in India as the cultivation of the plant developed.[34] By the 7th century A.D., the sugar cane industry had become widespread in northern India and more technologically advanced. From India, the products and agriculture of sugar cane moved west across Iran and into the Far East through the caravan networks.[35]

With the spread of Islam came not only a new religion to the Middle East, but also what has been termed as a "Green Revolution", or the Arab Agricultural Revolution, from the seventh through the eighth centuries. Many new crops were introduced into areas with very different climatic conditions. Crops such as rice, sorghum, hard wheat, sugar cane, cotton, watermelons, eggplants, spinach, artichokes, colocasia, sour oranges, lemons, limes, bananas, plantains, mangos and coconut palms changed cultivation patterns everywhere these crops were introduced.[36] This was a radical transformation of the Middle East and by the eleventh century, the revolution had traveled from one end of the Mediterranean to the other end. It was now possible to have two planting seasons and to rotate crops. One important outcome was that these changes allowed the summer months to be productive, as well.

During the early Islamic period, crops that required intensive watering and land that needed replenishment with moisture in order to continue the cultivation process relied heavily on old irrigation systems left over from past civilizations.[37] The spread of these new crops was dependent on how fast the old systems could be adapted or new technology could be developed or "borrowed rather than invented by the Arabs, for catching, storing, channeling and lifting water."[38] The development of these water delivery systems transformed the Arab world into a virtually unbroken expanse of irrigated lands where farming was almost year around. Watson notes, "By ingenious combinations which took full account of the degree of watering available and the type of soil, they were able to crop almost all categories of land more heavily than in the past, and sometimes to achieve particularly spectacular results by taking advantage of local soil variations and microclimates."[39] The harvests for the new agriculture were more bountiful than ever before, and income from such productive crops brought higher prices and a greater economic stability than the previous centuries.

Watson also points out "agriculture revolutions do not occur in a vacuum."[40] As the revolution touched the rural and urban populations, it triggered a series of responses between them. Trade was stimulated across the Mediterranean from the regions of the *Dar al-Islam* (the Islamic world), industrial growth increased as technology adapted and evolved and the power of the state reacted to a new rising class of middle class entrepreneurs.[41] There are numerous questions involved about the nature of this revolution and its consequences, enough to occupy scholars for decades. One of the most significant aspects was the fact that this revolution did not seem to be permanent.[42] The

decline of agriculture is one of the most significant factors in the later Mamluk Sultanate and is examined in Chapters Three and Four of this thesis.

The impact of this widespread diffusion of crops brought the sugar cane industry to the area of Syria, Palestine and Egypt in the early years of the Islamic conquests, around the mid-seventh century. However, the Crusades brought northern Europeans into contact with the sugar producing regions of the eastern Mediterranean, with the resulting high demand for sugar products.[43] This led to greater expansion of the sugar industry in the areas of Palestine and the establishment of new sugar cane plantations and factories in Rhodes, Malta, Crete and Cyprus. The Cypriot sugar cane industry in the Middle Ages was highly developed, as evidenced by the excellent archaeological remains on the island. A closer examination of the sugar cane plantation sites in Cyprus and the work of Maria-Louisa Von Wartburg is made in another chapter of this thesis.

The manufacture of cane sugar is an involved process starting with the planting of at least one node from the stem of the plant. Above the ground is a long stock or stem that supports the root system of the plant below ground. The stem is divided into joints that can be several inches apart on the stem and consist of a node and a section of the stem.[44] The plant reproduces asexually by covering a node and section of the stem with soil in furrowed rows in a field. The planting of sugar cane is very labor intensive, but usually one planting will produce more than one crop. The first harvest of the plant is known as the "plant cane" and subsequent harvests after that from the same stem and nodes are called "ratoon" crops. The harvests from "ratoon" cane yields less and less each year thereafter until finally the planting process must begin again with new stems and nodes. Consequently, the first harvest produces the best quality of sugar and is the most

abundant yield. Many factors affect the yields from "ratoon" harvests including local climate, types of pests, the variety of the cane and the quality of the "plant cane" harvest, and the price of the sugar at market.

There are three stages to processing sugar cane: 1) cultivation and harvesting, 2) extraction of the juice from the cane, and 3) the conversion of the juice into crystalline sugar. Because cut sugar cane spoils quickly, it requires processing within twenty-four hours of cutting. Locating the mills and factories for sugar cane production near the fields reduced the transportation requirements between field and mill. The harvesting as well as the planting was labor intensive. The sugar cane stems were cut short to the ground, stripped of leaves and bundled in preparation for the milling process. The quality of the sugar depended on the technological sophistication of the milling process, which did not change in the Middle East during the period of the Middle Ages.[45]

At the mills, the cane stems were chopped into pieces and crushed, sometimes twice.[46] Noel Deerr in his *History of Sugar*, quotes al-Nuwairi, a twelfth century Arab historian who described in detail the activities in a sugar cane factory located in Kus, Egypt.[47] The rise of these two powerful forces – one a totally new form of government combining military with administrative expertise and the other a "green revolution" triggering huge economic and social changes – catalyzed the creation of a new Middle East in the Middle Ages. The fourteenth century marked the beginning of a two hundred year period during which the Mamluk Sultanate stood as the primary military, governing and economic power. As a result, the Transjordan region would enjoy a period of prosperity, the evidence of which is still present today.

Endnotes

[1] Robert Irwin, *The Middle East in the Middle Ages, The Early Mamluk Sultanate 1250-1382.* (Carbondale, ILL.: Southern Illinois Press, 1986), 3.

[2] Ibid., 1-2.

[3] Ibid., 6.

[4] Ibid., 4-6.

[5] The *Qu'ran* expressly forbid any Muslim from taking another Muslim believer into slavery.

[6] Irwin, *The Middle East*, 12-13.

[7] Ibid., 6.

[8] Ibid., 11.

[9] See the following works of Hassanein Rabie for the best discussions of the financial system in Egypt and the Mamluk Sultanate: *The Financial System of Egypt, A.H. 574-741/ A.D. 1169-1341.* London: Oxford University Press, 1972 and "The Size and Value of *Iqta'* in Egypt, 564-741 A.H. 1169-1341 A.D in *Studies in the Economic History of the Middle East from the rise of Islam to the present day,* ed. M.A. Cook. London: Oxford University Press, 1970.

[10] P.M. Holt, "Mamluks," *Encyclopedia of Islam CD ROM* (Leiden: E.J. Brill, 1999),1.

[11] See Appendix B for a complete list of Ayyubid Rulers, Early Mamluk Sultans, and Circassian Mamluk Sultans. Reproduced by the permission of Bethany J. Walker from her article "Militarization to Nomadization: The Middle and Late Islamic Periods," *Near Eastern Archaeology* 62 (December 1999): 4, 208.

[12] Bethany J. Walker, "Militarization to Nomadization: The Middle and Late Islamic Periods," *Near Eastern Archaeology* 62 (December 1999): 4, 203.

[13] Walker, "Militarization," 204.

[14] See Figure 3 for the location of the Mongol Khanates.

[15] Holt, "Mamluks", 4.

[16] Ibid.

[17] Bethany J. Walker, "Mamluk Investment in the Southern Bilad Al-Sham in the Eight/Fourteenth Century: The Case of Hisban," *Journal of Near Eastern Studies* 62 (October 2003): 4, 242.

[18] Ibid., 3.

[19] Ibid., 4.

[20] Ibid.

[21] Khair Yassine, "The East Jordan Valley Survey, 1975 (first part)," *Archaeology of Jordan Essays and Reports* (Amman: Department of Archaeology, University of Jordan, 1988), 159.

[22] Robert D. Ibach, Jr., *Archaeological Survey of the Hesban Region – Hesban 5* (Berrien Springs, MI.: Institute of Archaeology and Andrews University Press, 1987), 3.

[23] Ibach, Jr., *Survey,* 191-194.

[24] Walker, "Mamluk Investment," 5.

[25] Carl. F. Petry, "A Geniza for Mamluk Studies? Charitable Trust (*Waqf*) Documents as a Source for Economic and Social History," *Mamluk Studies Review* 2 (1998): 54.

[26] Ibid., 60.

[27] Walker, "Mamluk Investment," 6.

[28] Ibid., 3.

[29] Ibid., 7.

[30] Ibid., 8.

[31] Ibid., 5.

[32] The details provided here are taken from the preliminary report on the excavation from the 1998 and 2001 seasons at Tall Hisban by Dr. Bethany J. Walker (Oklahoma State University), Co-Director and Chief Archaeologist of the excavations at Tall-Hisban and Dr. Øystein LaBianca (Andrews University), Senior Director of the Tall Hisban Project. This report is forthcoming and is entitled, "The Islamic *Qusur* of Tall Hisban: Preliminary Report on the 1998 and 2001 Seasons." It is scheduled for publication in 2003 in the *Annual of the Department of Antiquities Jordan.*

[33] Ibid., 19.

[34] Andrew M. Watson, "A Medieval Green Revolution: New Crops and Farming Techniques in the Early Islamic World," *The Islamic Middle East, 700-900: Studies in Economic and Social History*, ed. A.L. Udovitch (Princeton, New Jersey: Darwin Press, Inc., 1981), 30.

[35] Ibid., 21.

[36] Andrew M. Watson, "The Arab Agricultural Revolution and Its Diffusion, 700-1100," *The Journal of Economic History* 34 (March 1974): 1, 8-9.

[37] Ibid., 12.

[38] Ibid., 13.

[39] Ibid., 14.

[40] Watson, *The Islamic Middle East*, 44.

[41] Ibid., 48.

[42] Ibid., 29.

[43] J. H. Galloway, "The Mediterranean Sugar Industry," *The Geographical Review* 67 (1977): 180-181.

[44] J.H. Galloway, *The Sugar Cane Industry An Historical Geography from its Origins to 1914* (Cambridge: Cambridge University Press, 1989), 12-18.

[45] Ibid., 184.

[46] Ibid..

[47] Noel Deerr, *The History of Sugar*, Volume I (London: Chapman and Hall Ltd., 1949), 88-90. See Appendix A for the entire quotation from al-Nuwairi. Saleh Hamarneh also mentions the same passage from al-Nuwairi in his article, "Sugar Cane Cultivation and Refining under the Arab Muslims during the Middle Ages" in the *Annual of the Department of Antiquities Jordan* from 1977-1978.

Chapter Three

Levantine Sugar Production

The first stage in examination of the sugar industry at Tall Hisban requires a site-specific survey of those archaeological sites in the region of the Transjordan that provide comparable evidence of sugar cultivation, manufacture and trade. This chapter will focus on a site specific study of the sugar sites in the Jordan Valley that most effectively demonstrate the role of Tall Hisban as a probable sugar distribution site. A key element of this study will be a review of the best archaeological remains of the medieval sugar industry on the island of Cyprus. These remains offer the most outstanding extant example of the sugar industry that is still preserved. The pioneering work of Maria-Louise Von Wartburg thoroughly documents the technology of the sugar industry as it relates to cultivation, extraction, manufacture and distribution.

Wartburg notes that sugar was already a primary economic commodity in the Levant before the Crusades.[1] After 1099 A.D. and the establishment of the new Frankish states on the coast of Palestine and the Jordan Valley, trade between East and West increased sharply. The estates established by the Crusaders continued to grow and manufacture sugar for export to Europe.[2] Although scholarship is unclear about exactly when the West actually came into contact with sugar, perhaps through Egypt or one of the other Mediterranean ports in Sicily or even Spain, the Crusaders certainly increased the output of sugar to the West from their coastal centers at Sidon, Tyre and Acre as well as, the Galilee and the Jordan Valley.[3] By the fall of Acre in 1291 A.D., the sugar industry continued its westward advance by the retreat of the Crusaders from the Near

East. Now the development of sugar production spread into those areas outside the Muslim world into the islands of the Mediterranean.[4] In these regions, the cultivation and manufacture of sugar increased significantly and came to rival the old centers of Egypt and Greater Syria. These centers experienced a decrease in exports in the period immediately following the ouster of the Crusaders from Syria, which in turn stimulated the growth of the sugar industry on Cyprus in the decades following 1291 A.D.[5] Ties between Cyprus and coastal Syria had been close before the Crusader withdrawal.[6] Crusader rule in Syria and Cyprus overlapped, and the Crusader expertise in sugar production in Syria transferred easily to Cyprus as their position on the mainland contracted[7].

Cyprus

The Swiss-German Archaeological Expedition, directed by the team of F.G. Maier and Maria-Louise von Wartburg in the 1980/1982, 1987/1988 and 1989/1990 seasons, produced groundbreaking work for the study of the medieval sugar cane industry at the site of Kouklia on the west coast of Cyprus. (See Figure 2) Von Wartburg states "the excavations, conducted there...[Cyprus] enabled us to examine systematically a sophisticated structure of milling and refining installations, including mechanical devices completely ignored by the written sources. The wealth of new information gained made it possible to understand for the first time thoroughly how a sugar refinery in the Levant worked."[8]

In the *15th Preliminary Report* on the excavation at Kouklia, Von Wartburg acknowledges the impact of their results on the "wider context of the history of economy

and technology...of Mediterranean cane sugar production in the Late Medieval and Renaissance periods."[9] The excavation is indeed, the first of its kind in the research of "Medieval industrial archaeology."[10] Another important research objective is to learn more about the technology of sugar cane production in the medieval world. The Cypriot primary trade documents are vague about the production process and do not provide an adequate description of how sugar was made. Medieval society preferred to keep the technological process a closely guarded secret to prevent piracy.[11]

After the Battle of Hattin in 1187 A.D. and the fall of Jerusalem to the armies of Salah al-Din, the former Byzantine island of Cyprus was acquired in 1192 A.D. by Guy de Lusignan, the former Crusader King of Jerusalem, from the Knights Templar. The Lusignan family turned the sugar cane plantations on the island to their own interests and organized these plantations according to the feudal estate system. Thus, the sugar cane industry intensified and became a very successful financial investment for the Lusignan heirs. In addition, the Italian city-state of Venice became involved in the sugar production of Cyprus during this period. The Venetian merchants were apt at taking over the control of the sugar trade from Cyprus as well as other sugar enterprises on Tyre and Crete.[12] Von Wartburg notes that Venice later took a share in the second half of the fourteenth century, with the acquisition of Piscopia (Episkopi) by the Cornaro family (1369-70 A.D.).[13]

There are three main centers of sugar cane plantations and refineries on western Cyprus from the medieval period: 1) Paphos, the region of the Royal Domain of Couvoucle (modern Kouklia), forming the headquarters for the Royal Lusignan house; 2) Episkopi, the Cornaro family estates shared with the Venetian merchants and 3) Kolossi,

the Grand Commendary of the Knights of St. John near Limassol.[14] The excavation of the sugar cane refinery at Kouklia-Stavros reveals one of the few medieval sugar cane refineries in the Mediterranean and in the Near East where all the important functional elements survive."[15] In the *16th Preliminary Report* on the excavations, Von Wartburg concluded that this unique industrial complex formed the center of the Lusignan sugar production.[16]

The layout of these installations included a building divided into four separate units according to function: milling, refining, stoking, and storage/workshop area. The layout of these installations derives from well-conceived master plan based on exact operating concepts.[17] (See Figure 9) This is direct testimony that already in the thirteenth-century, planning before construction was taking place in the sugar industry on Cyprus. In addition, this design relates back to other production sites such as the one described in the account of al-Nuwairi in Egypt from the twelfth century. (See Appendix A) Because of this discovery, archaeologists from the Von Wartburg/Maier excavations in Kouklia-Stavros were then able to identify and locate other similar installations at the other important sugar sites in Western Cyprus.

The ceramic assemblage at Kouklia-Stavros further strengthened some of the conclusions about the preindustrial nature of the Mediterranean sugar industry.[18] Ceramic evidence helped set the end of sugar refining at the Kouklia-Stavros mill to around 1600 A.D. This depended on the discovery of certain types of glazed pottery characteristic of the fifteenth and sixteenth centuries, even after Venice assumed control of Cyprus in 1489 A.D. Documentary evidence produced a tentative date for the beginning of the mill's production, but pottery from well-stratified layers found towards the end of

excavation substantiated an initial date of late thirteenth to early fourteenth century. Radio carbon dating established firmly a late thirteenth century date for the initial building phase of the complex and then subsequent remodeling occurred in the fourteenth, and after large-scale destruction, in the fifteenth century.[19]

One of the greatest contributions of the Kouklia-Stavros excavation was the excellent analysis of the industrial pottery used in the refinement of sugar. Found in large quantities all over the Mediterranean world this pottery consists of primarily two main types: conical moulds with a circular hole at the lower end, and flat-bottomed jars.[20] Von Wartburg comments in a footnote that the analysis of the sugar pottery confirms an "astonishing interregional homogeneity of this class of vessels through the centuries."[21] She also mentions similar findings from excavations such as Tall deir 'Alla and Tall Abu Sarbut in Jordan, which all have a direct bearing on the work at Tall Hisban. The number of pottery fragments collected from Kouklia-Stavros helped to frame a typology for this style of pottery that correlates well with the account of the Florentine merchant Francesco Balducci Pegolotti's, *La Practica dell Mercatura,* written in 1340 A.D. and his observations about sugar quality and the size of the sugar moulds.[22] According to Pegolotti, the smallest mould yielded the highest quality of sugar called, in Italian, *Bambillonia* and *Caffetino;* the medium moulds produced an inferior quality loaf sugar called *Musciatto;* and the tallest moulds were used to produce crystalline sugar (rock candy).[23] At Cyprus, the tallest moulds were found in the greatest abundance. The predominance of the crystalline sugar moulds at Kouklia-Stavros indicates that the cheaper sugar was exported from Cyprus and played a larger role in the commerce of the island. (See Figure 10)

The milling sector used at the Kouklia-Stavros factory complex is clearly defined. Three units made up the main milling sector: a water mill with a vaulted subterranean wheel chamber; a special milling device below floor level in a separate room; and a grinding hall with a crushing mill driven by animals.[24] The special milling device is dated to the first building phase and the crushing mill is of a later date during remodeling. Von Wartburg believes that the two-stage mill at Kouklia-Stavros provides the first archaeological evidence of this technology as originally described by al-Nuwairi (1380-1432 A.D.).

The greatest importance of the Cypriot excavations is the discovery and description of the extensive and well-preserved complex of buildings that testify to the development of the Mediterranean sugar industry in the Middle Ages. This industry required not only considerable capital investment but also the construction of the buildings demonstrates the careful design of a master plan to accommodate a large-scale operation. All of these factors lead to the other conclusion that these complexes at Kouklia-Stavros, Kolossi and Episkopi were technologically advanced, refuting previously held opinions that the Islamic Near East was not able to compete with the West. All phases of both the construction and the ceramics permit a more in-depth analysis of the actual process of sugar refinement. Further investigation and more systematic excavation of refinery complexes in the Near East may provide answers to a host of questions. These questions concern not only social structure and environmental issues, but also the perplexing question of how the process transferred from the mainland of the Near East to the Crusader states and then onward into the western Mediterranean

and the West Indies.[25] The answer to this last question would perhaps reveal much about the technology of methods of production and innovations as well.

The Jordan Valley, Geography, Geology and Climate

The Jordan River Valley extends the entire length of Jordan from the Yarmuk River in the North to the Gulf of Aqaba in the South. The length of the valley from Lake Tiberias to the Dead Sea is some 105 kilometers and the width of the valley floor varies from six to twenty kilometers. The valley is below sea level from Lake Tiberias (-212.0m.) to the Dead Sea (-392.00m).[26] The Jordan Rift Valley extends from Biqa' in Lebanon to the Dead Sea and then on to the Red Sea and central Africa. There are several hypotheses about the formation of the valley rift from tectonic activity, either vertical or horizontal. The valley floor formed from the deposit of sediments from fresh water lakes and wadis in the Pleistocene period. Jum'a Mahmoud H. Kareen in his dissertation, *The Settlement Patterns in the Jordan Valley in the Mid- to Late Islamic Period*, states that the difference in rainfall and soil salinity between the northern part of the valley and the southern part and their relative geographical location between urban centers accounts for the high number of both rural and urban settlements in the northern Jordan Valley.[27]

The climate in the northern and central Jordan Valley is that of a steppe climate according to Numan Shehadeh in his article, "The Climate of Jordan in the Past and Present."[28] In the southern part of the valley, the steppe climate is found only in a narrow strip along the western slopes of the eastern mountains. The range of rainfall amounts in this region is from 280 mm. to 350 mm. Average annual temperatures in this region vary from 22° C to 23.6° C. The highs in the summer range from 30°+C to 37° C maximum.[29]

During the Islamic era, climatic fluctuations were numerous, but did not last long enough to produce any permanent changes for the landscape. They did affect land use within certain shortened periods. The Umayyad period of approximately two centuries was rather moist and moderately humid. The two centuries that followed, from the tenth through the eleventh century were dry. The next two centuries, the twelfth and thirteenth, were again moist and humid. Shehadeh does not provide any statistical data for the fourteenth century in the Transjordan.[30]

The Jordan River flows through a narrow strip of land and close to its course along the Jordan Valley. This strip is no more than 1000m.wide and the area of the flood plain is called in Arabic, the *Zor*.[31] This area of the *Zor* is rich in vegetation, with a high water table and a high percentage of humus (6%) and cultivation, especially during the Mamluk period was excellent for growing a wide variety of crops.[32]

The main part of the Jordan Valley, the *Ghor* is divided from the *Zor* by a group of dissected hills, named *Katar*. Kareem states that the sections of the *Ghor* and the *Katar* were not planted until after the 1960s because of scant rainfall, except in those sections that were watered through wadis or springs. On the eastern side of the Jordan River Valley, the main tributaries are the Yarmuk and the Zarqa Rivers. The following wadis contain secondary tributaries from the north to the south: 'Arab, Ziqlab, Jirm, Yabis, Kufrenjeh, Shue'ib and Kufrin.[33]

The Jordan River Valley - Tall Abu Gourdan

Tall Abu Gourdan is located northeast of Tall deir 'Alla, west of where the Zerqa River flows into the Ghor area of the Jordan Valley from the east. This is the area of the

central Jordan Valley. It was excavated in 1967 under the auspices of the Department of Antiquities of Jordan and the Netherlands Organization for the Advancement of Pure Research. The tall contains the remains of a medieval Arabic potters village dating from the thirteenth through the fifteenth centuries and has produced a wealth of pottery from various medieval traditions. Large quantities of sugar pots, both whole and fragmented, were found in the excavation of Tall Abu Gourdan. In 1975, H.J. Franken and J. Kalsbeek published a study on this medieval potters village, which presented the "first systematic introduction to medieval Arabic pottery from the Jordan Valley."[34] The book also contributes to Palestinian archaeology and more importantly, provides an introduction into the methods of medieval pottery making.[35]

The significance for the field of archaeology is: 1) the study connects pottery descriptions such as color, texture, and shape to the more technical information that includes petrographic and chemical analyses, 2) the study examines some of the problems that develop when only a few ceramic variables are used for the basis of chronology of a period.[36] The information on the preparation and production of pottery for the field of ancient ceramics is extremely valuable. Additionally, the contributions made by J. Kalsbeek in his approach to the medieval potter's problems through modern methodology have assisted Syro-Palestinian archaeologists with the problems of interpretation in ceramic typology.[37]

In his drawings from the excavation, Franken identifies Type 2, the bell shaped jar in which the sugar juice congealed to make the sugar loaf. He believes that the Type 1 pot was the syrup pot that fit into the bell shaped pot for drainage of the sugar cane syrup.[38] He further speculates that the prosperity of medieval village culture in this region

was due to the large-scale cultivation of sugar cane, probably nearby. The fact that no sherds were found in the first period level of the Tall may suggest that the village was not actively engaged in sugar pot production during this period, but perhaps functioned as an administrative center.[39] The presence of sherds found in the other subsequent two levels may indicate that potters actually lived there and produced their wares during those two periods. Franken proposes that the potters who lived in this village may have actually brought their tradition with them, coming seasonally with their pottery wheels to the source of the need.

The biggest challenge at Tall Abu Gourdan is the mixing of the stratigraphic layers due to damage done by countless earthquakes in the region. There is also evidence of destruction by fire in some of the layers. The basic problem concerns the lack of any architecture or artifacts that can identify the nature of the occupation of the Tall.[40] To the surprise of the excavators, the courtyard layers contained the heaviest amount of pottery sherds, but none of these sherds was of sufficient quantity "to represent everything that was used per layer."[41] Franken and Kalsbeek have determined the size of the kiln needed to fire the sugar pots at Tall Abu Gourdan. The kiln was very large, roughly five meters in height and there was evidence of mass production of the wares in this period.[42] Alan Walmsley in his contribution to *The Archaeology of Jordan* suggests that a more satisfactory date for Period Two at Tall Abu Gourdan would be the thirteenth through the fifteenth centuries.[43] Walmsley provides revised dating for the excavations at Tall Abu Gourdan and the conclusions of Franken in light of more recent information on the medieval period from the excavations at Tabaqat Fahl (Pella) through coin dates. Walmsley describes the sugar pots found at Pella as "plain ware, wheel-made elongated

jars and straight-sided bowls in a soft, light yellow-brown to reddish –yellow ware and linked with the sugar industry."[44] This comparison directly corresponds to the pots found at Tall Abu Gourdan. The preponderance of sugar pots and the established connection to the pottery industry supports the survey conclusions that this area was, in fact, an area of intense sugar cane cultivation and sugar manufacture.

Tabaqat Fahl (modern Pella)

The site of Tabaqat Fahl (Pella) lies some seventy-five kilometers north of the Dead Sea and five kilometers east of the Jordan River. This is a plateau area of the Transjordan between the Wadi al-Hammeh on the north and the Wadi Jirm on the south. The excavations at Pella were a joint operation by the University of Sydney and the University of Wooster. The archaeological complexity of Pella continues to be uncovered as new areas of occupation open and new periods of settlement are encountered.[45] The primary interest to this thesis concerns the work done on the Islamic period and the connections already established to the sugar industry of the fourteenth century.

Alan Walmsley, one of the Directors of the Excavations at Pella from the University of Sydney, along with Dr. G. Bisheh, Director-General of the Department of Antiquities Jordan, excavated a mosque near the south edge of the main mound in Area XVII. The plan of this mosque was similar in style to Ayyubid-Mamluk models.[46] Stratified remains of a Mamluk/early Ottoman village were also discovered in the fourth and fifth seasons of excavation in Area XXIII Plot A. In association with this village, much ceramic evidence was scattered over the main mound including glazed and handmade wares dated to the Ayyubid/Mamluk period. In addition, between 1979 and

1982, a section of a Mamluk/early Ottoman cemetery was found in Area IV. The size of the village is approximately 110 by 80 meters.[47]

Although not much is known about the actual village because of the absence of architectural remains, most of the information regarding the Mamluk period comes from the partial excavation of the cemetery at the eastern end of the main mound.[48] Three coins dating to the reigns of al-Mansur (1361-1363 A.D.), al-Ashraf (1363-1376 A.D.), and al-Zahir (second reign, 1390-1399 A.D.) support the proposed date for the Mamluk village, but none of the coins came from a proven context.[49] Previous surveys and excavations of earlier dates in the 1930's and the 1950's recognized the appearance of Ayyubid/Mamluk pottery on the mound, but no ceramics were found in context until the fourth and fifth seasons at Pella. Eight ware types were identified that relate directly to the same types recognized by Robert H. Smith during his season of excavation at Pella in 1973. (See Figure 7) Type 1 of Smith's ware was the plain ware so characteristic of sugar pot ware. Again, this is the most common type of ware found in association with sugar refinement in and near the Jordan Valley. Walmsley references the work of a number of surveys that have noted the presence of this type of pottery and reliable water sources in the form of springs that were necessary to irrigate and run the mills for production.[50] Smith did not correctly date this ware and though it belonged to the Abbasid period, but of course, this was before the creation of a correct ceramic Mamluk typology. Walmsley believes that this ware should be attributed to the Ayyubid/Mamluk period.

Walmsley also concludes that the presence of the mosque, the ceramics and the cemetery all dated to the later Islamic period demonstrates continuous occupation of the village from the late thirteenth to early fourteenth century until the beginning of the

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typochronolgy of the decorated and non-decorated pottery from the Islamic periods."[55] The archaeologists also hoped to combine the results of the analysis at Tall Abu Sarbut with other sites in the area, especially the information from Tall Abu Gourdan. The assessment of the first season of excavation concluded that on the east side of the tall, the layers of occupation were too thin and too disturbed by robber pits, so the next season's efforts needed to be concentrated on the west side of the tall where the stratigraphic layers were thicker for the Ayyubid-Mamluk periods and were not disturbed.[56]

In the second and third season of excavation in 1989 and 1990, work at Tall Abu Sarbut concentrated on the western part of the tall.[57] The surface of the tall was sharded to expose the partial remains of a large Roman building dating to the late antique period. During the Ayyubid-Mamluk period, the rest of the outer layers of Fatimid-Abbasid occupation were cleared for the construction of an industrial complex built on top of the Roman building. The result of this leveling was the creation of a large flat working area for some kind of industry.[58] A thick ash layer was found on top of the flat surface leading to a small building with mud-brick walls, many of which had low stone foundations. The surface below this layer of ash had not been burnt and there was no evidence of any previous widespread fire associated with these ashes. The ashes appeared to have been dumped, but by what industry and why? At first, the conclusion was that this was the remains of a potter's workshop similar to the one at Tall Abu Gourdan.[59] However, this conclusion was not supported by the presence of wasters (the blemished and discarded remains of kiln fired pottery). However, "what was found were many sugar pot shards, from large conical and sack-like industrial jars" similar to the ones found at Tall Abu Gourdan.[60] The sugar industry does create a lot of ash in the refining process through the

boiling of the sugar cane juice to distill it into thick syrup. In light of these two factors, the large amounts of ash and the many sugar pot fragments scattered around this industrial area, the evidence points to the presence of sugar production at the site.[61] Nearby to Tall Abu Sarbut was the evidence of mills and a large millstone had been seen only two short kilometers away from the main tall in a wadi.[62] The conclusion by the archaeologists was that Tall Abu Sarbut was most probably a sugar production center that included a nearby mill and the main building for processing the pressed juice.

On top of the mud-brick building, a later, much larger building was constructed with heavy stone foundations nearly a meter in height. The building included a courtyard, surrounded by many rooms that were accessed through a large stone threshold. Within this building complex over 90% of the pottery sherds found were sugar pots.[63] (See Figure 7) Steiner concluded that this building was "either a storehouse for storing the refined sugar, or a sugar factory where the actual process of the cane and refining the syrup took place."[64] There were no remains of ashes within the building area. The writing on several ostraca (inscribed potsherds) in the debris on the floors of this building indicated that some kind of contracts or messages about goods and delivery dates were part of the function of this area. Dromedary bones were also present in this area, probably indicating the use of such animals for transport. Use of this building eventually ended and it appeared that the building was leveled for some other building project of a later date.[65] After these phases of occupation, a hard gray layer covers the tall and it appears later that the tall was re-established as a village, still connected to the sugar industry. Evidence of this new occupation was indicated by the prevalence of Mamluk period sugar pots over the site, but the site is now clearly defined as a village with courtyards, houses, storage

pits and household ware of the most common varieties including Hand Made Geometric Painted Wares (HMGP).[66]

For additional studies regarding the technology and methods of the manufacture of sugar pots, the works of H.E. LaGro and H. de Haas, who co-directed the excavations at Tall Abu Sarbut, are excellent.[67] Many of the important facts about the how these vessels were made and the tradition of pottery making that they come from can be helpful in understanding the significance of a site to the economy and trade of the Levant both before and after the Mamluk Sultanate. The quantities and the sizes of the sugar pots and the absence of wasters can all be factors in identifying a site as a factory or storage, and the presence of such buildings will determine whether or not the site was prosperous and to what degree and what type of sugar was dominant in the production. In turn, the location of such sites near a pilgrimage or caravan route will have a definite bearing on how the economy of a region was affected by its industry and agriculture.

The Archaeological Survey of the Hesban Region

The Andrews University Heshbon Expedition began a regional survey in 1973 as part of the wider scope of the excavations. The purpose of this survey was to "reach a better understanding of Tall Hesban in its wider geographical context."[68] The survey continued into the 1974 and 1976 seasons during the excavations at Tall Hesban and included the additions of two small projects: a trail excavation at Umm es-Sarab in 1974 and an intensive surface survey at Tall Jalul in 1976. The objectives of the survey were to: 1) locate all archaeological sites of ceramic cultures within a ten-kilometer radius of Tall Hesban, 2) establish the exact location of each site and place it on a map; 3)

describe, photograph, and to sketch if possible the visible archaeological features and significant characteristics; and 4) collect any artifacts for analysis by the experts of the expedition.[69] This information then might enable the archaeologists and anthropologists to construct a history of occupation within the Heshbon region and to examine settlement patterns.

The area of the survey was expanded from the original ten kilometers for 1973 to include boundaries from "the Jerusalem/Amman highway on the northwest (through Tall Iktanu and Naur); the Naur/Umm el-Amad road on the northeast; the Umm al-Amad road on the southeast; and on the southwest the Wadi Ayun Musa eastward to Qaryat el-Jureina and south along the Madaba road."[70] Exceptions to these boundaries on the west included three sites (95, 96, and 97) and on the southeast, Jalul. The survey was once again expanded in 1976 to include northeast beyond the Naur/Umm el-Amad road so that the northeast boundary was between Umm ed-Summaq and Khirbet es-Suq.[71] The number of sites surveyed was 148 and this number included all the historical periods. The survey team identified 52 sites yielding Ayyubid/Mamluk (1200-1456 A.D.) pottery. Of these sites, 18 were located in wadis, 33 were on the plateau and one site was in the Jordan River Valley. Ayyubid/Mamluk period pottery was dominant at eight of the sites, and six of those dominant sites were on the plateau. The survey team concluded that these factors were linked in some way, but the linkage remains undetermined.[72]

There were ten water-driven mills identified in the survey, located on the banks of the Wadi Hesban between two springs, Ain Hesban and Ain Sumia. Five of the mills were associated with sites within the survey area and five were not. Shunet Sukr was the only mill found in the Wadi Hesban to produce Ayyubid/Mamluk pottery. Often, the

word *sukkar* is found in a place name in those sites most closely connected to the sugar industry and usually is supported by the number of sugar pots generally found at such sites. In the as-Safi Valley, there are numerous hills and wadis, with the name 'sugar' in the title.[73] Ayyubid/Mamluk pottery was not found at any of the other mill sites in the Wadi Hesban other than at *Shunet Sukr.*[74]

Mills

There is not much difference in mill technology for the grinding of wheat or extracting the juice of sugar cane. It is often difficult for a mill to be distinguished as to type unless there is pottery present that can establish identification. The letters and travelogues written by visitors to the region in past centuries have helped in identifying the type of mill at a specific location. In many cases, the direct testimony of a traveler describes the kind of production seen at a particular mill. In performing one of the first surveys of Eastern Palestine in 1889, Conder noted that many types of mills were still functioning at that time. While some mills may have had medieval predecessors, the Ottoman authorities might have reconstructed others.[75] Two types of millstones were used in Jordan and Palestine: the upper rotating stone with either a flat or conical millstone called the horizontal wheel, or the 'edge runner' in which a vertically fixed round stone called the vertical wheel rolled on a pivot in a circle over the cane. Power for these mills came from either flowing water, or animal or human exertion.[76] "Vertical mills for lifting water are well known in *Bilad al-Sham*, but not vertical water wheels with gearing for producing power to run machinery."[77] The horizontal wheel mills are distinguished based on how the water flows through them. The first type of horizontal

wheel mill is called the "Greek"/"Norse" mill, which is run through a force of downward flowing water through a simple chute. The second type of mill wheel operates under flowing water, but pressure is created by sending the water down a constructed tower and out through a narrow nozzle. The pressure increases when a raised tower serves as part of the chute system and releases the water as a jet onto the wheel. This form of wheel mill is the "arubah penstock mill" and represents the most common type found in Jordan. Unless the wheel operates in a closed space, the apparatus is not considered a true turbine for energy. True turbine powered mills have not been found in Jordan.[78]

The use of the penstock mills is a more advanced technology and demonstrates the use of certain environmental factors in its design. Penstock mills were widespread on the east-west wadis running into the Jordan River and the 'Arabah depression as determined by a number of the different surveys.[79] Alison McQuitty notes that dating most of these mills to any particular period is difficult because of the extensive re-furbishment of mills in the eighteenth and nineteenth centuries and the possible re-use of medieval mills. The evidence from the fourteenth century for sugar mills suggests that horizontal wheels powered them, but many questions regarding the history of mills in Jordan remain unanswered.[80]

The East Jordan Valley Survey, Part I

In February 1975, Mo'awiyah Ibrahim from the Department of Antiquities in Jordan, KhairYassine from Jordan University and James Sauer from the American Center of Oriental Research in Jordan conducted a joint survey. The goals of the survey were to "visit, describe, photograph, locate on maps and collect artifacts from as many

archaeological sites as possible in the east Jordan Valley, from the Yarmouk River in the north to the Dead Sea in south, and from the Jordan River on the west to the rise of foothills on the east."[81] These goals also incorporated the interpretative focus of the survey to determine past occupational history and settlement patterns in the east Jordan Valley and to compare these observations and conclusions to the present valley residents for economic purposes. Also, this survey would permit the cooperating institutions to determine which sites might be suitable for future excavation and those that needed immediate protection or salvage operations.

The 1975 survey covered only the north half of the valley from the Yarmuk River to the Wadi Rajib. The number of sites examined totaled 106, with 54 already identified from previous archaeological surveys and an additional 52 new sites.[82] The Ayyubid/Mamluk period was the dominant period in the Valley with more than half of the sites yielding representative pottery. Out of the total 106 sites visited, 58 were of the Ayyubid/Mamluk period. These sites comprised many older settlements that had been re-occupied and a number of new first time settlements. Eleven of the new sites surveyed were Ayyubid/Mamluk. Several of the sites also were occupied during the Fatimid/Abbasid periods and then appeared to have been abandoned after the Mamluk period or still others continued to be occupied through the subsequent Ottoman period. Seven of the sites were important for the sugar industry in Jordan and were marked with large barrel vaulted water driven mills with millstones *in situ* and surrounded by large quantities of sugar pots.[83] There were also sites with heavy concentrations of sugar pots without the presence of mills, two in particular. Most of the sites south of the Dead Sea near es-Safi, such as Tall es-Sukkar and Tawahin es-Sukkar, had sugar mill installations.

One of the most significant sites was Dhra el-Khan, which had a well-preserved outline of a large square structure that was probably a caravanserai.[84]

The survey team concluded that the Ayyubid/Mamluk period produced large agricultural villages in the Jordan Valley, most of which were engaged in some aspect of the sugar industry, either in cultivation, production or distribution. Eight of the sites recommended for excavation were Ayyubid/Mamluk sites and a large number of the sites that needed immediate attention were Ayyubid/Mamluk sites. The team also recommended that since sugar production was so dominant in the Ayyubid/Mamluk and was also so profitable during that period, that the present day farmers in the Jordan Valley should "diversify and begin to produce sugar."[85]

The East Jordan Valley Survey, 1976 (Part Two)

The second season for the survey took place in the months of February and March of 1976, covering the southernmost half of the Jordan Valley between Wadi Rajib and the Dead Sea. The survey identified some 118 additional sites, which made the total for both seasons 224 sites surveyed. The same survey team returned for the 1976 season, sponsored by the three same representative institutions. The same field goals for the survey continued into the 1976 season of operation.[86]

The Ayyubid/Mamluk period once again dominated the field, producing the largest number of about 49 sites total. The transformation of the Jordan Valley during this period produced the greatest change from any of the previous periods. The distribution of the new settlements and the older settlements was restricted to the floor of the Jordan Valley and in the Zor (wadi) where the water is also quite plentiful.[87] The second survey

found approximately the same kinds of identification markers for the sites, including sugar mill installations, masses of broken sugar pots, water mills and the related architecture. The conclusion of the team was that the sugar industry was well represented throughout the entire length of the valley. During the Ayyubid/Mamluk period, the industry flourished, stimulating population growth and increasing agricultural production as well. At the time of the survey some thirty years ago, the distinction between the Ayyubid and Mamluk period had not been fully determined based on the ceramic evidence and typology. It was difficult then for the survey team to accurately access the percentage of strictly Mamluk sites by pottery alone. The question of Mamluk versus Ayyubid pottery differentiation is a topic that is producing a lot of research. Many archaeologists have tried to formulate a ceramic typology and chronology for the two periods and have made progress, but the study is still not complete.

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Chapter Four

Economic Theory

The Mamluk Sultanate represents an important period both politically and economically for the Transjordan. The military activities of the Mamluks translated into economic policies and actions that affected the life of the sugar industry initially in a positive manner, but then took a negative turn. The theories of Fernand Braudel have helped scholars place this period into the full spectrum of historical study, while the efforts of S.D. Goitein, Hassanein Rabie and Eliyahu Ashtor have shed valuable light on the economic practices of the period and their impact on commercial activity in general and the sugar trade in specific. All of these historians have made significant contributions to the understanding of the complex factors behind the decline of the Mamluk Sultanate.

Braudel's Economic Theory

The influence of Fernand Braudel and the school of *Annalistes* has profoundly affected the study of the relationship of history and material culture. By examining the entirety of an age, not just certain periods, other processes aside from just the political engines of the society are evident. All groups of the society became important, and not just the events provoked by a chosen few. Quantitative trends instead of chronology, long-term patterns in the place of short-term events become the real actors on the world stage. *Annalist* historians study the broader scope of history and include in that study the everyday life of the people who lived in the societies of the past.[1] Their historical

commentary synthesizes disciplines such as geography and other social sciences to reconstruct the past from a wide variety of data and material.

Braudel believes that "every economy, society and civilization is a world unto itself, divided internally and shared unequally amongst its members. Each of these individual mechanisms must therefore be taken to pieces and put together again to bring out the resemblances, similarities recurring features and hierarchies among their components."[2] He further distinguishes between *material life*, "consisting of very old routines, inheritances and successes," and *economic life*, which he uses "to imply a higher and more privileged level of daily life, with a wider radius and involving constant care and calculation."[3] Material life consists of those cultural legacies we inherit from long ago such as money or the distinction between country and town. It is elementary, comprised of slow yet constant movement marked by imperceptible change. It is not without its surprises and innovative occurrences, however, which can sometimes be of great significance. Economic life involves trade, markets, and transportation between participants of a widely varying nature. In many cases, it becomes a system unto itself.[4]

Braudel observes that short-term events occurred against a backdrop of persistent process and that there was a unity to this relationship over time. In Braudel's structural history, physical or material factors operate over time (*la longue durée*), which can limit or enhance the behavior of mankind. The next level of Braudel's theory involves conjunctural history or "mediohistory" in which time periods are broken down into five, ten, or fifty years increments through which various social and economic activities can be measured according to their fluctuation around a norm unique to the period.[5] This "conjoncture" was relevant to the economic changes that occurred through time and using

Braudel's theory quantitative, quasi-statistical data resulted from such an approach. The final segment of Braudel's theory is the *l'histoire événementielle* or "microhistory" representing events (political) in the historical process that are meaningless when applied against the sweep of process and pattern. Later third generation *Annalists* such Le Roy Ladurie would add that these smallest events were pattern breakers at the intersections of history and were critical in understanding and explaining change.[6]

The historical period comprising the early Mamluk Sultanate, from 1260 A.D. to the death of al-Nasir-Muhammad in 1341 A.D., represents a series of conjunctures that meet Braudel's criteria for study under this model. If we accept the terminology of Ladurie, we might further accept such key dates as 1260 A.D. (Baybars' ascension to power) and the cadastral surveys conducted in 1298 A.D. during the reign of Sultan Lajin (1296-1299 A.D.) and the third reign of Sultan al-Nasir-Muhammad (1310-1341 A.D.). These periods are well documented both from the archives in Cairo and now, more importantly, from the provinces in Syria through *waqfiyya* documents.[7]

Braudel's intent was to provide "a model" for interpreting historical data, not a general theory.[8] While Braudel developed his original model for the study of European economic history, he provides a framework that helps scholars effectively examine pre-technological, pre-market economies and societies. By offering scholars a platform for analyzing the role of both cyclical trends as well as specific, discrete events in history and their intersections, he introduced a "total" approach to the study of history and the belief that culture and society possessed an inner inter-connectedness worthy of examination.[9] The most productive part of Braudel's theory is that it lends itself readily to change and is

adaptable to the shifts of historical study and research. As the trends of society fluctuate and shift, so the Annalist tradition responds to these changes and grows with them.[10]

Goitein's Economic Foundations for the Mediterranean Society

S.D. Goitein's Cairo Geniza studies provide an insightful depiction and social commentary on the economic foundations for Mediterranean society during the twelfth and thirteenth centuries. The meaning of Geniza in medieval Hebrew was "the repository of discarded writings."[11] These writings, bearing the name of God, could not be destroyed and were stored away in a special place before being buried in a cemetery. Goitein's Geniza documents were discovered in a lumber-room attached to the synagogue in Fustat (old Cairo). Fustat was the capital of Egypt before the founding of Cairo by the Fatimid dynasty (969-1171 A.D.). The documents represent a vast array of archival records from the daily business of the Jewish community in Fustat and include court records, letters, legal instruments and all sorts of public and private correspondence. Goitein's study coalesces the diverse fragments of information found in the documents into a mosaic that allows scholars to interpolate a sense of the social and economic fabric of the Mediterranean society of the time. Even though the Jewish mercantile society in Fustat preserved the documents, these archives help scholars evaluate Mediterranean commerce as a whole because no ghetto restrictions applied to the relationship of Muslims, Jews or Christians during the classical period of the Cairo Geniza (965-1265 A.D.).[12] The documents represent every conceivable written venue, including general correspondence, court records, and other types of juridical papers.[13] However, the Geniza documents are limited in their scope because of the changes in the Jewish community in the area during

the twelfth century. By this time, most of the middle-class Jews involved in trade and commerce lived in both Fustat and Cairo. However, towards the end of the century, these affluent merchant Jews moved to Cairo, abandoning their homes in Fustat and the opportunity to discard their records in the old synagogue. Moreover, only the more traditional Jewish traders followed the precepts of Hebrew law that required preservation of documents considered holy. The result was an uneven distribution through the century of the materials discarded in the old synagogue in Fustat.[14]

The other relevant fact about the nature of the Geniza documents is that they reflect the changing times of trade throughout the Mediterranean. The Italian city-states were assuming more power internationally while the Arabic speaking Jews were turning inwards to deal only with Egyptian trade and commerce with the countries of the Indian Ocean.[15] Goitein's analysis of the Geniza documents focus on the *social* relationships of business and finance in the medieval world. As he states, "the intricate and captivating problems of economic and juridical history posed by the Geniza papers must be left to experts specializing in these fields."[16]

Many industries figure prominently in the Geniza documents and there is much information regarding certain types of agricultural products available from Egypt in the twelfth and thirteenth centuries. Sugar product receives the lion's share of attention in this respect. The Geniza descriptions provide evidence that sugar production in Old Cairo was a great industry during the twelfth century and that the Jews participation in the sugar trade was extensive.[17] The Arabic word *sukkari* that means "a maker or seller of sugar," was a common name for anyone engaged in this occupation from the eleventh through the thirteenth century. There are many types of references made to the diverse

aspects of sugar production, from location of the factories to the analysis of sugar profits. Sugar factories represented some of the largest investments for the financial community of the medieval Middle East, and the owners of these factories were some of the wealthiest in the community. Another Arabic name that regularly appears is *qandiyya*, which refers to the separate group of sugar candy producers. The Geniza pages reveal the prices of sugar and even why the price was low or high at a particular time.[18] In one particular case, a merchant lists his assets after completing a journey and includes income from a partnership in a sugar mill. Another merchant on his deathbed arranges for payment of a large debt from the proceeds of the sale of sugar production stored with a particular proprietor.[19]

Numerous letters throughout the Geniza testify to the large amounts of sugar ordered by different merchants. Toll or customs houses operated under the name of the commodity handled within the facility. These tollhouses served as places to transact business with official money assayers stationed inside these bourses. In addition, customs houses functioned as storage and distribution centers for the particular commodities as well as dealing with legal matters regarding the ownership of the products.[20] Some of the letters also testify to the existence of semipublic houses belonging to the representatives of the merchants, while others discuss the various caravanserais (an inn on a trade or pilgrimage stop), which also served as storehouses or bourses for use in daily commercial activities.

Aside from merchant activities, the Geniza documents reveal that factories in a more modern sense of the word did not really exist in medieval Egypt. Instead, single craftsmen or families of craftsmen in a small workshop were largely responsible for

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Sugar *maṭbakh's*, "places of cooking" or factories, were major features of the landscape around Cairo. Details from the Geniza documents demonstrate that these sites were valuable assets and employed a great numbers of workers.[21] Partnership in these factories generally meant that the owners were actively engaged in running the business and did not hire managers to operate the factory for them.[22] Sugar factory ownership continued to be highly fashionable business even into the thirteenth century when it appears that a large number of physicians favored the sugar business.[23]

Goitein cites a number of documents attesting to methods and regulations of the sugar business from the Geniza documents. They are included in the appendices at the back of Volume I, Economic Foundations. The Geniza documents provide a clearer picture of business practices before the advent of mamluk administration in the late thirteenth century as well as the period shortly afterwards. Additionally, they provide an overview of the details of trade and commerce in the medieval Mediterranean region as well as a platform for examining the development of the sugar industry in the fourteenth and fifteenth centuries.

Eliyahu Ashtor and the Levantine Sugar Industry

The economic foundation of the Mamluk Sultanate is a subject of great debate among a number of modern historians. Many see a direct connection to the later decline of the Sultanate during the Circassian period. One of the first historians to address the

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financial complexities of the early Mamluk Sultanate is Professor Eliyahu Ashtor his pioneering studies of the 1950's. According to Ashtor, the early mamluk sulta inherited the old economic and political superiority of the Ayyubids, the dynasty rule they usurped in 1260 A.D. Initially, the mamluks maintained the old system passing on their holdings in land and ownership to their heirs. However, a politica economic watershed occurred in the third reign of al-Nasir Muhammad in 1310 A after the sultan ordered a new cadastral survey, the *al-Nasiri Rawk*. The changes instituted by al-Nasir Muhammad produced a new method of rewarding mamluks their loyalty and service on behalf of the sultan.[24] This new system is at the heart of the discussion on the decline of the Sultanate and is the subject of the last chap this thesis.

Ashtor provides many reasons for the economic success of the *Bahri* Mam period (1260-1389 A.D.). He states that one of the first consequences of the new strength established in the Bahri period was demographic growth in the regions o and Syria.[25] Due in part to the long period of peace in Egypt that the mamluk reg introduced, it was a slower process in Syria because of numerous invasions by th Mongols that annihilated much of the population. However, the stability of gover insured almost one hundred years of peace for both areas once the mamluks deali the Mongol attacks along the Syrian borders. In addition, some of the increase in population in both Syria and Egypt came from the large-scale immigration of Ira peoples and Muslim adherents as they fled from the advancing infidel Mongols. this increase had begun by the last half of the thirteenth century. Another source increased population was the absence of the plague for the first half of the fourte

century and only two outbreaks in Syria and Egypt in the later half of the thirteenth century.[26]

The strength of the monetary system during the Bahri period accounted for a long period of some one hundred and thirty years in which the currency was stable and prices and commerce did not fluctuate. Close ties with regions such as Mali that supplied gold to the Sultanate remained excellent and the silver supply, although somewhat strained in the later half of the thirteenth century, still was sufficient to support Egypt and Syria. Ashtor evidences all of these factors by a close examination of the average weight of dirhams, the grain prices in Egypt, and the price of bread in Cairo.[27]

This long sustained prosperity was also the result of the trade with Southern Europe. Trade played a fundamental role in supporting the mamluk regime and enabled the elite members of the government to get rich through the exports of goods produced in the Sultanate. Trade also worked in reverse and provided great financial gains for the Christian traders who did business in the Near East. Although trade declined after the fall of Acre in 1291 A.D. and the Crusaders retreated from their positions on the coastal mainland, commerce continued between the east and the west. Pope Nicholas IV had declared that no Christian nation could continue to have any trade relations with the mamluk regime in order to cut off their arms supply, weaken their economy and shut down the slave trade with the Golden Horde so the mamluks could not be refortified. This order of prohibition lasted through many papal successions (1291-1344 A.D.) and forced the Italian city-states to issue orders barring any kind of commerce with the lands of the sultan into the early part of the fourteenth century.[28] The ports of Egypt and Syria were cut off to Western Europe, but the demand for spices from India now so popular and in

great demand eventually forced the Pope to permit trade with the Near East, but still banned the sale of war materials.[29]

It is from this period of the late thirteenth to the early fourteenth that the rise of intermediary trade alternatives developed in Cyprus and Little Armenia. The region around the Black Sea witnessed an increased rise in trade as access to the overland caravan routes from Asia by the Italian merchant states improved. Trade with the mamluks by the southern European nations did not really stop, but only diminished slightly. In fact, Ashtor comments that the papal decree prohibiting trade was not well enforced. Many of the houses of commerce in the ports of Alexandria were still open and consuls were present even in the early part of the fourteenth century.[30] By 1345, direct trade had resumed and again the cities of Venice, Genoa, and Pisa conducted great volumes of business with the ports of Egypt and to a lesser extent, Syria.[31] Following the destruction of the coastal trading cities in Syria by the early mamluk sultans and the papal decrees forbidding commerce, the trade of Syria fell off significantly. By the mid-fourteenth century, however, the centers of Acre, Tripoli, and Beirut regained their former level of activity and began supplying major quantities of cotton, spices and textiles to the West.

The other group, the Karimi merchants, gained great wealth in the early Mamluk Sultanate. They were the merchants, rich wholesalers of the spices transported from Yemen, Egypt and Syria. In addition to monopolizing the spice business and discouraging competitors, they also functioned as bankers for the Sultanate, holding powerful sway over the finances of the sultans. Despite their wealth, however, their hold was not secure. A royal decree from the ruling sultan could easily end the commercial

favor they enjoyed. The Karimi merchants were a short-lived group who did not survive the final decades of the Circassian Mamluk Sultanate.[32]

Ashtor also provides much detail about the development of the Levantine sugar industry from 1250 to 1400 A.D. He references many sources that testify to the existence of the sugar industry in the region of Syria and Palestine that produced sufficient sugar for export, although not as much as during the Crusader period. He mentions the statements of al-Qalqashandi in speaking about the "*aghwār*", the deep valleys of the districts along the Jordan River and their use as sugar cane plantations. Ashtor notes that these were the areas of the mamluk sultans' big estates. Western pilgrims note the existence of sugar plantations in Jericho and around the Dead Sea. The famous Italian merchant Pegolotti refers to the sugar of "Kerak" and other travelers' accounts mention the many water mills throughout the region. Ashtor concludes that in the second half of the thirteenth century and throughout the fourteenth century, sugar production was still a rather substantial industry and produced good income for the mamluk regime.[33] Ashtor also points out that the area of Upper Egypt received similar comparisons. He also says that many travelers saw the sugar factories. Their testimony corroborated the writings of various Arabic authors who noted that the sugar factories owned by the sultan were in Upper Egypt.[34]

Sugar consumption at this time offers further support regarding the location of sugar cultivation and production in Egypt and Syria during the early Sultanate. Ashtor cites many primary sources describing the great public banquets given by the sultans in the thirteenth and fourteenth centuries at which the guests consumed great quantities of sugar. Sugar was a sweet treat to the Arabic palate and was in demand by all levels of

society.[35] Walker provides a detailed description of these lavish banquets in her study of the period.[36]

While the West imported significant amounts of sugar in this period, the east also continued to consume the commodity. Even with the papal prohibition, western merchants used ports in North Africa and Little Armenia to send sugar into Western Europe. Pegolotti, the Italian merchant, describes in detail the most important types of Levantine sugar using terms that correspond to the varieties mentioned in al-Qalqashandi. Ashtor lists the prices for Levantine sugar and its production in the factories. He also provides information on shipping, points of origin, loads carried in the galleys and cogs of the Italian merchants throughout the fourteenth century. The source for most of his information comes from the Datini archives of Venice.[37] His use of the latter limits his ability to assess the worth of all of these shipments because the Datini lists are incomplete. In addition, other shipments overland were taking place at the same time as the sea trade was continuing, which is important considering the entirety of the balance of payments of Egypt and Syria.[38] The examination and analysis of Ashtor and other leading Islamic historian's theories concerning the decline of the Mamluk Sultanate is the subject of the next chapter.

The *Iqtā'* System

The financial system of the Mamluk Sultanate derived from an amalgamation of previous regime's complex land allocation and taxation structure. This system based on the assignment of tax revenue from cultivated land to soldiers as payment for military duties takes the form of "*iqtā'*." This system of payment evolved over the centuries from

the time of the Abbasid caliphate in the mid-eighth century to the twelfth century Seljuk Turk dynasty of Nur-al Din (c.1146-74 A.D.), who unified most of Syria and Egypt and ended the old caliphal institutions of rule.

Salah-al-Din imposed the system on Fatimid Egypt after his conquest of the country in 1171 A.D. Hassanein Rabie observes that an indigenous system of *iqtā'* already existed that was different from the Turkish model and included many variations. He further believes that not enough information is available about the old Fatimid system and further research needs to take place in order to understand its function.[39] Even the Turkish model differed somewhat from the earlier form of *iqtā'* in the Abbasid caliphate. The original intention of granting an *iqtā'* was the right to collect taxes and to keep them in lieu of salary. The *iqtā'* system helped decentralize the collection and disbursement of revenues due to the state. Granted only in return for military service, an *iqtā'* was not hereditary. A ruler could alter the size of the *iqtā'*, revoke it, or give it to another soldier. The holder of the *iqtā'* did not own it personally and could not sell it, give it away or lease it. The holder did not have any political, personal or judicial power over the people who farmed the *iqtā'*. The size of the *iqtā'* reflected the rank, level of administrative duties, or relationship that the holder had with the ruler. The holder could not confer his *iqtā'* on any other subordinates. However, the granting of the *iqtā'* required holders to pay those in ranks beneath them.[40]

Salah-al-Din did not adhere strictly to the old Zankid system that did use a hereditary form of *iqtā'* to coerce soldiers to be loyal and to fight when necessary. However, Salah-al-Din did not opt to use the accustomed allotment of *iqtā'* for his

soldiers and administrators. Instead, *iqtā'* under the new Ayyubid dynasty of Salah-al Din became non-hereditary and carried no real authority for those granted the concession.[41]

Therefore, the system when the Mamluks came to power was an Ayyubid model. Even this model changed with the great influx of Mongol refugees and exiles in the thirteenth century just as the Mamluks were beginning their long period of supremacy. The Mongols did not come from a slave type of institution as the Mamluks and were a free group of soldiers. Their prowess on the battlefield was great, so they were absorbed into the mamluk *iqtā'* system as free men, and gradually some of their tribal institutions such as the Mongol Code became part of the new state system.[42] Other changes occurred as each mamluk sultan re-organized and altered the system to fit his political control over his constituents. The *rawks* ordered during the reigns of Mamluk Sultans Lajin (1296-98 A.D.) and al-Nasir Muhammad (third reign, 1310-1341 A.D.) re-apportioned the Egyptian cultivated land, concentrating power in the hands of the Sultan and taking it from the *amirs* and the sons of the mamluks.[43]

In the Mamluk Sultanate, the *iqta`at* from Egypt and Syria combined to form a massive, centralized bureaucratic tax collection system that assured control of the state to the sultan. Rabie concludes that, "the impact of the Egyptian *iqtā'* system on army structure, taxation, expenditure, and financial administration was considerable."[44] There is a direct correlation between the intense mamluk investment in Syria in the fourteenth century and the uneven administrative patterns that developed there, especially during the third reign of al-Nasir Muhammad.[45] The decline of the Sultanate in the fifteenth century is the focus of such conclusions.

Sedentarization and Nomadization

Tall Hisban provides a good example of the use of the food systems model developed by Øystein LaBianca, director of the excavations at Tall Hisban in 1996, 1998, and 2001. He proposes that from antiquity the region of the Middle East went through cycles of food system intensification and abatement. The period of food system intensification is characterized by a more sedentary lifestyle when a group of people settles down in a particular area and conducts farming on any type of scale. The period of abatement begins when the group adopts a more nomadic lifestyle and begins to migrate, usually accompanied by flocks of sheep, goats and camels, the necessary animals to help the group sustain life.[46] LaBianca believes that the Middle East should be treated as a single unit of analysis for several reasons: 1) the region is considered the historical cradle of life; 2) for at least four thousand years, the peoples of the region have been a politically and economically cohesive unit within the framework of the power structures that rose and fell; 3) the region produced the three great monotheistic religious faiths of Judaism, Christianity and Islam; and 4) the region is the site of the Islamic Empires. A number of geographical and climatological features including summer droughts, extremes of temperature, periodic water shortages and the proximity of both desert and farmland heavily influenced the development of the region.[47]

The unique relationship between available land and water gave rise to irrigation agriculture, dry farming, and pastoralism in the Middle East. This complex connection determines where and how food procurement will take place. In the case of the Transjordan, both forms of farming occurred. Sugar cane tended to be the primary

produced in irrigated areas, while cereals were grown through the practice of dry farming.

Another primary concept in LaBianca's theory is that of "transhumance." Transhumance involves the seasonal movement of peoples and animals from pastures located in the lowland pastures to those pastures in the highlands. LaBianca observes that seasonal migration is an ancient activity that characterizes much of the mountainous areas of the Middle East. Typically, these animal herds were composed of sheep, goats and in some cases, cattle. Transhumants migrate to lower elevations in the winter months, during which they occupy dwellings that are more permanent. Here they carry on minimal cultivation of wheat and barley. In the summer months, tents provide the main place of residence as the group becomes fully nomadic, then again in the winter the group returns to their original place of settlement. The region of the Transjordan is an excellent location for transhumant activities.[48]

Horizontal nomadism involves long periods of travel over great distances as the groups are in constant search for water and food for their herds and flocks. There is no seasonal variation to this type of pastoralism and the primary regions of habitation are deserts areas. The nomads depend on the single-humped camel or dromedary for travel in the deserts, as these beasts of burden are well suited to traverse long, dry distances without water.

LaBianca sees three periods of intensification and abatement in the history of the area: fifteenth – fifth centuries B.C.E.; the fourth century B.C.E.- the seventh century A.D.; and the eighth –nineteenth centuries A.D.[49] The early Mamluk Sultanate provided the region a period of relatively protracted political stability which fostered the period of

intensification that spurred increased agricultural activity, most noticeably sugar production. He sees the growth of the town of Hisban and the revival of trade along the trade route from the Red Sea to Damascus as further evidence of this marked increase in food system intensity.[50] He further supports his conclusion of increased trade in the central Transjordan, specifically at Hisban, during the Ayyubid period by the findings of the Hesban Survey that none of the sites in the region around Hisban were new settlements; instead, they were older, already-established sites that experienced increased growth.[51]

LaBianca attributes much of the credit for this spurt in commercial and agricultural prosperity to the unification of the local tribes against a common enemy (the Crusaders) under the leadership of Salah-al-Din. This unification, together with "the earlier gains of the Arab agricultural revolution," allowed inhabitants of the area to capitalize on the expanding markets.[52]

The cyclical nature of sedentarization and nomadization relate closely to Braudel's concept of *la longe durée*. Both focus on events occurring over the longer swings of time as opposed to the more rapid pace of political, economic and military activity. Another similarity between the two lies in their focus on the response of people to the geographical setting in which they live. LaBianca believes how people meet the need for food is one of the most important demonstrations of these responses.

Endnotes

[1] A. Bernard Knapp, *Archaeology, Annales, and Ethnohistory* (Cambridge: Cambridge University Press, 1992), 5.

[2] Fernand Braudel, *Capitalism and Material Life 1400-1800*, translated by Miriam Kochan (London: Harper and Row, 1973), xii.

[3] Ibid.

[4] Ibid., xiii.

[5] Knapp, *Archaeology, Annales, and Ethnohistory*, 6.

[6] Ibid.

[7] See the work of Bethany J. Walker regarding the importance of *waqfiyya* documents in current research of the Mamluk Sultanate.

[8] Braudel, *Capitalism*, xi.

[9] Ibid.,9.

[10] Ibid., 16.

[11] S.D. Goitein, "A Mediterranean Society, The Jewish Communities of the Arab World as Portrayed in the Documents of the Cairo Geniza," Volume. I, Economic Foundations (Berkeley, CA.: University of California Press, 1967), 1-2.

[12] Ibid., 71.

[13] S.D. Goitein, " Mediterranean Trade in the Eleventh Century: Some Facts and Problems," Studies in the Economic History of the Middle East, ed. M.A. Cook (London: Oxford University Press, 1970), 52.

[14] Goitein, "A Mediterranean Society, Volume I," 148.

[15] Ibid.,148-149.

[16] Ibid., 149.

[17] Ibid., 126.

[18] Ibid., 220.

[19] Ibid., 263.

[20] Ibid.,195.

[21] Ibid., 81.

[22] Ibid., 89.

[23] Ibid., 252.

[24] Eliyahu Ashtor, *A Social and Economic History of the Near East in the Middle Ages* (Berkeley: University of California Press, 1976), 285.

[25] Ibid., 288.

[26] Ibid., 289-291.

[27] Ibid., 293-297. (See charts on those pages)

[28] For background regarding the papal embargo, see Bethany J. Walker's unpublished dissertation "The Ceramic Correlates of Decline in the Mamluk Sultanate: An Analysis of Late Medieval Sgraffito Wares" (Toronto: University of Toronto, 1998), 135-136.

[29] Ibid., 298.

[30] Eliyahu Ashtor, "Observations on Venetian Trade in the Levant in the XIVth Century," *East-West Trade in the Medieval Mediterranean*, ed. Benjamin Z. Kedar (London: Variorum Reprints, 1986), 534-535.

[31] Ashtor, *A Social and Economic History*, 300.

[32] Ibid., 301.

[33] Eliyahu Ashtor, "Levantine Sugar Industry in the Later Middle Ages-An Example of Technological Decline," *Technology, Industry and Trade The Levant versus Europe, 1250-1500*, ed. B.Z. Kedar (Brookfield, VT: Variorum Reprints, 1992), 228-229.

[34] Ibid., 231.

[35] Ibid., 232.

[36] For detailed descriptions of these banquets and English translations thereof, see Bethany J. Walker's unpublished dissertation "The Ceramic Correlates of Decline in the Mamluk Sultanate: An Analysis of Late Medieval Sgraffito Wares" (Toronto: University of Toronto, 1998).

[37] Ibid., 234-235.

[38] Ibid., 236.

[39] Hassanein Rabie, *The Financial System of Egypt A.H. 564-741/A.D. 1169-1341* (London: Oxford University Press, 1972), 26.

[40] Ira M. Lapidus, *A History of Islamic Societies* (Cambridge: Cambridge University Press, 1988), 148-152.

[41] Rabie, *Egypt*, 30.

[42] Ibid., 31.

[43] Ibid., 45.

[44] Ibid., 72.

[45] Bethany J. Walker, "Mamluk Investment in Southern Bilad Al-Sham in the Eight/Fourteenth Century: The Case of Hisban," *Journal of Near Eastern Studies* 62 (October, 2003): 4, 248.

[46] Oystein *LaBianca, Sedentarization and Nomadization – Hesban 1* (Berrien Springs, MI.: Institute of Archaeology and Andrews University Press, 1990), 33.

[47] Ibid., 34-33.

[48] Ibid., 36.

[49] Ibid., 133.

[50] Ibid., 209.

[51] Ibid., 218.

[52] Ibid., 241.

Chapter Five

Decline of Mamluk Sultanate

The decline of the Mamluk Sultanate in the fifteenth century is the result of a number of factors. The traditional scholarship focuses on the corruption of the mamluk administration and the financial policies that led to the gradual collapse of industry, particularly the sugar industry, through the fourteenth century.[1] In the later fourteenth century a number of devastating phenomena, including the Black Death, earthquakes, and drought, destroyed a majority of the population in the region of Egypt and Syria and reduced agriculture to a vague shadow of what it had been.[2] In addition, other scholars cite the devaluation of the mamluk currency from silver to copper coinage from the *Burji* Mamluk period (1382-1517 A.D.) onward as a primary cause. The mamluks have been accused of failing to respond to advances in technology and of being a too conservative regime, one interested only in reaping the financial rewards of the economies they controlled and ignoring the need to nurture and develop the region to its full potential while preserving the land and its resources.

The accounts of contemporary Arab historians testify to many of these actual events, but they provide only the recitation of facts, not the reasons for how and why did all of this happened. All of these factors combine to produce a state and an economy in crisis. However, these problems did not just rise up at the beginning of the fifteenth century and bring down the Sultanate. Many of the difficulties originated long before the *Burji* sultans assumed power. In order to understand fully the decline of the mamluks, the

seeds of disaster must be traced back through the fourteenth century to their sources, and the important work of several key scholars must be examined.

The investigation concerning the failure of industry needs to begin by again looking at the research of Eliyahu Ashtor. Ashtor uses the decline of the Levantine sugar industry in the latter Middle Ages as a prime example of the mechanisms of failure at work within the Sultanate. He states that the end of sugar exportation from the Levant to Southern Europe in the fifteenth century actually began with the closing of many sugar factories in Egypt at the beginning of the fourteenth century.[3] Ashtor blames this reduction on the ascendancy of the big trusts owned by the sultans and the most influential amirs over the smaller private enterprises. By the mid-fourteenth century, ownership of these factories fell into the hands of mamluk "sugar barons" who were for the most part directors of the sultan's financial administration.[4] These factories were not only located in Egypt, but in Syria as well, specifically in the Jordan Valley itself, an area already established as an extremely productive center for sugar production. Ashtor ascribes this burgeoning monopoly among the sultans and the amirs to special fines and taxes levied by the mamluk administration to suppress free competition. Among the most repulsive and cruel methods of elimination was the "*tarh*" system, the forced purchase of sugar owned by the sultan or the amirs. Not only was this system used on the local factory owners, but also it extended and applied to the foreign merchants from Southern Europe who were forced to purchase sugar at pre-determined prices, to assure the continued flow of money into the capital in Cairo.[5] One of the most corrupt and greedy Mamluk sultans in Ashtor's opinion was Barsbay (1422-38 A.D.), who epitomizes the absolute height of these abusive practices. Barsbay's rule is the period of state

monopolization when private ownership of the state's most lucrative industries, such as the sugar industry was taken over by the sultan. Barsbay also took over control of the spice trade, driving the powerful Karimi merchants from the business and significantly reduced commerce to the detriment of the whole society.

This corruption by state ownership also led to another key element in the decline of the Sultanate, technological stagnation. Ashtor asserts, "in the second half of the thirteenth century and until the end of the fourteenth century, the technological level of the Near Eastern sugar industry was relatively high."[6] By the early fifteenth century, as the heavy financial burdens laid on private enterprise by the mamluk regime wreaked havoc on the production of the sugar factories and the plantations, technological advances were being made in Europe that assured higher yields and better quality of sugar.[7] Technological innovations in sugar production there replaced the old methods of production still in use in Syria and Egypt, and any interest in updating the process in the Levant fell victim to the excesses of the state. Ashtor substantiates his conclusions through a survey of Levantine sugar prices from the end of the fourteenth century. The failure to adopt new technology for production left the Levantine sugar industry dependent on increasingly outdated, labor-intensive methods. Not only did this limit production, it also drove production costs higher. His figures suggest that by the end of the fourteenth century, Levantine sugar prices were much higher than its competition in the West.[8]

As an addendum to his conclusions about the decline of the sugar industry, Ashtor also mentions the effects of the progressive depopulation in the region because of the many instances of the plague in the Middle East. The frequent wars and attacks of the Il-

Khan Mongols in Persia and Iraq produced mass exoduses out of Syria into Egypt during the last half of the thirteenth century, thus inhibiting growth in the region as well. From the mid-fourteenth to the mid-fifteenth centuries, the Black Death reduced the already weakened population in Syria dramatically.[9]

By the beginning of the fifteenth, Ashtor believes all of these factors resulted in a decay in the medieval Muslim Levant from a once industrialized, monetary based economy to an underdeveloped third world status. This was in striking comparison to a fast moving European economy on which the Middle East had become totally dependent.[10]

In contrast to Ashtor's ideas, Sato Tsugitaka in his study, *State and Rural Society in Medieval Islam Sultans, Muqta's and Fallahun,* concludes, "the repeated spread of the plague led to the decline of both Egyptian and Syrian society under the *Burji* mamluks."[11] Tsugitaka presents the conclusions of A. L. Udovitch, who stresses that the plague reduced the population in the region resulting in economic stagnation in the activities of both urban and rural areas.[12] Since the mamluks relied heavily on in kind based land taxes, the dramatic drop in agricultural production forced the *iqta'at* holders to raise taxes. The abusive and corrupt practices of the later *Burji* Mamluk regime, then, was the result of economic decline, not the cause of it.[13]

However, Tsugitaka does place some emphasis on the explanation of al-Maqrizi as to the origins of the decline. The following includes the reasons customarily attributed to the mamluk decline, 1) political corruption in the form of bribery that weakened the state; 2) a dramatic rise in land taxes; and 3) the circulation of copper coinage. Tsugitaka also mentions that the political changes in the organization of the *iqta* system from the *al-*

Nasiri Rawk prescribed the new state structure for the fourteenth century, consolidating power into the hands of the royal mamluks and the amirs closest in loyalty to the sultan.[14] These elite mamluk members achieved tight control over the peasants within their individual *iqta'at*, disregarding the agricultural circumstances that the peasants dealt with in trying to pay taxes each year. With the death of al-Nasir Muhammad in 1341 A.D., the entire mamluk structure lapsed into violent civil war and eventually into political corruption as the different mamluk factions strove to assert their control.

Clearly, the question Tsugitaka seeks to address is whether the decline of the Sultanate was the cause or the result of greedy, corrupt administrative practices. Tsugitaka sees a seeming connection between both al-Maqrizi and Udovitch; both historians seem to believe that "there was an intimate link between a just government and agricultural prosperity in the Islamic Middle East."[15] In Tsugitaka's eyes, however, the issue is not so clearly defined. For example, how would a "just" Mamluk government have dealt with the social disaster of the plague? Tsugitaka's analysis leads to the conclusion that the loss of available labor to work the sugar cane fields and the processing factories devastated the area's sugar industry. To cover the substantial loss of revenues from that industry, the Sultan sought alternatives in the form of bribery, price gouging, improper appropriation of land, tax abuse and nationalization of industry for monopoly purposes.

Another noted scholar of the period, Amalia Levanoni, raises some key questions concerning the origins of the decline and exactly when it started. Levanoni traces the problems of the state back to the third reign of al-Nasir Muhammad when the previous mamluk institutions underwent extensive alteration and reform.[16] Through a whole series

of economic reforms, al-Nasir Muhammad quickly succeeded in increasing the state income. This was in the form of the *al-Nasiri Rawk*, the cadastral survey that redistributed the *iqta'at* to the army that began in Syria in 1313 A.D. and in Egypt in 1315 A.D. as well as in the new attention given to the agricultural sector of the Sultanate. The survey increased the pool of land for distribution and the sultan's personal portion of *iqta'at* as well. Land holdings were broken up so that no one amir could hold a large contiguous domain under his influence. The survey also cancelled the taxes on the farmers within each holding and lessened the influence of the landholders on each area. Al-Nasir Muhammad took a personal interest in and paid particular attention to the agricultural problems within each *iqtā'*, making much needed repairs, constructing irrigation systems and dams, and other technological advancements to aid in production. This was despite the fact that such expenditures were usually the sole responsibility of the *iqtā'* holder.[17] His power and privilege extended to all within his favor. All of these factors spurred new growth and commerce in the mamluk state. On the surface, the third reign of al-Nasir Muhammad appeared as a great golden time in which the masses enjoyed the attention of a truly magnanimous ruler.

This is certainly not the case in the opinion of Levanoni. "...al-Nasir Muhammad created not growth, but the illusion of growth. Soon after his death, his legacy was found to consist not of a firmly established infrastructure that could have guaranteed the economic future of the Mamluk state, but of a concatenation of increasingly complex problems, undoing most of his achievements within a generation."[18] All of al-Nasir Muhammad's building projects created a need for huge sums of money that in time created a uncontrollable debt for the state. At this point, al-Nasir Muhammad began the

abuses usually attributed to sultans in the latter half of the fourteenth century. By 1328 A.D., he instituted personal control over government expenditures, appointing a supervisor expressly for securing money to support his projects. These abusive practices quickly became normative behavior and included confiscation of properties, special taxes levied on administrators, and the rescinding of previous tax exemptions for agricultural production, such as sugar.[19] The government took control of the market place, setting artificially high prices for goods and then forcing their purchase. The effect of these practices gradually eroded industrial and commercial activity and achievements.

Levanoni believes that, far from stimulating economic growth, al-Nasir Muhammad's fiscal policies led to the ruin of the mamluk economy. The only way he could maintain his popularity was with extensive bribes as a counter measure to his tough stance on economics.[20] Levanoni states that that the three most extravagant expenditures of al-Nasir Muhammad were his ambitious building programs, his patronage of the Bedouin, and his own household and harem. These were the greatest contributing factors to the economic crisis and decline of the mamluk state.[21]

Levanoni's assessment of al-Nasir Muhammad's third reign focuses on the personality of the man and his lack of understanding just exactly what the far ranging effects of his policies would have on the future of the Sultanate. By replacing the traditional values and institutions that characterized the strengths of the mamluk power base, he essentially removed the hierarchy for advancement and created a new generation of mamluk leadership, one lacking in discipline and overwhelmed by materialism and opportunism. This caused a tremendous shift in the center of power and set the stage for the factional struggles among the "rank and file" mamluks who ordinarily would not have

had enough power to interrupt or sway the succession process. These changes forever altered the future of the Sultanate and in fact assured its financial, political and social doom. Levanoni concludes that the "seeds of decline" were sown during the third reign of al-Nasir Muhammad. The other factors, such as the plague, the earthquakes, the drought and other disturbances in the fourteenth century eliminated any possible recovery for the mamluk economy.[22]

Because depopulation played such a pivotal role in the decline of the Mamluk Sultanate, primarily due to the Black Death and the plagues that followed, the seminal work of Michael Dols offers important insights.[23] Until Dols' study of the Black Death in the Middle East, no general examination of the event existed, even though there was enough relevant historical material from the Arab authors to provide a good survey. Dols states in his study that the Middle Eastern population suffered from a devastating series of epidemics, beginning with the Black Death. Further, the accumulated effects of these plagues damaged the people more severely than the Black Death itself with the total effect being far greater than that experienced by the European population from similar attacks in the same time period.[24] His research focuses on the outbreak of the Black Death in 1347 A.D. to the middle of the fifteenth century in the centers of the Mamluk Sultanate in Egypt and Syria.

He asserts that ultimately more than a third of the population died during the plague outbreak and its following episodes, especially due to deaths from the pneumonic plague.[25] Of further interest, though, is his comment that the mamluk army was not spared either, with the resulting effect simply exacerbating the problems of political and

social instability. This further threatened the strength of the Mamluk Sultanate, which saw its elite military corps dying before its eyes.[26]

Dols warns that any attempt to produce accurate numbers of mortality for Egypt and Syria is hazardous, due in part to the unreliable and limited data available found in medieval chronicles. In addition, most of the figures apply only to urban centers and do not address the deaths in the countryside. Further complicating the matter is the problem of wide scale flight by the countryside population into the cities, which inflates those numbers. Additionally, deaths that occurred indirectly from the plague and its complications or those whose weakened constitutions resulted in shortened life spans cannot be adequately estimated. Finally, no accurate numbers exist for the total population of the Middle East during the medieval period. In Dols' view, the lack of reliable figures on the general population, combined with "the scarcity of information for mortality due to the plague, make a reasonable judgment of the demographic effect of the Black Death exceedingly difficult."[27]

Bethany J. Walker chooses to emphasize Levanoni's "social approach" to the decline of the Mamluk Sultanate in the fifteenth century.[28] Walker suggests, "that social developments had as much to do with the economic decline of the fifteenth century as poor government and competition from abroad."[29] While acknowledging the influence of al-Maqrizi on traditional studies of the decline, she believes that "the decline of a powerful state apparatus is complex and cannot be explained in terms of a single factor."[30]

Walker goes on to argue that while each of the issues discussed as causing the decline are viable in themselves, they do not constitute the sole source for the decline.

She believes the major question is not "What happened" but "When and where did it start?" Walker looks to the fourteenth century for the point of origin of the decline.[31] For support, she points to the work of Ibn Khaldun, who outlines the life cycle of Muslim dynasties that closely describes the reign of the current Mamluk Sultan, al-Nasir Muhammad. The irony is that Ibn Khaldun's contemporary realistic assessment predates al-Maqrizi's more romanticized portrayal of the same reign by more than a hundred years.[32]

Levanoni's concept of the "disintegrating social order" serves as the focus for Walker's approach. The rejection by al-Nasir Muhammad of the traditional recruitment methods and slower advancement processes among the mamluk ranks turned the system upside down. Because he did not ascend the throne as a mamluk, al-Nasir Muhammad bought the loyalty of his mamluk followers. Like Levanoni, Walker concludes that his recruitment of non-mamluks and promotion of inexperienced mamluks "gradually dissolved the solidarity between mamluk and master and among mamluks that gave the Mamluk system its cohesion and strength."[33]

She sees the changes in the social order occasioned by al-Nasir Muhammad's "reforms" as setting the stage for further social, economic and political discord. These untrained leaders lacked roots in the Mamluk heritage while the troops were loyal only as long as they were paid or otherwise permitted to abuse the treasury's *largesse*. While some scholars might take issue with the idea that the decline started during what accepted as the "Golden Age" of Mamluk rule, Walker firmly believes with Levanoni that general societal factors played a role comparable to any others already proposed.[34]

The decline of the Transjordan in the fifteenth century was part of the wider decline of the Syrian provinces of the Sultanate. The same factors that produced economic, social and political instability in Cairo affected the Transjordan even more severely. The plague and a variety of natural disasters including earthquakes and drought changed the health, lives and productivity of the people. In his article "Environmental Hazards, Natural Disasters, Economic Loss, and Mortality in Mamluk Syria," William Tucker studies three categories of disaster common in Syria from the thirteenth through the sixteenth centuries; climate, biological and social (famine).[35]

The climate in Syria varied in extremes from violent windstorms and hail to snow and severe cold to heavy rains and floods. Famine-producing droughts also worked a slow steady deterioration of the people's health. Insect infestations destroyed crops and farm animals died in the plague that reduced the human population as well. The propensity for earthquakes in Syria is great. Seismic experts suggest that major quake probability is one every 350 to 400 years, and the possibility for smaller quakes is in the range of one every fifty to one hundred years. Data from the mamluk period affirms these predictions, leading to the conclusion that earthquake damage in Syria produced a tremendous loss for the state and the people of the region.[36] Tucker lists a series of consequences that could well have taken a major toll on the population in Syria, causing agricultural production and commerce to diminish, creating a labor shortage, reducing the finances of the region to a crisis level and unleashing a cycle of never-ending food shortages and deprivation. Given the economic, political and social problems of the period, it is not difficult to imagine a decline in sugar production in such a bleak landscape.

Endotes

[1] Eliyahu Ashtor, "Levantine Sugar Industry in the Latter Middle Ages—An Example of Technological Decline," *Technology, Industry, and Trade The Levant versus Europe, 1250-1500* ed. B. Z. Kedar (Brookfield, VT: Variorum, 1992), 236.

[2] Bethany J. Walker, "Mamluk Investment in Southern Bilad al-Sham," *Journal of Near Eastern Studies* 62 (October, 2003): 4, 249.

[3] Ashtor, "Levantine Sugar Industry," 236-237.

[4] Ibid.

[5] Ibid., 242.

[6] Ibid., 244.

[7] Ibid., 246.

[8] Ibid., 248-257.

[9] Eliyahu Ashtor, "The Economic Decline of the Middle East During the Later Middle Ages – An Outline," *Technology, Industry and Trade The Levant versus Europe, 1250-1500* (Brookfield, VT: Variorum, 1992), 254-255.

[10] Ibid., 280-281.

[11] Sato Tsugitaka, *State and Rural Society in Medieval Islam Sultans, Muqta's and Fallahun*, ed. Ulrich Haarmann (Leiden: E.J. Brill, 1997), 237.

[12] Ibid., 238.

[13] Ibid.

[14] Ibid., 235-236.

[15] Ibid., 239.

[16] Amalia Levanoni, *A Turning Point in Mamluk History The Third Reign of al-Nasir Muhammad Ibn Qalawun (1310-1341)*, ed. Ulrich Haarmann (Leiden: E.J. Brill, 1995), 142.

[17] Ibid., 145.

[18] Ibid., 196.

[19] Ibid., 150.

[20] Ibid., 154-155.

[21] Ibid., 155.

[22] Ibid., 196-199.

[23] Michael W. Dols, *The Black Death in the Middle East* (Princeton, New Jersey: Princeton University Press, 1977), 3.

[24] Ibid., 4.

[25] Michael W. Dols, "The General Mortality of the Black Death in the Mamluk Empire," *The Islamic Middle East, 700-1900: Studies in Economic and Social History*, Ed. by A.L. Udovitch (Princeton NJ: The Darwin Press, Inc., 1981), 417.

[26] Ibid., 406.

[27] Dols, *The Black Death*, 194.

[28] Bethany J. Walker, "The Ceramic Correlates of Decline in the Mamluk Sultanate: An Analysis of Late Medieval Sgraffito Wares," (unpublished Doctoral Dissertation, University of Toronto, 1998), 20.

[29] Ibid.

[30] Ibid., 15.

[31] Ibid., 16.

[32] Ibid.

[33] Ibid, 19.

[34] Ibid., 20.

[35] William Tucker, "Environmental Hazards, Natural Disasters, Economic Loss and Mortality in Mamluk Syria," *Mamluk Studies Review* 3 (1999): 114.

[36] Ibid., 125.

Chapter Six

Tall Hisban

The excavations at Tall Hisban in 1998 and 2001 provide a wealth of material about life on the frontier during the Early Mamluk period. Researchers returned to Tall Hisban after some twenty-five years to "fill in chronological 'gaps' in the archaeological record, as well as produce a nuanced model of core-periphery relations and occupational cycles."[1] Accomplishing these research goals at Tall Hisban, however, requires a synthesis of the environmental, archaeological, art historical and textual data gathered at the site.[2] The cyclical nature of LaBianca's model of intensification and abatement regarding hinterland studies and settlement patterns offers an appropriate methodology for the questions addressed in this thesis. These questions deal with the specifics of the sugar industry in the Transjordan in the fourteenth century; the political and economic milieu of the period on the frontier of the Mamluk Sultanate; Tall Hisban's relationship with other known sugar sites in the Transjordan; and the problem presented by the decline of Mamluk power in the region by the fifteenth century. The answers to these questions will allow us to construct a rough profile of the role played by a non-urban commercial center on the frontier of the Sultanate at its height.

Strong evidence similarly exists for an active sugar industry in the Transjordan. Earlier discussion reviewed the presence of sugar production in the region of the Jordan River Valley and those wadis that served as tributaries to that system. The primary surveys that noted the presence of mamluk period ceramics, including sugar pots, are the Hesban Survey and the East Jordan Valley Survey (1975 and 1976). The recent work of

Jum'a Mahmoud H. Kareem has significantly enhanced these earlier efforts. While Kareem's focus is on examining "the socio-economic situation and settlement patterns and density in the Jordan Valley", his findings offer great insight into the development of the sugar industry in the region from the Ayyubid period through the Ottoman era.[3] Kareem's survey notes the existence of mamluk sugar pots scattered throughout the Jordan Valley from the Yarmuk River on the north to the southern end of the Dead Sea to the south on a site-by-site basis. In addition to Kareem's locations, others sites significant to this study include Tall Abu-Sarbut, Tall Gourdan, and Tabaqat Fahl (Pella). Abu Dalu's study of the sugar mill sites in the Jordan Valley testifies to the booming business of sugar that existed from the late thirteenth through the fourteenth centuries. Figure 5 of this thesis locates the above sites in the Jordan Valley and reflects the widespread distribution of mills, factories and storage facilities that date from the mamluk period. The following list provides the site name and number (corresponding to the East Jordan Valley Surveys', 1975 1976 system of numbering) as well some indication as to the type of site for the sugar industry:

New Sugar Sites	**(New Sites Contd.)**	**(New Sites Contd.)**
Er-Rasiyyah South (11)	Banat Ya'qub (16)	Dhra' el-Khan (31)
Tawahin es-Sukkar (160)	Keraymeh South (90)	Dirar (113)
ed-Dabbakiyyah (215)	Mazarat Abu 'Isa (35)	Tell es-Sukkar (51)
Khirbet Sheikh Aleiyam (37)	Deir 'Alla Village (120)	Khursa'a (181)
Maqam esh-Sheikh Hussein (8)	Tell er-Rabi (122)	Shaghur (196)
Shaqaq Muthallath el-'Arda (155)	Sqaq ez-Zu'ar (141)	Tell ed-Dolani (138)
Tell Ba'ajawiyyah (14)	Abu Zeighan (159)	Tell et-Tahuneh (189)

Large # of Sugar Pots, No Mills

Tell es-Shunah (North SW (4)

Tell Fendi (38)

Tell esh-Shunah South (Nimrin) (182)

Maqam esh-Sheikh Hussein (42)

Abu 'Obaideh (111)

Mazaret Abu 'Isa (35)

Potter's Village Complex

Deir 'Alla Village (120)

Tell Gourdan (116)

Tell Qa'dan South (117)

Factories

Tell Abu-Sarbut (121)

Mills & Sugar Pots

Er-Rasiyyah South (11)

Tell 'Abu Bisseh (18)

Khirbet el Marqa'ah (45)

Tell es-Sukkar (51)

Khirbet Sleikhat (80)

Keraymeh South (90)

Tell es-Qos (102)

Few Sherds

El-Midraj (15)

Umm Kharw'a (16)

Khirbet Ma'adh (27)

Khirbet Sleikhat (80)

Khirbet el-Marqa'ah (10), water mill

Tell Salman (53)

Shqaq ez-Zu'ur (141)

Dhra' el-Khan (31), caravanserai

Tell el-Arba (34)

Khirbet Sheikh Aleiyan (37)

El-Hammah al-Garbi (49)

Tell esh-Shuneh (middle) (52)

Tell Ba'ajawiyyah (14)

Banat Ya'qub (16)

Waqqas (60)

Much of the evidence provided by the surveys demonstrates that many new villages connected to the sugar industry came into existence during the thirteenth and fourteenth centuries.[4] Two sites, North and South Shuneh, also appeared to be storage facilities, which occupied strategic places on the trade route between Damascus and Cairo. In the Coptic language *esh Shuneh* means cereal storage place. Kareem notes first that this could imply sugar storage as well as grain and that these two key sites supplied sugar to the Ayyubid and Mamluk administrative centers of Cairo and Damascus.[5]

Surveyors found seven sites with a large number of sugar pots from the mamluk period with large vaulted water driven mills, many with millstones *in situ*. These provide strong testimony to the large-scale cultivation and production of sugar in the Jordan Valley in the form of agricultural villages just as the sources indicate. Many of the sites listed above provided only a small number of sherds because the areas were plowed and in cultivation, such as El-Hammeh al-Garbi and Tell esh-Shuneh (middle), while the site of Mazaret Abu 'Isa was unique, producing a rather large number of sherds even though it was in a plowed zone. The surveys of the Wadi el-Yābis provide other evidence for the importance of sugar to the region. Kareem notes that the area "irrigated large sugar-cane plantations on the floor of the Jordan Valley and powered numerous mills for processing the sugar from the sugar-cane."[6] From the archaeological results of such excavations as Tall Abu Sarbut and Tall Gourdan, the central part of the Jordan Valley was very active in the early part of the Sultanate. This is due in part to the more complete preservation of the sites allowing a better understanding of factory structure and the support industries, such as pottery making to produce the sugar jars.

The summary of the East Jordan Valley Survey of 1976 states that in the southern half of the Jordan Valley the Ayyubid/Mamluk period continued to be well represented and dominated the sherds collected in the field. The new settlements listed above from Dirar (113) through Shqaq Muthallath el-'Arda (155) were generally located on the floor of the Valley and the Zor along with the older settlements where there is a good water supply.

Tabaqat Fahl (Pella) is another site that confirms the presence of typical industrial sugar pottery found throughout the Jordan Valley and always associated with a water source such as a spring. The real importance of this site lies in the preservation of the stratigraphy so that the actual context of the sugar pottery can be understood within a village environment. Further excavation and the discovery of more sites such as Tabaqat Fahl will provide the much-needed information on the development, status and distribution of the sugar industry across the Transjordan and for Hisban in particular.

The survey of the Wadi Hesban (See Figure 8) conducted by the Madaba Plains group yields very little evidence of the sugar industry in the area near Tall Hisban. The only site that may suggest sugar cultivation and production is a site some three to four km. from the tall, site number 41, named Shunet Sukr by Conder in his 1889 survey of the region. The Hesban survey did not identity any "sugar pots" associated with this site, but only Ayyubid/Mamluk pottery. The importance of this site is that it is the only site in the actual wadi bed that produced any Ayyubid/Mamluk pottery at all. The rest of the sites were all located on the plateau above the wadi. In addition, surveyors found ten water driven mills between Ain Hesban and Ain Sumia in the area and one of them was located at site 41. These facts would suggest that there was some kind of sugar activity

close to Tall Hisban and that further research could clarify the sites in the area and connect them to the industry in the Jordan Valley.

Strong evidence clearly exists to support the role of sugar in the economic revitalization of the Jordan Valley in the late thirteenth and fourteenth centuries. The Jordan Valley clearly provided the requisite water supply necessary for sugar cultivation. Moreover, technological development of water mills powered by this same riverine and wadi system allowed for the creation of the factories needed to process the sugar cane. The only remaining question was that of distribution of the sugar products.

The Mamluk Sultanate recognized the importance of trade to its existence. Trade routes to India on the east and to Europe on the west provided a valuable flow of goods and cash to support the Sultanate's elaborate administrative/military structure and building programs. At the same time, because Syria and the Transjordan, in particular, occupied a central geographic position within the Sultanate, the area served as a "major junction between Egypt, Syria, the Arabian Peninsula, Palestine and Iraq."[7] (See Figure 6) In this capacity, the entire region played a significant role in the economic and political ebb and flow of the period.

Rafat el Majali and Abdul Rahim Mas'ad in their article on the trade routes in Jordan during the mamluk period illustrate this by pointing out first the number of villages distributed across Syria: 400 in the vicinity of Kerak; 300 in the Balqa district; and 1200 in the northern region of the country.[8] Moreover, trade activity burgeoned in the area, with large commercial centers developing along the routes to support the large number of caravans that traveled through the area. Majali and Mas'ad note that some of these caravans "numbered between 18,000 and 20,000 camels."[9] The early Mamluk

sultans recognized the importance of security for the trade routes and the cargoes that traveled them by refortifying such trade centers as Ajlun, Kerak, and Shaubak. In this respect, the citadel at Tall Hisban may have received special attention from Sultan Baybars (1260 A.D.) for its strategic importance as a frontier outpost. He also established an extensive postal system through the Transjordan, designed to protect and defend any incursions by the Mongols or the Crusaders.

The Transjordan was a cobweb of caravan routes that carried sugar and other items produced in the region while also bringing in important trade goods. Major trade routes linked the East Bank to the West Bank as well as Syria with Aqaba and from there to the Arabian Peninsula and Yemen or to India and China. The Syria-Aqaba route also ran north as well as south, tying to routes through Damascus north and then on westward to Europe. A second route ran from the West Bank through the lower part of the Jordan Valley, connecting through the eastern desert to Iraq. For all these routes, Aqaba was an important stop for all caravans traversing the region because it functioned as a government-taxing site.[10]

In addition to these main routes, other important caravan routes connected key cities throughout the region, including Mafraq, Zarqa, Amman, Hisban, Madaba, and Kerak. This particular route took an easterly path towards Kerak where it separated into routes headed for Aqaba and Palestine. Another route running north from Aqaba passed through Hisban and Amman to Ajlun, Irbid, Umm Qays, and on into Syria. Irbid served as a major trade center serving many markets. Still other routes connected Iraq with the Transjordan before moving on into Palestine. Other westward routes journeyed south to Aqaba.[11]

The *haj* pilgrimage route that passed through the Transjordan was the only entrance for caravans coming from Syria, Persia and northern Iraq on their way to the holy cities of Medina and Mecca. The route ran from Damascus into northern Jordan at Busra, then on to Zarqa, Amman, Lajjūn, Kerak, and then southward to Ma'ān and eventually into the Arabian Peninsula to Medina and Mecca. Religious travelers taking this route enjoyed not only the safety afforded by the fortresses of the Mamluk Sultanate, but access to the commercial centers of the Transjordan which provided necessary goods and supplies. Because of its proximity to the trade routes and the *haj* routes cutting across Transjordan, the citadel at Hisban could easily store and supply sugar produced by the many factories located in the central Jordan valley as well as any production in the area of the Wadi Hesban.

Tall Hisban is an excellent example of a distribution site for sugar, although the question still remains as whether it was just a local distribution site, supplying sugar to the surrounding areas or were the storage rooms constantly being replenished with sugar that was then loaded onto camels in the caravans moving in all directions across the Sultanate. While sugar potsherds (See Figure 7) were found in all fields, they were dominant in Field L, the location of the storage room at Tall Hisban.[12] One of the many earthquakes that occurred in the region between 1341-1458 A.D. destroyed the storeroom at Tall Hisban, collapsing the vaults over the area and displacing the walls.[13] Additionally, a resulting fire burned the storeroom shelves, as evidenced by the charred remains found on the site. Much of the pottery in the storeroom, including large quantities of glazed relief ware, lamps, jugs, jars, were found in the rubble, thus leaving the method of storage, and placement of the sugar jars unclear. The actual number of the

sugar jars is unclear as well. However, the large number of sherds collected and the fact that several nearly complete sugar jars were found leads to the conclusion that Tall Hisban potentially contained a sizable amount of sugar. This sugar conceivably represented a significant contribution to the financial well being of community and to the mamluks who held the region as *iqtā'*. There is no evidence that Tall Hisban was directly connected to any type of sugar factory or pottery production site close by, but the true analysis of that conclusion can only be further demonstrated through another survey of the Wadi Hesban and the excavation of other potential sites for the sugar industry.

Tall Hisban is a distinctive type of town within the early Mamluk Sultanate because of the attention it received from two important sultans, Sultan Baybars (1260-1277 A.D.) and Sultan al-Nasir Muhammad (1308-1341 A.D.). Baybars used the citadel to secure his borders and provide a commercial stop for the caravans passing through the region. Further, its proximity to the *haj* route allowed it to serve as a source of goods that could be sold in other towns located on the actual pilgrimage route. The favor shown by al-Nasir Muhammad came when he elevated Tall Hisban to the status of administrative capital of the Balqa (1308-1356 A.D.). His refortification and reconstruction at Tall Hisban during his third reign (1310-1341 A.D.) appears to be a reward for the support and loyalty demonstrated by the local Bedouin tribes.

After its destruction in the mid-fourteenth century, Tall Hisban was never again reoccupied to the extent it had been during the height of the Mamluk Sultanate. Excavations reveal some limited local reoccupation afterwards, but its role as an administrative and commercial center disappeared. Returning desert nomads took the area over in one of those periods of abatement, characterized by LaBianca as

"nomadization." Using the food systems model, Tall Hisban during the late thirteenth to the mid-fourteenth century typified a period of intensification by the mamluk sultans when investment was high, agricultural production was expanding, the countryside was increasingly abundant, the urban population was growing, trade was extensive, peace prevailed and disasters were not anticipated. There was no more war, the Crusaders were gone, and the Mongols defeated, the populace returned to the quiet activities of daily living. In Braudelian terms, the Mamluk Sultanate was a period of conjunctures, those intersections in the Islamic period of *la longue durée* as the material and cultural life of the Middle East changed economically and politically.

Endnotes

[1] Bethany J. Walker and Øystein S. LaBianca, "The Islamic *Qusur* of Tall Hisban: Preliminary Report on the 1998 and 2001 Seasons," *Annual of the Department of Antiquities Jordan* 47 (Amman, Jordan: Hashemite Kingdom Jordan, 2003), 1. (Forthcoming)

[2] Ibid.

[3] Jum'a Mahmoud H. Kareem, *The Settlement Patterns in the Jordan Valley in the Mid- to Late Islamic Period* (Oxford: Archaeopress, 2000), 1.

[4]Khair Yassine, Mo'awiyah Ibrahim, and James Sauer, "The East Jordan Valley Survey, 1975 (first part)," *Archaeology of Jordan: Essays and Reports* (Amman, Jordan: Department of Archaeology, University of Jordan, 1988), 182.

[5] Kareem, *The Settlement Patterns*, 10.

[6] Ibid, 14.

[7] Rafat el Majali and Abdul Rahim Mas'ad, "Trade and Trade Routes in Jordan in the Mamluke Era (AD 1250-1516)" *Studies in History and Archaeology of Jordan* 3 (Amman: Department of Antiquities, 1987), 312.

[8] Ibid.

[9] Ibid.

[10] Ibid., 314.

[11] Ibid.

[12] Walker and LaBianca, "The Islamic *Qusur*," 25. (forthcoming).

[13] Ibid., 8, 25.

Chapter 7

Conclusion

Many new questions have resulted from the most recent excavations at Tall Hisban. One of the most important questions deals with Mamluk administration in the provinces and its influence on agriculture and commerce. A study of Tall Hisban will help scholars better understand the interaction between the central government in Cairo and those commercial/administrative centers on the frontier during the height of the Sultanate in the fourteenth century. The intent of this thesis was to examine the role of Tall Hisban in the sugar industry in the fourteenth century and its value both economically and commercially to the Sultanate.

The historical methodology of Ferdinand Braudel provides a framework for this examination, while the studies of daily commercial activities by Goitein demonstrates practices and policies of the period. The primary sources allow us to corroborate the historical events in the Sultanate while providing first-hand insight into the nature of the participants. In turn, the modern work of Hassanein Rabie and SatoTsugitaka have helped explain the operations of the complex state apparatus that developed for administering the *iqtā'* system and its ultimate role in the decline of the Sultanate.

The character of the Sultanate reflects its origins. The mamluk institution itself grew out of a slave-soldier tradition marked by loyalty, camaraderie, and military prowess. By the end of the thirteenth century, this slave-soldier organization stepped beyond merely being the military arm and became the government itself. The early Sultanate was marked by the need to respond to the multitude of economic,

administrative and political changes affecting the region. Strong leadership within the Sultanate during the fourteenth century sparked a "golden age" of rule in the Near East. By the early sixteenth century, however, the power of the Mamluk Sultanate was gone, dissipated in a flurry of financial crises caused by war, losses due to plague, technological stagnation, agricultural decline and various natural disasters.

Agriculture plays a major role in the economic and social history of the period. The "green revolution" had a profound impact throughout the region. In this respect, mamluk influence was paramount. Mamluk investment quickly made sugar cane cultivation and production a dominant industry in the fourteenth century, especially in the Jordan Valley and those commercial centers strategically located on the trade routes within the Transjordan.

Eliyahu Ashtor's studies of trade and commerce during the Sultanate focus on the nature and relationship of the mamluk regime with the West. The decline of the Sultanate and the Levantine sugar industry were the hallmarks of his research and have stimulated invaluable scholarship on this topic. Ashtor theory for the decline rested on the old scholarship that focused on the corrupt practices of the *Burji* mamluks. Newer scholarship, represented by the efforts of Amalia Levanoni, Sago Tsugitawa, Michael Dolls and Bethany Walker, have traced the origins of the decline to the *Bahri* Mamluk Sultanate, specifically the third reign of al-Nasir Muhammad. It is during this third reign that much of the financial reorganization of the Sultanate occurred with far-reaching effects for the provinces in agriculture in general and the sugar industry in specific. In this respect, Tall Hisban offers an appropriate subject for the study of how agriculture,

commerce and mamluk administration combined on the frontier of the province of Greater Syria.

Clearly, Tall Hisban was a storage and distribution site for the sugar industry that experienced new growth and revitalization from mamluk investment during the period. Tall Hisban functioned as a key outlet for sugar moving in almost any direction on the frontier of the Sultanate. It also served as an important administrative center, balancing the Sultanate's tenuous political dynamics with the Bedouin tribes in the area as well as other foreign incursions. Its location on the frontier made Hisban a natural flashpoint for changes in economic, social, political and/or military policies within the Sultanate.

A review of the surveys indicates that Tall Hisban was relatively unique as a distribution and storage center. The full extent of sugar cultivation and production in the Jordan Valley is difficult to assess because field study of potential sites had been limited. However, the distribution of identified sugar mill sites and factories illustrates the necessarily close relationship, both operationally and geographically, between the various components of the sugar trade. Storage and distribution sites could be located elsewhere, but would still need to be in close proximity to trade or pilgrimage routes to take full advantage of available demand. As such, outside of North and South Shuneh, referred to in Kareem's study of settlement patterns in the Jordan Valley, no other strong candidates for distribution and storage appear. The fact that North and South Shuneh are located in key positions at trade hubs in both the northern and southern ends of the Transjordan may indicate that Tall Hisban could be considered an eastern storage and distribution point.

Further strong evidence for Hisban's importance to the Sultanate focuses on the special regard for Tall Hisban expressed by two of the most prominent Mamluk sultans,

Baybars and al-Nasir Muhammad. Commercial investment of any kind reflects value, and the resources committed to the area by the mamluk administration reinforce the roles the town played in both commercial and political affairs.

A further excavation season in May 2004 is planned for Tall Hisban. The focus of these efforts will be on a room adjacent to the storerooms and the mamluk village below the citadel. The area offers great potential for information regarding how sugar was stored and distributed both on a local and regional basis. The work at Tall Hisban is not yet finished; the answer to one question provokes a dozen more. The site is well preserved for Islamic studies and provides material evidence of an historical watershed in the region of the Transjordan during the fourteenth century.

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Appendix A

Translation of al-Nuwairi's description of a sugar factory is taken from: Noel Deer, *The History of Sugar. Volume One* (London: Chapman and Hall LTD., 1949), 90-92.

"The cane is carried on the backs of camels and asses, and unloaded at "the house of the sugar-cane." There are wooden tables with grooves, and men with great knives who prepare the cane. The knives are two-thirds of *ell* long and one-third of an *ell* broad. With these knives they cut the cane into halves lengthwise, and cut off the top that has no sweetness. This is called *lukluk*. From the lower part of the cane they remove the roots and earth. This called "cleaning." From these tables the cane is brought to others, which stand separate on a broad wall. One side abuts on the "house of the sugar-cane," and the other on the "house of the pouring." Men sit astride on seats and hold in their hands knives which are larger than those used to cut the cane. In front of them are tables. A man takes a number of stalks and cuts them into small pieces, which he throws into the "house of the pouring." There they are placed in baskets, which are called *ijjara*, and are all of the same size. They are then carried to the mill-stone. The cane is laid under the stone which is turned over the lower stone. The juice is pressed out and flows by openings in the base to the holder, the outlet of which is stopped. The cane is then taken to another place. Here it is placed in baskets of plaited work of *halfa* (rushes), which are slit open below and at the sides. These are laid under the wheel of a beam, and by means of the beam the wheel rolls on them until it has crushed them, and the rest of the juice has been pressed out. The juice that is pressed out by the stone mill and the beam (*tacht*) is brought to the same place. The juice is passed through a sieve, which is placed in a kind of frame. From this it flows to a closed vessel, which is called a *bastula*, in predetermined quantity. When this is filled with strained juice it is brought to the place where is it boiled [sic]. It is then strained a second time and led to a large boiler (*chabia*). Into this is poured with straining all that is in the *bastula*. This holds 50 *matr* of juice. Each *matr* is half an official Latin *qintar*. The Latin *qintar* has 200 *dirhem*. Therefore the *chabia* holds 3,000 *rail* (2.75 lb.). This is the content of the *bastula*.

The juice is now heated in a place outside the place in which the presses stand, till it boils briskly and has decreased by a certain volume, when the fire is removed. When the boiling has ceased the liquid is carried to great vessels, called *kurbisse*. In each *kurbisse* there is a great piece of wood the length of a man's forearm. This wood serves for holding the *kurbisse* and for tilting it over. The juice is poured through woolen material called *kisa*, under which are large jars called *daun*. Through the wool the juice is strained into the boiler. For each stone mill one uses one *chabia* and eight boilers, in order to boil what was pressed out by the mill and the *tacht*. After boiling the juice is brought to a copper vessel called *dast*, on the upper edge of which are two wooden handles. The workman holds these so that he may not be burnt. The boiled juice, called *mahlab* (honey), is poured into moulds (*ablug*) of earthenware, which are narrow below and wide above. In the bottom of each mould are three holes, which are plugged with pieces of sugar-cane. These moulds are placed in the house of the pouring, in which there are long benches like mangers (*midwad*). Under these moulds are vessels (*gadus*) into

which flows that which is separated in fine drops. This makes the syrup and dropped honey. Then the people serve the moulds with *dakaschib*, one after the other till the moulds are full. They are of different sizes; one holds more than a *qintar* and the others less. When they are full and one has done to them all that is to be done, they are brought from the house of the pouring to the covered house. There they are placed over other vessels into which drops that which is still honey-like. The refuse of the canes and the tops are pressed and boiled by themselves. This is called *chabia*, and gives the worst syrup (*asal*). The quantities which come from the presses have different names, such as *dariba, wada, jad*. 1 *dariba* is 8 *jad*; 1 *jad* is the content of a *chabia*. This answers to 3,000 Latin *rotl* of juice. Therefore a *dariba* is 24,000 *rotls* of juice. This separates itself according to the goodness of the cane into 15 or 25 *qintar* of sugar and 8-12 *qintars* of honey sorts.

As a maximum one gets from a *feddan* of cane 3 *dariba*, namely 2½ qand and a half of honey (*chabi*). A *dariba* corresponds to 24 *qintar* n Egypt. There are canes that are not good, the juice of which does not stiffen to sugar. These are only boiled to honey. It is called *mursal* (rejected).

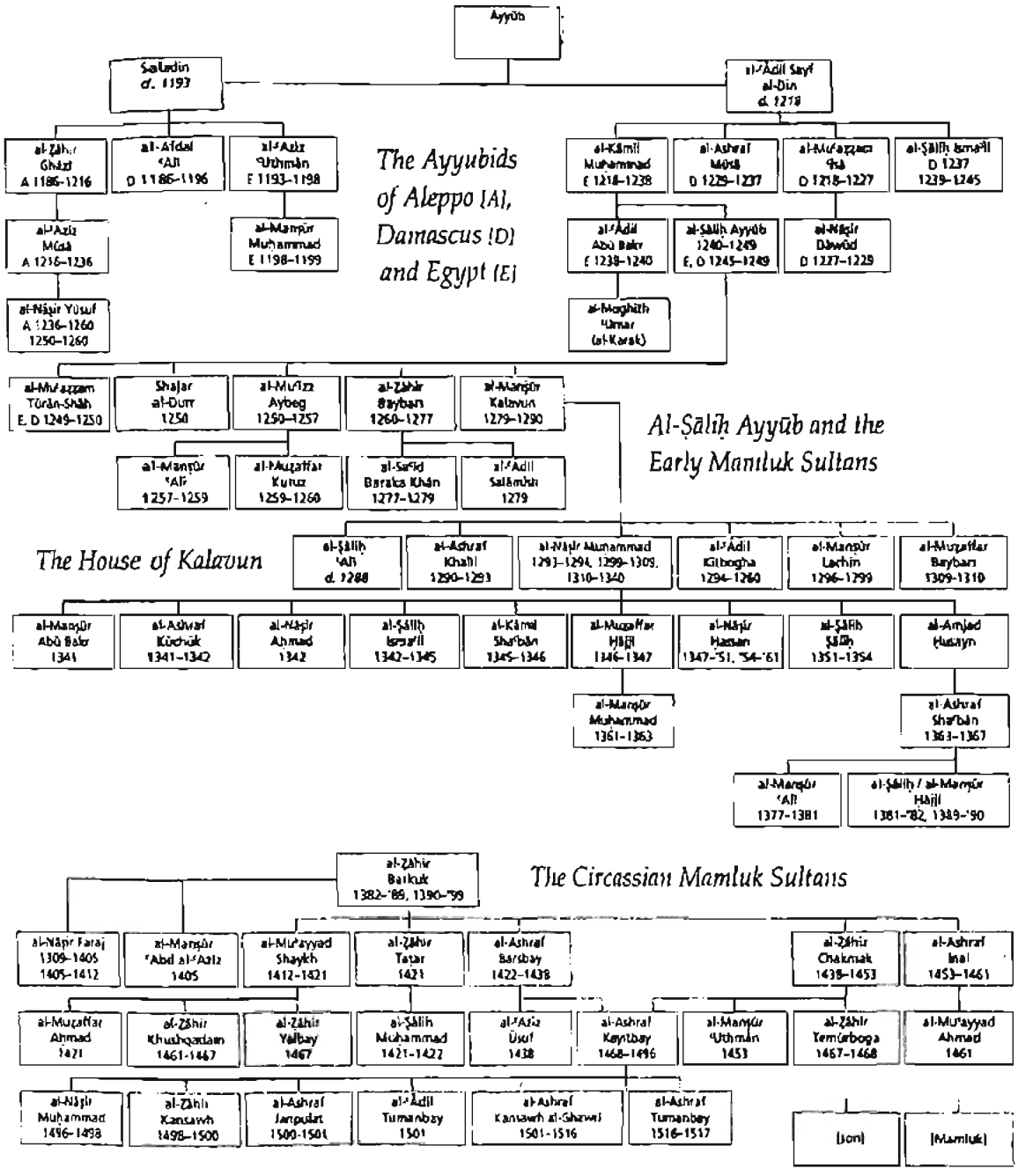
The description above corresponds to the techniques of Kus in Upper Egypt. There is not much difference in other parts. The sugar-cane of Syria is worked differently according to the district. This applies to the lowlands and to the coat of Tripoli, Beirut and Akka. It is pressed in water mills, ox mills or beams. What we have written on the sugar-cane in Egypt belongs to the study of field cultivation and irrigation. Properly this does not belong to this book, which deals with supervision, but the overseer cannot do without a study of this subject.

An important study for the overseer of the presses is to take note of what has been made, and thereby to see that no theft, fraud or negligence takes place. The overseer of the presses must every night and day compare what is packed with what is pressed and obtained, in order that when all is over he has an oversight over the whole, according to what we shall explain in the method of calculating.

When the sugar is dried and becomes as white as possible it is brought back to the boiling room, dissolved in water with the addition of some clean milk and boiled. Then one gets from it white sugar and the *qatara* (drainings). From each *qintar* one gets 5/12 sugar and 7/12 *qatara*. Often one repeats the process, when one gets the whitest and purest sugar. Its *qatara* comes very near the droppings (*qatr)* of plants (honey).

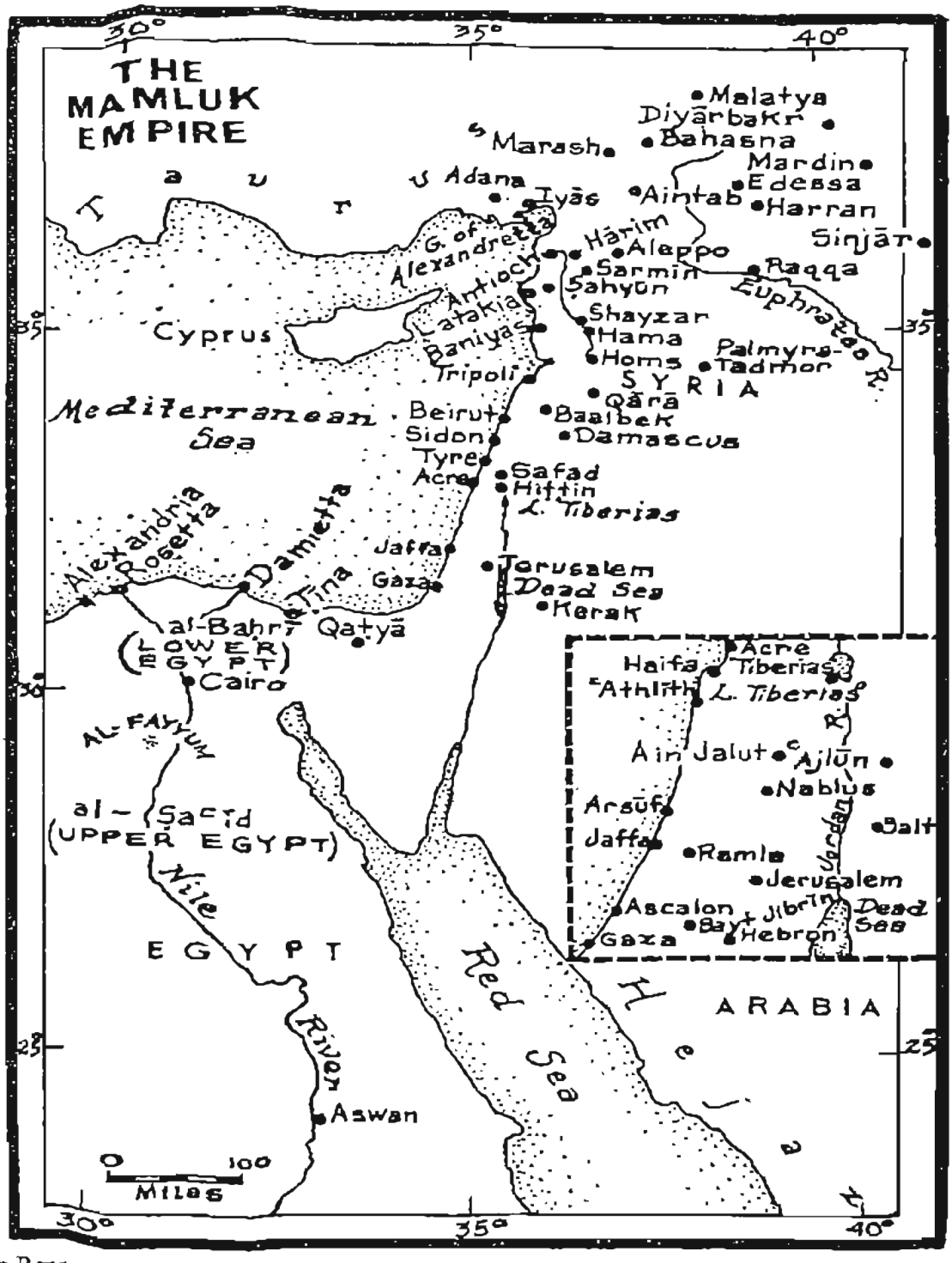
The control comprises things that one cannot put in a book, and presents also things that one can hardly say in speech."

Appendix B



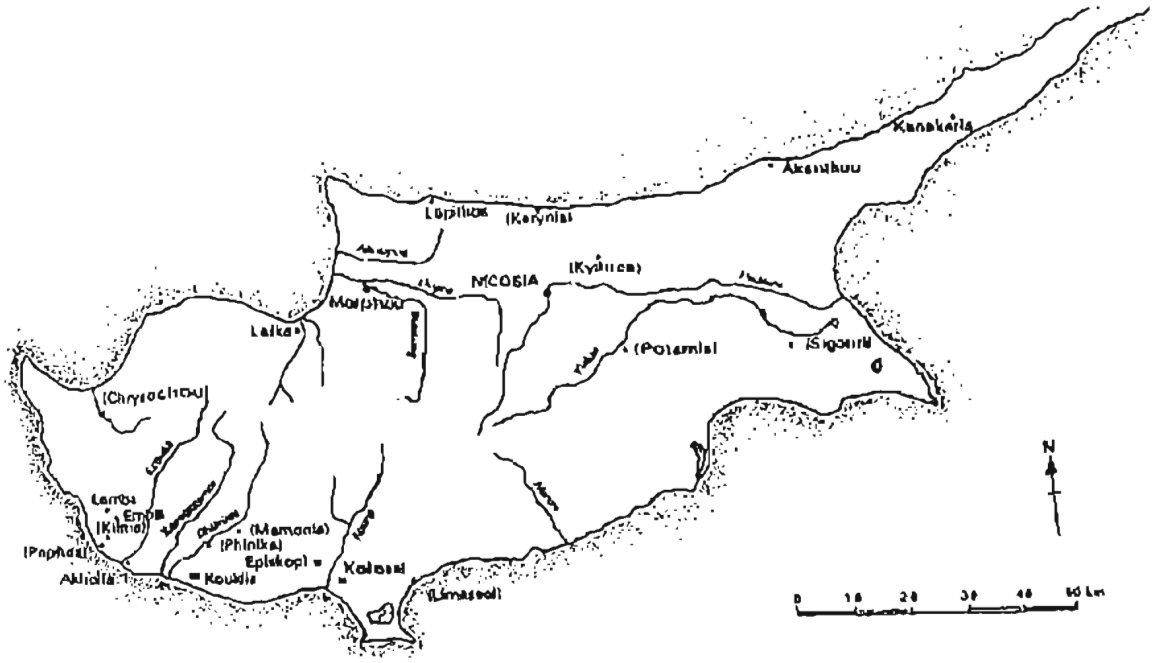
Ayyubid and Mamluk dynasty chart, reproduced from Bethany J. Walker, "Militarization to Nomadization: The Middle and Late Islamic Periods", *Near Eastern Archaeology* 63 (1999): 4, 208.

Figure 1



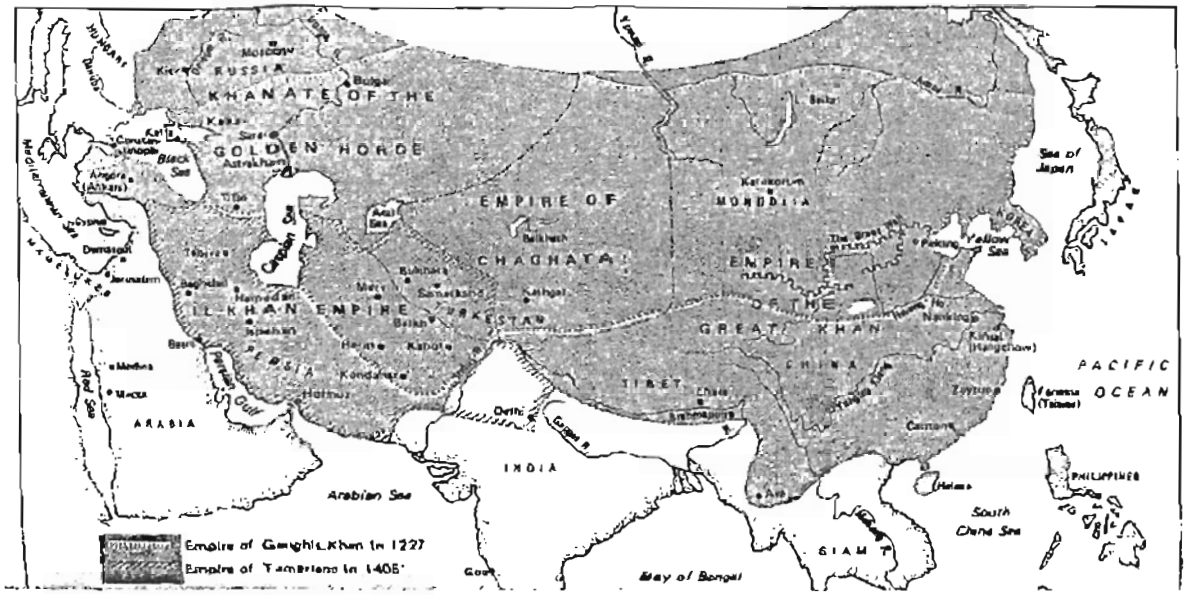
Map Reproduction of the Mamluk Empire taken from I.M. Lapidus, *Muslim Cities in the Later Middle Ages*, Cambridge University Press.

Figure 2



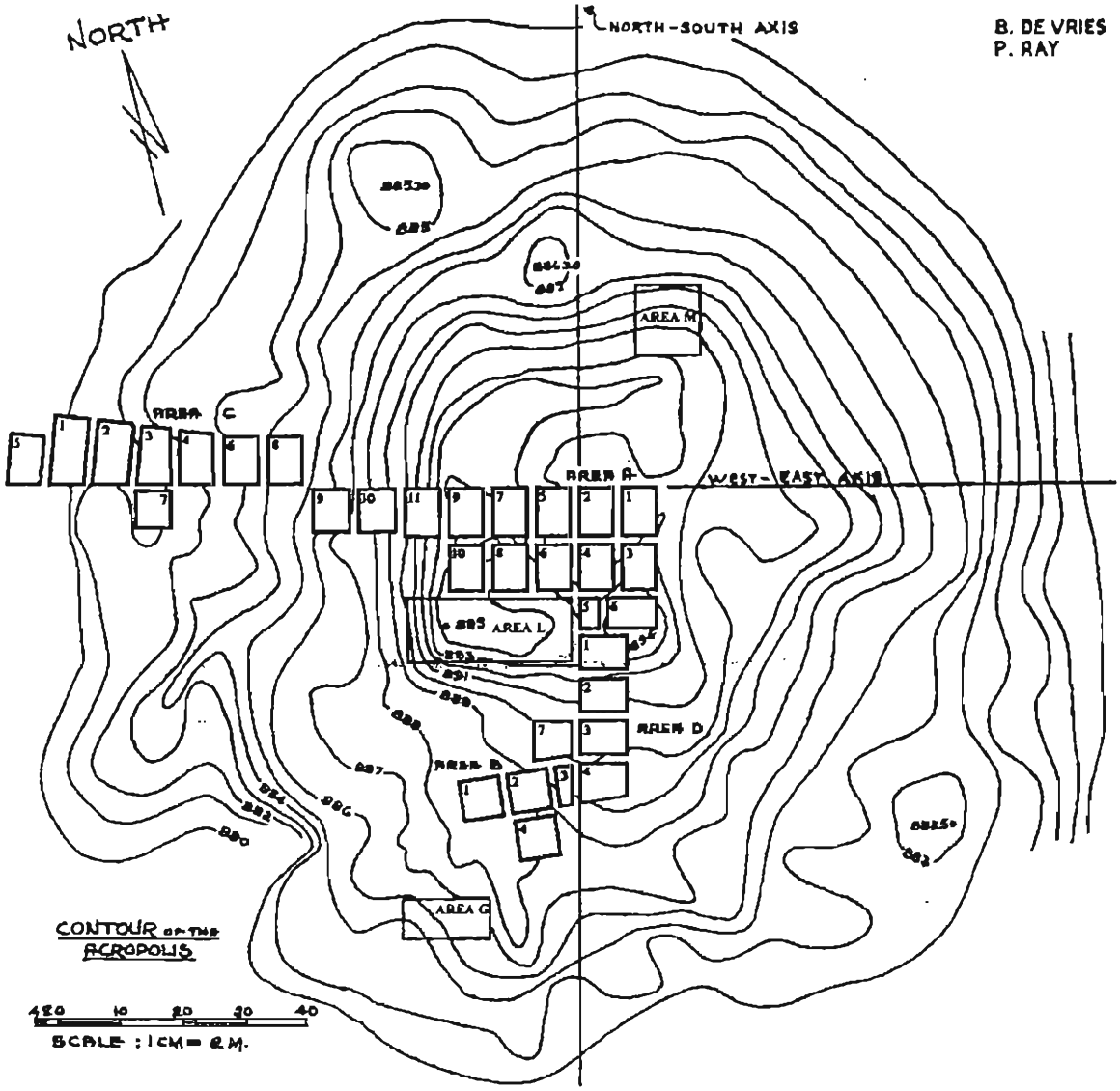
Map of Cyprus showing sugar cane production sites. Reproduced from Maria von Wartburg, "The Archaeology of Cane Sugar Production: A Survey of Twenty Years of Research in Cyprus" *The Antiquaries Journal* 81 (London: Oxford University Press, 2001), 307.

Figure 3



Map of Mongol Empire. Reproduced from Janet L. Abu-Lughod, *Before European Hegemony The Word System A.D. 1250-1350* (New York: Oxford University Press, 1989), 142.

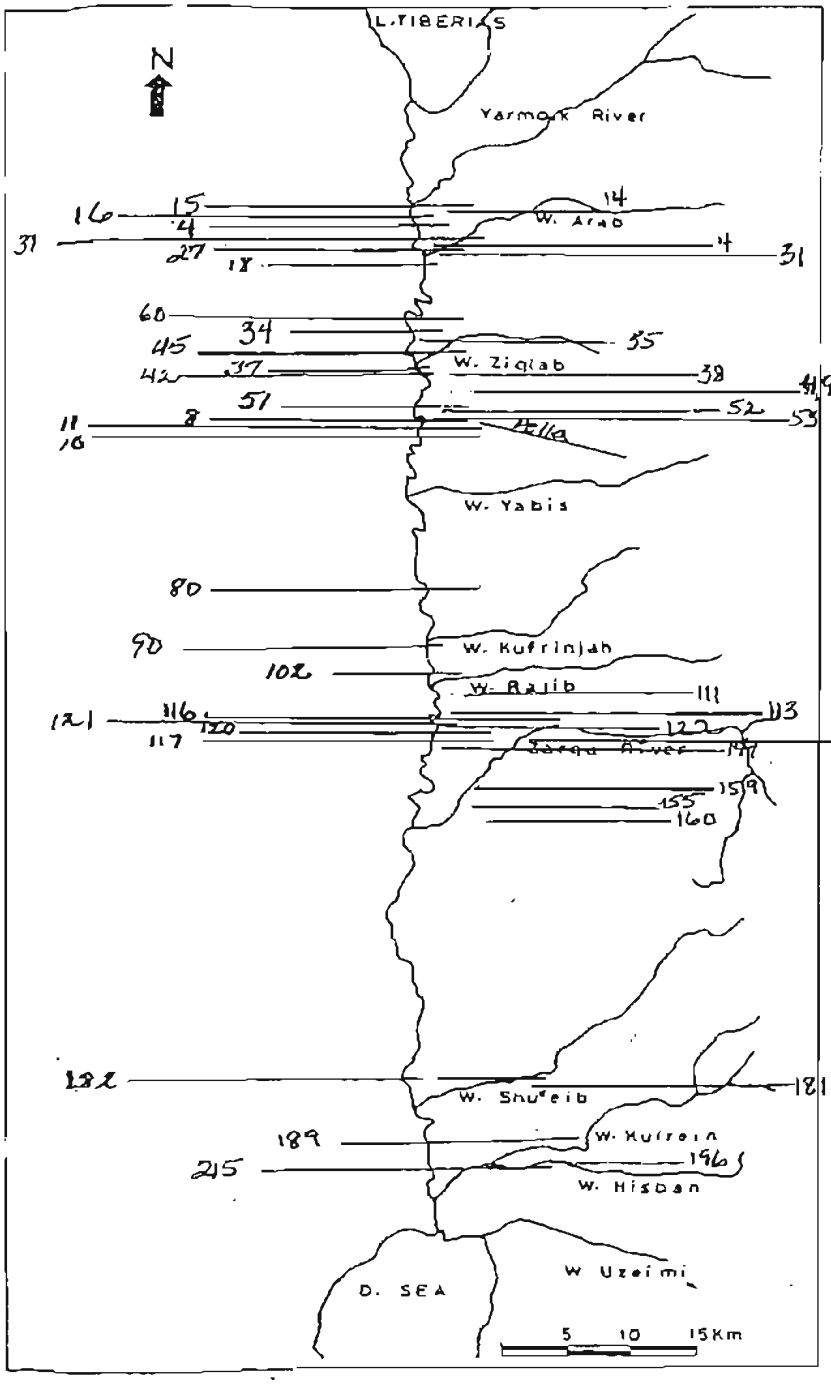
Figure 4



MPP: TALL HISBAN
2001 SEASON

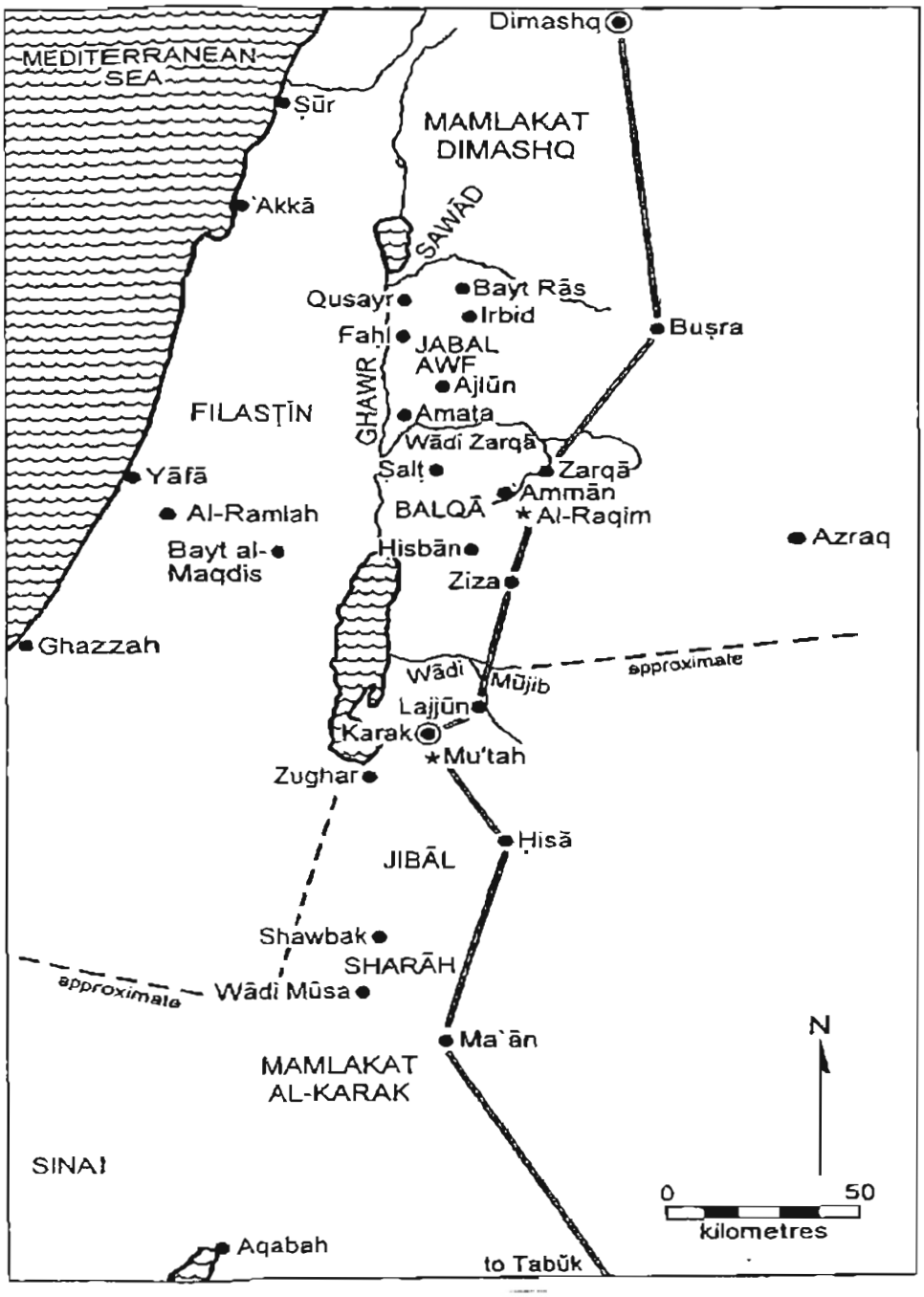
Tall Hisban Contour Map. Reproduced from Bethany J. Walker, "Mamluk Administration of Transjordan: Recent Findings from Tall Hisban" *The Bulletin of Middle East Medievalists* 13 (October 2001) 2,31.

Figure 5



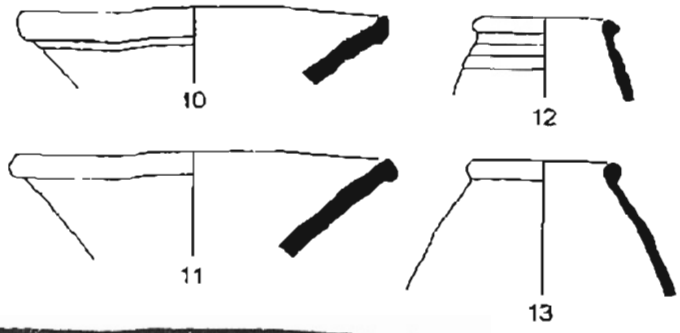
Map of Sugar Sites in the Jordan River Valley, adapted from Jum'a Mahmoud H. Kareem, *The Settlement Patterns in the Jordan Valley in the Mid- to Late Islamic Period* (Oxford: Archaeopress, 2000), 74.

Figure 6



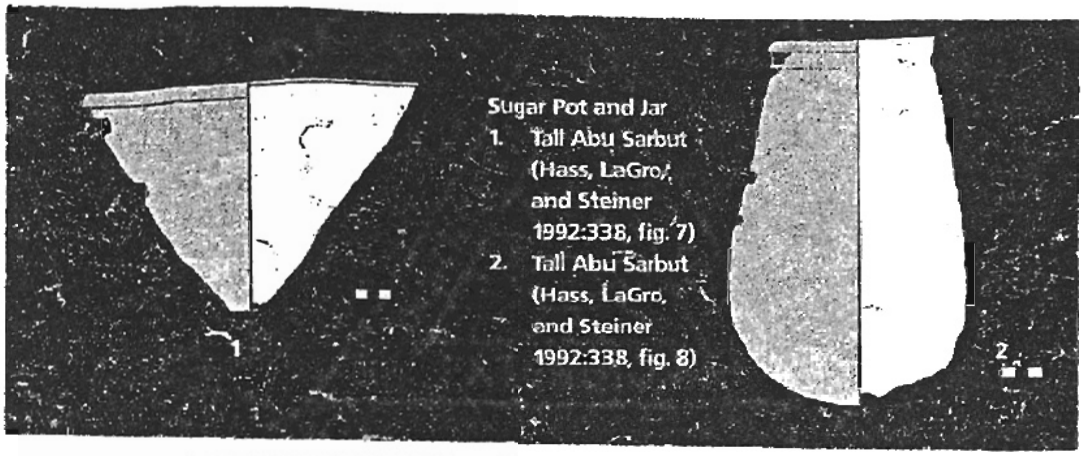
Map of major centers, provincial divisions and the pilgrimage route in Mamluk Jordan. Reproduced from Alan Walmsley, "Fatimid, Ayyubid and Mamluk Jordan and the Crusader Interlude" *The Archaeology of Jordan*, ed. Burton Macdonald, *et al.* (Sheffield, England: Sheffield Academic Press, 2001), 522.

Figure 7



Sugar pots from Tabaqat Fahl (mid-fourteenth to fifteenth century)

Reproduced from *The Archaeology of Jordan*, ed. by Burton MacDonald, Russell Adams and Piotr Bienkowski.

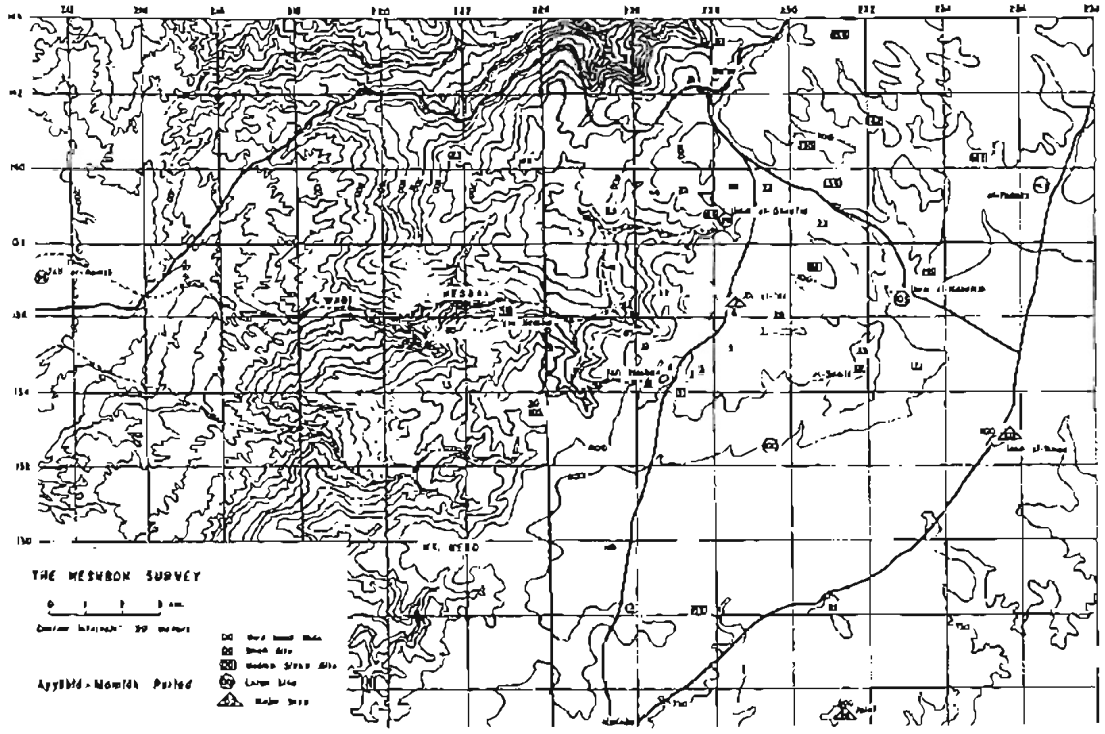


"Molasses" Jar from Mamluk Hisban (thirteenth and fourteenth centuries)

Reproduced from "Militarization to Nomadization: The Middle and Late Islamic Periods," Bethany J. Walker, *Near Eastern Archaeology* 62:4 (1999).

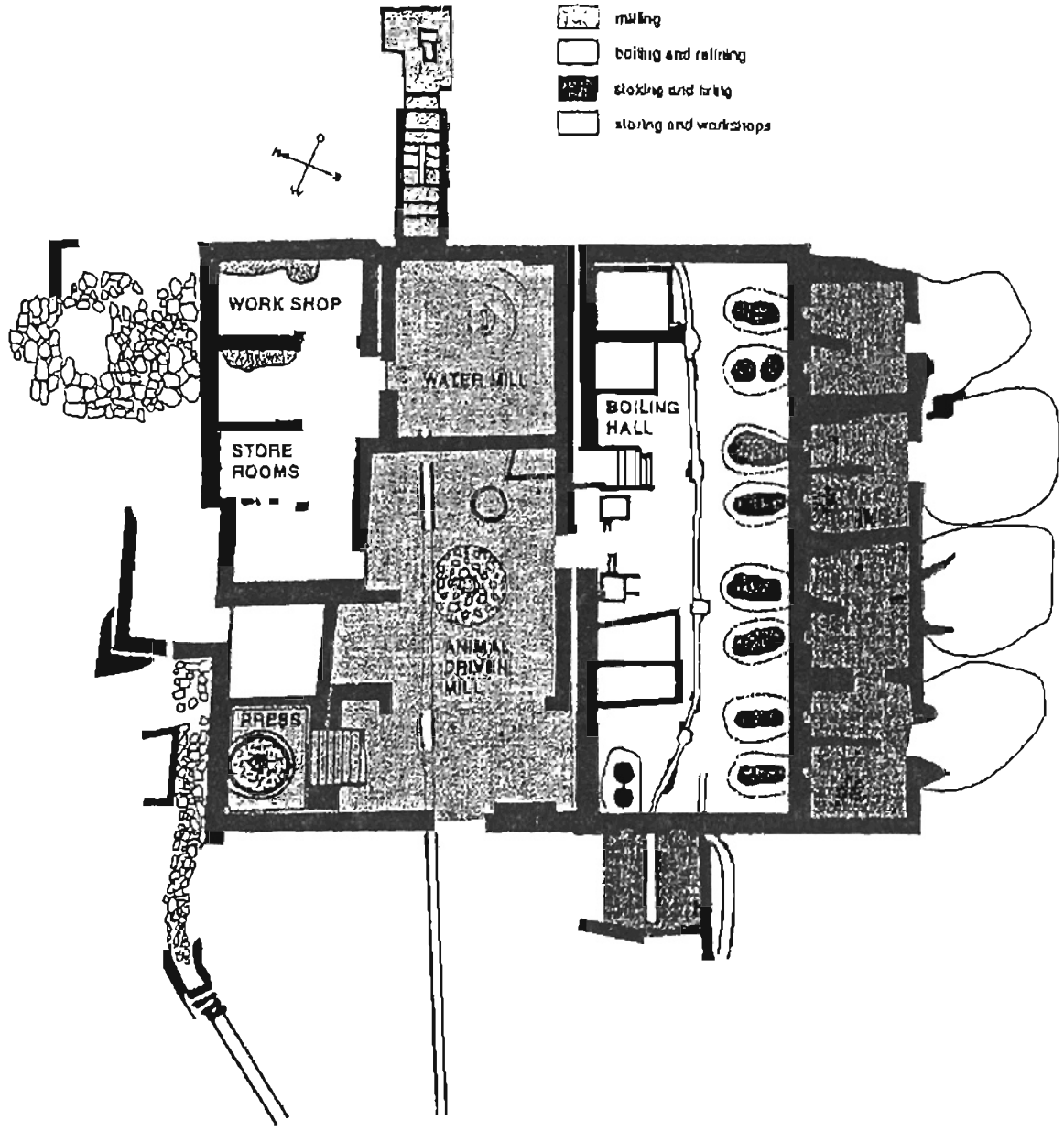
Photographs and drawings of sugar pots from various Jordanian sugar sites.

Figure 8



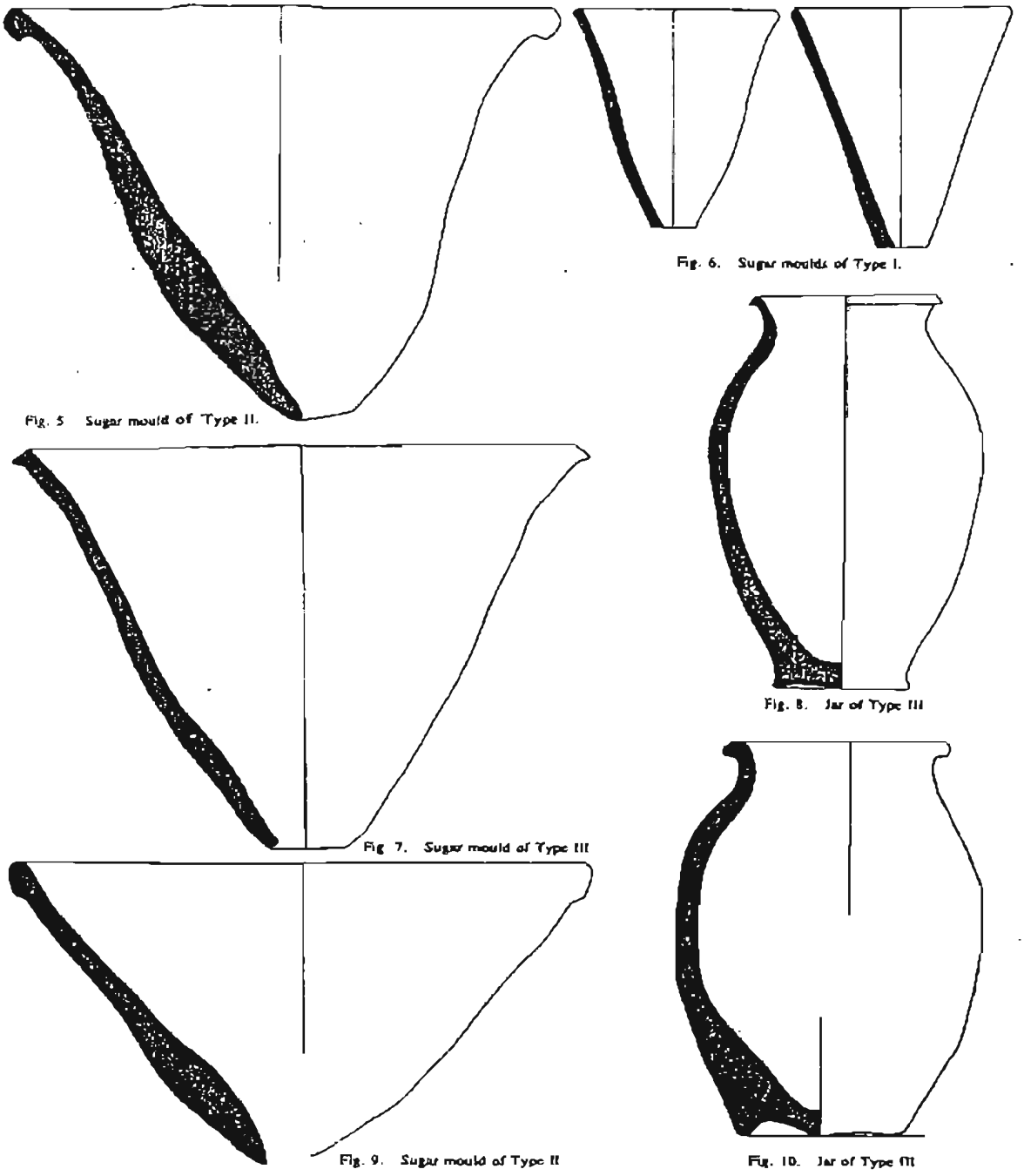
The Heshbon Survey, the Ayyubid-Mamluk Period. Reproduced from Robert D. Ibach, Jr., *Archaeological Survey of the Hesban Region, Hesban 5* (Berrien Springs, MI: Institute of Archaeology and Andrews University Press, 1987), 193.

Figure 9



Kouklia-*Stavros:* plan showing the working units of the production complex. Drawing: Marie-Louise von Wartburg, FSA. Reproduced from "The Archaeology of Cane Sugar Production: A Survey of Twenty Years of Research in Cyprus," *The Antiquaries Journal*, Vol. 81 (2001)

Figure 10



Sugar moulds and jars, type I-III, excavations at Kouklia-*Stavros*. Reproduced from Marie von Wartburg and F.G. Maier, "Excavations at Kouklia (Palaepaphos) 15th Preliminary Report: Seasons 1987 and 1988," *Report of the Department of Antiquities, Cyprus*, 1989.

VITA

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