THE STUDY OF MICRO-ARTIFACTS EXTRACTED IN ARCHAEOLOGICAL FLOTATION FROM THE MOUNT ZION EXCAVATIONS AS THE BASIS FOR AN ASSESSMENT OF THE HISTORICITY OF JOSEPHUS' DESCRIPTION OF THE ROMAN SIEGE OF JERUSALEM IN 70 C.E.

by

William Stumpff

A Thesis submitted to the faculty of
The University of North Carolina at Charlotte
In partial fulfillment of the requirements
For the degree of Masters of Arts in
History

Charlotte

2023

Approved by:

_____
Dr. Shimon Gibson

_____
Dr. Ella Fratantuono

_____
Dr. Rafael Y. Lewis

ABSTRACT

WILLIAM STUMPFF. The Study of Micro-Artifacts Extracted in Archaeological Flotation from the Mount Zion Excavations as the Basis for an Assessment of the Historicity of Josephus' Description of the Roman Siege of Jerusalem in 70 C.E. (Under the direction of Dr. Gibson)

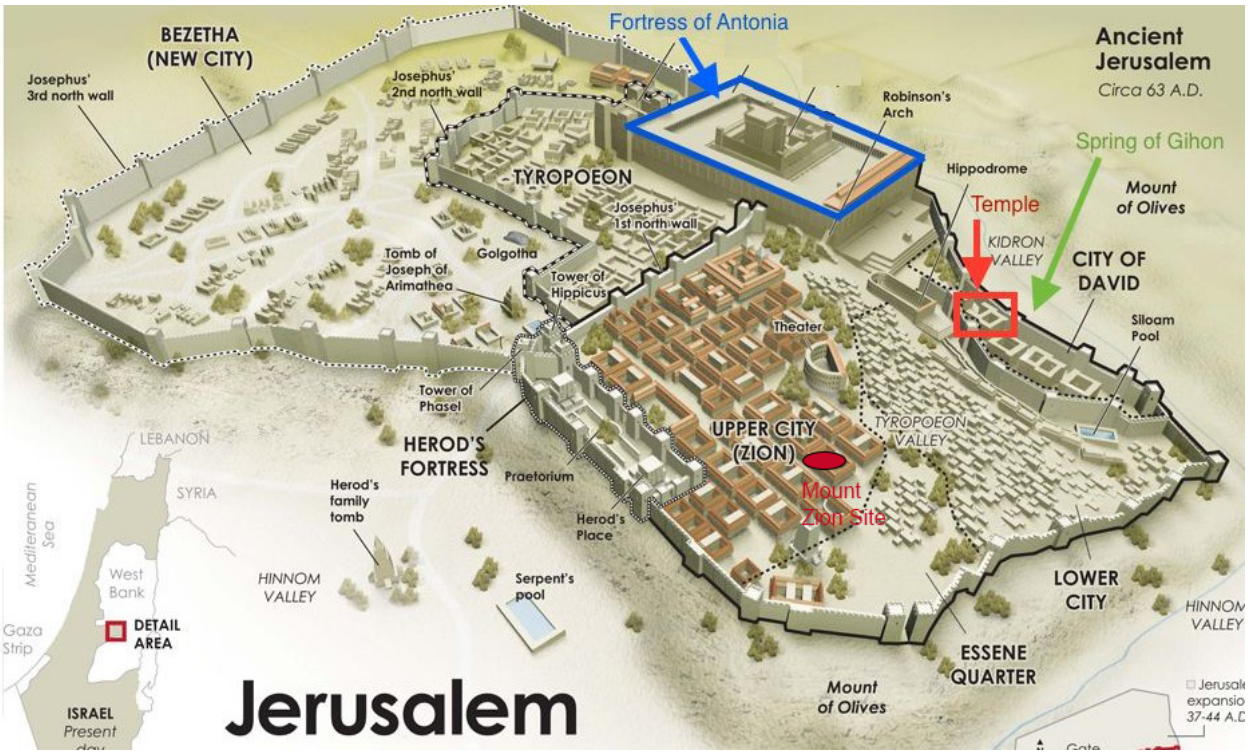
While Josephus' credibility has been checked many times by scholars, no one has thought to use flotation to check the starvation during the Siege of Jerusalem in 70 C.E. The Mount Zion archaeological site contains levels of the Early Roman (ending in the siege), Byzantine, and Medieval Periods. Josephus described a scene of death and starvation inside the city's walls. Flotation has the capability to view the dietary pattern and quantity of food consumed during the living surface's final usage. I argue that the people inside the city did not suffer as much as Josephus stated in the *Jewish War*. This thesis proves how the people during the Early Roman period may not have consumed the same quantity as the other periods but disproves what Josephus said when pertaining to the Mount Zion Site.

ACKNOWLEDGMENTS

I would like to give thanks to every involved in the 2022 season at Mount Zion. This included Dr. Gibson, Dr. Lewis, Suzanne Johnson, Virginia Withers, and Gretchen Cotter. Before I even started my thesis, Drs. Gibson and Lewis began collecting the flotation samples, and without the two of their guidance during the process, I would have never understood everything that came with flotation. Thank you to Dr. Fratantuono for helping me with the grammatical side of the paper. And the biggest thank you to Suzanne Johnson for counting the thousands of micro-artifacts. An additional thanks to the CHANE Foundation for funding this three-month-long trip to Jerusalem.

TABLE OF CONTENTS

LIST OF TABLES



(Map of Second Temple Jerusalem)

Introduction

The Siege of Jerusalem 70 C.E. left the city absolutely destroyed with the remaining Jewish population fleeing the city. The siege caused famine, death, and the end of the Second Temple period. With the destruction of the city, many historical documents went up in flames, leaving the works of Flavius Josephus as the only primary source and eye witness of the First Jewish-Roman War (63-73 C.E.).

The purpose of this study was to examine the micro-artifacts -- small items recovered from floors or installations of ancient buildings -- using the flotation method, since these extremely small objects cannot usually be seen with the naked eye. The micro-artifacts studied came from the floors and installations of houses from 70 C.E. uncovered during archaeological excavations at Mount Zion in Jerusalem. I analyzed the data from this dig and reported on the results of the work in this thesis. I then consider whether the artifactual data help us comprehend the description of the Roman siege of Jerusalem as given by Josephus in his writings, particularly in *The Jewish War*. I examine and assess the credibility of Josephus as a historian of the siege and I provide a summary regarding the current consensus on this subject among scholars. I argue that the people trapped in the city did not starve to the same extent that Josephus described. To prove this argument, the quantitative analysis of the Early Roman period's food remains need to equal or greater than the Byzantine and Medieval periods to prove the people did not starve during the siege. If I can assess this argument, then it will disprove Josephus as a reliable source.

Chapter One introduces the Jewish historian Flavius Josephus and the historical circumstances of the siege of Jerusalem. I highlight the historiography, presenting the details of the failed revolt at Jerusalem. An essential part of this chapter discusses the biases that Josephus

may have had while he was employed by the Flavius family, but at the same time staying loyal to his Jewish community. Alongside the historiography, I examine *The Jewish War,* the most important source describing the siege. Characterized as an apology for the Jewish public, Josephus describes the people's suffering. The food supplies described by Josephus demonstrated a massive shortage, causing famine in the city. Men stole food from their wives, and wives stole food from their husbands. The Jerusalemites became so desperate they began to eat anything they could find, including rotten food and cow manure.

Chapter Two focuses on the flotation analysis of the soil samples taken from the loci that may be dated to the time of the siege of 70 C.E. A quantitative analysis creates an even investigation for the three periods. I present graphs, charts, and tables to illustrate this information. The flotation finds should consist of an assortment of items revealing the dietary patterns of the people. The analysis demonstrates the items consumed, immigration of livestock, and botanical remains surrounding the city for dietary patterns.

In Chapter Three I compare the flotation analysis (and other comparative data) to Josephus' description of the famine of Jerusalem. My analysis may change the common interpretation of the living conditions through the micro-artifacts found at the Mt Zion Site. If Josephus is proven correct, little to no food remains will have been found, indicating that they consumed every piece of edible substance available. If Josephus is proven wrong, a plethora of food remains would suggest that people did not necessarily starve, or at least not in that part of the city.

Chapter One

Introduction

The Siege of Jerusalem (lasting until 70 C.E.) ended the precarious Jewish and Roman balance of power which had been in place in Palestine since Pompey's arrival with his Roman troops around 60 B.C.E. This period of time included rulers who were appointed by the Romans, notably the well-known Herod the Great (from 37 B.C.E), and after the Herodian dynasty, by a series of Roman procurators. The siege of Jerusalem took place at the time of the First Jewish-Roman rebellion, (lasting from 66 to 70 C.E.) and was the direct result of growing tensions between the two cultures. The Roman blockade of Jerusalem lasted a total of four months, causing the destruction of the entire city and the Jewish Temple. The siege was a demonstration of the military might of the Romans, and the savagery of the conquest served as a message to the other provinces of the empire who might be considering rebelling. The Roman General Vespasian (69-79 C.E.) and his son Titus (79-81 C.E.), who both later became emperors, led the campaign to extinguish the rebellious Judaean citizens.

As a result of the destruction of Jerusalem, the written works of Flavius Josephus are the sole eyewitness accounts concerning first century Judaea history. Born into a high-ranking priestly family of Pharisees, Josephus first became a general in the Jewish army. After refusing to commit suicide with his fellow soldiers, following the defeat at Yodfat (67 C.E.), Josephus was captured and became a Roman slave. During this time, the Flavian family noticed Josephus' intelligence and appointed him as their family historian. Provided with Roman-based sources, he began his journey to becoming the most influential individual historians of first century Jewish history. Josephus' text encompasses the entire history of this region, notably in his book

Antiquities of the Jews, including references to the sectarian group of the Essenes, as well as Jesus (though some see this as a later extrapolation), John the Baptist, and of course to many other historical aspects of the revolt against the Romans. *The Jewish War* describes the events of the Siege of Jerusalem, including the destruction, the reason for the siege, and the suffering of the people residing inside the city walls. The text provides a detailed record of the conditions suffered by the people inside the city during the period of the Roman siege.

In this chapter, I argue that Josephus' description of the suffering only represented the lower class of the inhabitants of Jerusalem, while the upper class did not suffer to the same extent. This chapter addresses the following research questions include the following: What happened before the siege? Why did Rome want to conquer Judea? What is the difference between the rich and the poor? What did Josephus think of the insurgents? What were the conditions of the people inside the city?

Background on the Jewish Revolt and Siege of Jerusalem

The initial crisis between Rome and Judea began well before the Jewish Revolt of 66 C.E. to 73 C.E. with the death of Herod the Great in 4 C.E. The death of Herod, who was appointed as King of Judea by Rome, led Emperor Augustus to establish a Roman province in Judea two years later. During Herod's rule, he created an immense rift in the relationship between Rome and Judea. The next 60 years until the beginning of the Revolt only hurt the relationship between the two nations. Crisis after crisis by the Roman political system enraged the Judeans to the brink of Revolt. During the sixty years, several significant instances arose that led to the Judeans to Revolt against the Roman Empire. [1]

[1] Martin Goodman, *The Ruling Class of Judaea: The Origins of the Jewish Revolt Against Rome A.D. 66-70 (*Cambridge, New York, Port Chester, Melbourne, Sydney: Cambridge University Press, 1987), 1.

Before the Roman forces laid siege on Jerusalem, several events pushed Judea to the breaking point. Along with Rome's failure to establish peace with their Judean territory, Emperor Gaius attempted to insert a statue of himself inside the Temple. A statue in the Temple would undermine the monotheistic faith of Judaism. This attempt failed with the emperor's death. The next emperor, Claudius, appointed Herod's grandson Agrippa I as the new King of Judea, which resulted in temporary peace. However, King Agrippa's role in the Roman political system benefitted Roman authority and denied the refortification of Jerusalem. Riots and banditry started in the countryside that later spread to Jerusalem. Some wealthy Judean citizens immigrated to other regions in fear of the upcoming Revolt. [2]

While the Roman Empire gained territories in Judea, they needed high ranking Judeans to govern the territory. In Roman fashion, they established new territories into the existing political system or otherwise they left it to autonomous control. [3] The failure of this policy compelled Rome to recapture Judea. Bandit acts throughout the region forced Rome to suppress the rebellious acts through military actions. After decades of being a part of the Roman Empire the Judean elites identified themselves as both Roman and Jewish, believing that they deserved the same rights as other Roman citizens. [4]

Starting in the coastal city of Caesarea, the Roman Army began their conquest of Judea. The overall goal of the Romans was to reach and conquer Jerusalem. Before the destruction of Jerusalem, the Romans traveled across the region, capturing major cities establishing their dominance over Judea. Regarding military experience, weaponry, and the number of trained troops, Rome completely outclassed the Jewish Rebels. A tactic of Cestius (Governor of Syria)

[2] Ibid., 11-24.
[3] Ibid., 29.
[4] Martin Goodman, *Rome and Jerusalem: The Clash of Ancient Civilizations (New York: Alfred Knopf, 2007), 15.*

to deal with the region's hostile terrain was to abandon any object that might slow their pace, including supplies, weapons, and livestock. The only items the Romans kept included artillery weapons intended for siege warfare that the rebels might use against them and the animals intended to carry it. The rebels main form of combat revolved around guerrilla warfare. Cestius exploited this and tricked the rebels into thinking they had fallen asleep while the army continued their path to Jerusalem in the dead of night. The Roman presence in the city created a conflict among the region's locals with one soldier exposing himself inside the Temple. [5]

Before the Jewish Revolt, Rome increased taxes on the empire's territory. The rising taxes caused an uproar in Judea but did not infuriate the people to the same extent as the Roman sacrilegious acts. Typically, Roman law allowed the free practice of religion, but they went to the extreme by trying to place another statue, of the Roman Emperor Caligula, in the Temple. Although never completed, this endorsed the stigma of the Roman oppressive rule in Judea. [6] The Romans did not represent the only harmful entity to the citizens of Judea; the poorest of Judea began to bear a grudge against the richest who held favor in Rome. They raided, looted, and murdered the Jewish elites. The elites of Judea favored Roman rule which heightened the difference in economic prosperity of the two classes. The poor began to act accordingly, feeling the burden of the rising land prices. The rich sided with Rome but placed themselves in the anti-Roman rhetoric to display comradery with the poor. Until 70 C.E., the majority of fighting did not involve the Romans but it was an interpersonal conflict among the Jewish elite and poor. [7] The primary physical violence came during the Siege of Jerusalem in 70 C.E.

---

[5] Steve Mason, *A History of the Jewish War, A.D. 66-74,* (New York: Cambridge University Press, 2016), 281-296.
[6] Goodman, *The Ruling Class of Judaea,* 10-11.
[7] Goodman, *Rome and Jerusalem,* 441-442.

Jerusalem represented the last independent Jewish state and the final enemy of Rome. Along with being the capital city of Judea, it contained the most religious site of Judaism, the Temple. The Roman conquest of the Jewish cities resulted in a major diaspora of Jews to Jerusalem and foreshadowed the absolute defeat of the Jewish rebels. The conquest of the Temple would symbolize the defeat of Judea. After the suicide of Nero in 68 C.E., Vespasian strived to become the next Emperor of Rome. To legitimize his claim to the throne, he wanted to demonstrate his strength by conquering a foreign territory. Martin Goodman emphasizes that "Vespasian's image urgently needed the gloss of foreign conquest-the surest foundation of authority for a Roman Politian". [8] Conquest and the demonstrations of strength embodied the best way for Romans to rise in the political system. Knowing how the conquest of Jerusalem meant to his rise to power, Vespasian started a bloody siege that he planned to win at any cost. [9]

The suicide of Nero resulted in a civil war inside Rome. Along with gaining the title of Emperor, Vespasian wanted to reestablish peace in the Roman Empire. Roman cultures praised strong leadership, and the Flavian family took full advantage of this knowledge. Publicizing the war efforts raised the Flavian family's influence in the Roman courts. The Romans preferred, when they conquered foreign territory, to appoint a leader of their choice. The successful conquest helped establish the regime and the peaceful transition of power. According to Goodman, the Flavian family focused their attention on the three main "media" outlets, which included: the replacement of senators, the construction of monuments in the Flavian name, and the circulation of new coins. The conquest of Jerusalem allowed the Flavian family to be

[8] Ibid., 474.
[9] Ibid., 473-474.

accepted as the next royal family in the Roman Empire. [10] With the knowledge of the events leading up to the siege historians have researched every aspect of Josephus' life.

History of Research on Josephus

As influential as Josephus was during the first century Judean history, many have debated aspects of his life and writings. Josephus' text, *Vita,* crafted as an autobiography and his development as the Flavian family historian. He also wrote *Jewish Antiquities* and *Against Apion, which* Tessa Rajak emphasized the underlining narrative of an apology narrative to his fellow Jewish citizens. [11] Even though Josephus was a slave of the Flavian family, Rajak concluded that he did not lose his faith in Judaism. Her evidence suggests that Josephus always attempted to demonstrate that the best solution to the Revolt was the cooperation between Rome and Judea. A mutual relationship between the two cultures would result in prosperity in the ancient world. Even after being forced to write for a Romans audience, Rajak doubts that Josephus experienced any internal changes to his beliefs. His apologetic narrative spread to other Greek-speaking nations that reached the hands of foreign Jews. [12] Rajak's notes that this fits in with other historians' interpretation of Josephus.

Goodman follows the same apologetic theme of interpreting Josephus' text as Rajak. Being an elite member of Judea, Josephus self-identified as both Roman and Jewish similar to many other Judean elites. Josephus' eyewitness accounts described the traumatic events of Judean history; however, his apologetic narrative was not meant to justify his newly found political power but to show the resemblance between the two cultures. Goodman also states that while Josephus works highlighted the cause of the revolt, one should not presume inaccuracy in his

[10] Mason, *A History of the Jewish War,* 3-6.
[11] Tessa Rajak, *Josephus: The Historian and His Society (Great Britain: Duckworth, 1983), 6.*
[12] Ibid., 224-225.

accounts. He argues that the hostility of the Roman governors of Judea serve as the main cause of the Revolt. [13] The apologetic narrative is associated as the new trend amongst historians.

Steve Mason aligns with Goodman blaming the governors agitating the youth who later became the insurgents of the Revolt. Judea's leaders began enlisting the nation's youth to fight against the tyrants which forced the Romans to intervene. [14] Josephus' autobiography claims the comfort he felt while being in the good graces of Titus. However, while he did live in luxury with Titus, he felt pity for his fellow captive Jews who did not receive the same treatment. [15] Mason also inferred that the *Antiquities* narrative meant to portray his apologetic feelings for the elite Judeans and a hope for a peaceful future. [16] He concludes that Josephus' works represent the most influential works that facilitate historians in salvage the useful information. The message of Josephus can include two different meanings that included the loyalty to the Flavians or a declaration of war guilt. [17] Josephus may represent the only eye-witness account but was not the only Flavian historian.

The other Flavian historian, Tacitus, wrote about the Jewish Revolt in a different manner in his text The Histories. By comparison with Josephus, some of the primary sources Tacitus used consisted of military reports provided by the Roman generals themselves. The difference between the two Flavian historians is that Tacitus published his text approximately 30 years after the rebellion against the Romans and did not witness the events that he wrote about, while Josephus did witness the events. Rajak notes that the sources Tacitus employed, besides the same sources Josephus made use of, are substandard and harmed the authenticity of his work. [18] The

[13] Goodman, *The Ruling Class of Judaea,* 6-7.
[14] Mason, *A History of the Jewish War,* 109.
[15] Ibid., 21.
[16] Ibid., 274.
[17] Ibid., 576.
[18] Tessa Rajak, *Josephus, 209.*

works of Tacitus, as suggested by Rajak, become unnecessary when compared to Josephus, since Tacitus was concerned with facts dealing with the outcome rather than with matters relating to forethought and deliberation. [19] Seward makes use of Tacitus in a different fashion, by using his text as a way to question Josephus as a reliable source. For example, the population numbers that Josephus provided for Jerusalem differed from those given by Tacitus, with Tacitus inferring that Josephus' number were significantly exaggerated. [20] Therefore, quite a few historians of Josephus have questioned his opinion on Jerusalem.

Josephus' Opinion on Jerusalem

The insurgents who started the Revolt against the Roman Empire consisted of members of Judea's peasant class. These individuals wanted Judea's independence from their Roman overlords. P. Bilde notes how past historians have assumed "Josephus was the main reason for the war in the policy and behavior of the Jewish insurgents, the so-called robbers and imposters." [21] As a representative of the Flavian family, Josephus declared the insurgents' fault for causing the Revolt to the Roman audience. This took all blame away from the Romans for causing the war. Bilde argues the main reason for the Revolt was the failing socio-economic conditions of Judea's peasant class. This economic inequality forced the insurgents to rebel against Rome. [22] Located throughout Judea, the insurgents immigrated to Jerusalem to find shelter and make their final stand.

In *The Jewish War,* Josephus had few positive comments about the insurgent's actions. The insurgents guarded all the exits of the city's wall to ensure no one entered of left the city. If

[19] Ibid, 214.
[20] Seward, *Jerusalem's Traitor:* 274.
[21] P Bilde, "The Causes of the Jewish War According to Josephus," *Journal for the Study of Judaism in the Persian, Hellenistic, and Roman Period,* 10, No. 2 (1979): 181.
[22] Ibid., 196.

anyone approached the gates, they were immediately killed with no questions asked. Those in favor of Roman rule who successfully fled the city traveled to the Roman camps to persuade the Roman forces to assist in rescuing the innocent citizens trapped in the city. The cries for help from the Judeans of Jerusalem persuaded Vespasian to lay siege to the city. [23] Before the arrival of the Romans to Jerusalem, they hoped the immense army would intimidate the insurgents into surrendering, but to no avail. The citizens trapped inside the city strove for a peaceful solution to the Revolt. The insurgents, on the other hand, wanted the opposite and continued to fight for their freedom. [24] During the Revolt, the insurgents resorted to sneaky, underhanded tactics to fend off the Roman forces. Cowering in fear from the attacks, the Roman forces heard the innocent citizens yelling for peace and invited the Romans inside the city's walls. The insurgents only fought in guerilla-style combat, attacking them, and fleeing to disturb the Roman advancements. [25] Josephus even personally tried to convince the insurgents to concede the Revolt with no success. The insurgents did not change their battle strategies. The citizens traded their property and valuable possessions for the ability to leave the city safely. [26] Being trapped in the city caused the famine that created a conflict between the insurgents and the citizens inside the city.

The insurgents represented the raider who looted homes in search for food. They tortured and killed any citizens hiding food, stole food from their own family, and robbed anyone concealing food. Along with stealing food, they intimidated anyone seeking refuge with the Romans. Dragging them to witness the destruction caused by the Romans, they tried to demonstrate what happened to those who fled the safety of the city; citizens' fear led them to

[23] Flavius Josephus. *The Jewish War, Books IV-VIII* (Loeb Ed. Transl. Thackeray), 121.
[24] Ibid., 217.
[25] Ibid., 233.
[26] Ibid., 333.

remain in the city. Titus began to remove the hands of prisoners, which gave reasons for the insurgents to continue the battle. [27] Josephus said nothing positive about the insurgents but did not want the city of Jerusalem to meet the same fate as the rest of Judea.

Being a citizen of Judea and a man who practiced Judaism, Josephus knew the importance of Jerusalem. To demonstrate the importance of the city, he stated "behold the beauty of what you are betraying: what a city! what a temple! What countless nations' gifts!" [28] Josephus had the goal to save the city and Temple from both the Romans and insurgents. He knew that this siege meant the end of the city and the destruction of the Temple which signified the end of the Revolt. Before the inevitable destruction of the Temple, Josephus noted how Titus warned the people of the pending destruction of both the city and the Temple. This emphasized the forced rhetoric of Josephus stating how Titus apparently did not want to destroy the Temple. Described as an accident, the Temple burnt to the ground. Josephus even described how Roman soldiers attempted to save the Temple and his personal sorrow about the Temple's destruction. [29] Josephus apparently wrote *The Jewish War* as propaganda for his Roman superiors and seemed highly influenced by his Roman friends; therefore, he seems to have distorted the quantity of food in the time of the siege.

Hidden Food in the City of Jerusalem

During the Roman rule of Judea, the ruling class experienced massive prosperity. With the Romans' backing, the region's elite began collecting large plots of land once owned by the peasant class. The increased immigration to the region led to a reduction in land available for individuals to occupy, resulting in a biased land division. The lack of land and increased

[27] Ibid., 333-343.
[28] Ibid., 331.
[29] Ibid., 447-453.

population at that time may have been an important factor that created famine and affected the people even before the Siege. The lack of land resulted in the starvation of the poor that needed to borrow money from the elite. The peasant class did not have the capability to repay the debt, so borrowing money was not an option for many people. The lack of land resulted in the lack of food that later hurt the people during the siege. [30]

When the inhabitants of Jerusalem recognized that the path of the Revolt pointed towards them, they stockpiled food that should have lasted, at the minimum, the duration of the siege. This put the Jerusalemites inside the wall at a supposed advantage, with the Romans struggling to secure clean water. [31] As discussed above, the poor represented the insurgents, and the rich represented the ruling class. This means that the rich had plenty of supplies while the poor scavenged for scraps. Goodman described how the Temple stores contained large quantities of food. Unlike Josephus' description, Goodman states that the people with food stores did indeed share food with the insurgents. He gives no evidence to this claim. With most of the food located in the Lower City with the elite, it should have lasted until the war's end. He also explains how only a few citizens with food stores experienced having their food supplies destroyed. [32]

Subterranean tunnels inside the city were a perfect place for food and people to hide during the siege. These tunnels reached all parts of the city and contained secret exits leading outside the city. The exits allowed the rebels to sneak in and out of the city and steal food from the Roman camps. The tunnels also contained fresh water. Given that the Romans did not notice the tunnels the Judeans used them to hide, store, and scavenge for food. Closer to the end of the siege, rebel leaders mainly occupied the tunnels where they waited out Roman assaults. These

[30] Goodman, *The Ruling Class of Judaea*, 61-62.
[31] Ibid., 177.
[32] Ibid., 216.

leaders kept non-rebels out of the tunnels to conserve their provisions and stone-work tools; citizens who did manage to flee to the tunnel with food were immediately killed. Having learned of the tunnels leading outside of the city, the Roman forces blocked the tunnels to prevent people from leaving the city. [33] Historians have concluded that Jerusalem did in fact have food stores and opened debates on Josephus' credibility.

Historiography on Josephus' Credibility

As mentioned already, the fact that Josephus writings are the only source of the first century Judean history. Born into a high-ranking priestly family of Pharisees, Josephus became a general in the Jewish army. He refused to commit suicide with his fellow soldiers after the defeat at Yodfat (67 C.E.) but was captured and became a Roman slave. The Flavian family noticed his intelligence and appointed him as their family historian. His affiliation with his fellow Judaeans and his intended Roman audience caused biases in his text. Josephus' personal biases left historians wondering about the credibility of the text. Besides his personal eyewitness accounts of the events, the only other primary sources that he utilized in his texts consist of the military field reports provided to him by Vespasian, Titus, and other Roman generals.

Broshi has tested the credibility of Josephus against archaeological evidence, Josephus provided the dimensions of Masada's architectural remains almost precisely as they have been found in the excavations. Broshi evne assumed that Josephus never stepped foot on the ancient city. Josephus stated the fortress included 37 towers in the fortification wall, while the archaeological excavations found the remains of 27 towers. This mistake might have been the

[33] Mason, *A History of the Jewish War,* 425-440.

fault of the archaeologists, the copyist, or it may have been Josephus' textual error. [34] Broshi also addressed the geographical and census information provided by Josephus, inferring that "all these figures are reasonably accurate." Regarding the geographic information, Broshi wrote: "This precise number may appear credible but [it] is quite impossible." [35] The methods Broshi used to judge Josephus' credibility reveal that Josephus may very well have had some flaws in his work, but not enough to question the overall authenticity of his writings.

Huntsman acknowledged the ancient writing techniques of historians, indicating that they differed from the neutrality of modern historian techniques. Josephus did not write to *persuade* a given audience, but, instead, he followed a trend popularly used by historians in antiquity to state facts only for the purpose of *informing* the reader. [36] He comprehended the external and internal biases of Josephus, as representing the pro-Roman and pro-Jewish narratives. Josephus praised Vespasian and Titus, while at the same time trying to remain faithful to his heritage. [37] Broshi and Huntsman both noticed Josephus' inaccuracies and biases, but nevertheless they both regard Josephus as the single most influential source of that era.

During the Jewish War, the Roman Empire witnessed turmoil with the suicide of Nero. In Steve Mason's book *A History of the Jewish War, A.D. 66-74*, he argued that the Flavius family used the victory in Judaea to peacefully unite Rome. With the Flavian family wanting as much publicity as possible, Josephus questioned what was true and what was false. Mason used the rest of the book to analyze the controversy and to deduce what the narrative truly meant to recount. [38]

---

[34] Magan Broshi, "The Credibility of Josephus," in *Bread, Wine, Walls, and Scrolls,* 71-77 (New York: Sheffield Academic Press, 2001): 71-72.
[35] Ibid., 73.
[36] Eric Huntsman, "The Reliability of Josephus: Can He Be Trusted?" *Masada and the World of the New Testament* BYU Studies 36.3,)1996-7): 393.
[37] Ibid., 397.
[38] Mason, *A History of the Jewish War*, 4.

He described how Josephus had two narratives: one acceptable to his Roman sponsors and one of events not actually available to him such as the military report given to him by Roman generals. To explain how Josephus used material not available, Mason described a Herodian and Roman governors' dispute.

Described as a "rapid-fire summary," he concluded that available material did not structure his narrative but adapted it to fit his purpose; meaning he used the information in the way he wanted with no concern for the true meaning. [39] During siege warfare scenes of rape have a direct connection with pillaging. Although a common occurrence in war, Josephus never mentioned any instances of rape in his narrative. Knowing his audience, he purposely did not mention rape since Roman elites preferred to read about acts of heroism. [40] An example of Josephus' inaccuracy comes from his exaggeration in his accounting. He stated that the number of casualties and troops during the war needed to be divided by a hundred or a thousand to reach a reasonable number. The skewed number represented in *The Jewish War* signifies the inaccuracy of Josephus' counting techniques. [41] Knowing that the Flavian family represented the main audience altered the meaning of his narrative.

Mason published a chapter in the book *Josephus and Jewish History in Flavian Rome and Beyond* that focuses on interpreting the audience and meaning. His goal was to demonstrate how influential the audience was in shaping Josephus' structures, themes, and characteristics. In historical writing, the reader must know how the writer influenced the historical events. This would leave Mason questioning if the intended audience had the capability to comprehend how

[39] Ibid., 134.
[40] Ibid., 442.
[41] Ibid., 410,427.

Josephus employed the sources. [42] Ancient authors tended to write to communicate with others about their interests, values, and attitudes. Mason deduced that the Flavian family personified the primary audience, but there are hidden messages in his narrative for a very different audience.[43] Mason indicates five examples in the text targeting the Roman elite which include the following: how his narrative was first reviewed before publication, the evidence of references to the war and his circumstances while writing, the little information on Judean culture, the visible audience of the Romans, and the theme of a civil war between Judea and Rome. [44] To appeal to his sophisticated Roman audience, Josephus produced a narrative of propaganda to please the Flavian family.

Historical and archaeological analysis indicate that Josephus' text reads highly in favor of Rome with numerical inaccuracies: based on what Josephus wrote, archaeological remains indicate that he did indeed see the locations in person. It is up to the historians to study Josephus and see how he described the suffering that enveloped the city. If so, many scholars consider him a credible source, but how did *The Jewish War* describe the living conditions inside the city?

Josephus on the Suffering During the Siege

Starvation brings out the worst of citizens trapped in a city, with no one involved in the conflict being safe. Famine, disease, and pillaging follows siege warfare. The Siege of Jerusalem of 70 C.E. represents the horrors of facing the Roman army. As the only primary source of first century Judea, *The Jewish War* contains the lone written description of the siege. Josephus witnessed the events and then illustrated the scene for his Roman audience. The scarcity of food

[42] Steve Mason, "Of Audience and Meaning: Reading Josephus' *Bellum Judaicum* in Context of a Flavian Audience," In *Josephus and Jewish History in Flavian Rome and Beyond, 71-100*. (Leiden and Boston: Brill, 2005), 71-72.
[43] Ibid., 74-78.
[44] Ibid., 78-97.

forced the besieged to scavenge and steal food, which on occasion resulted in conflict ensuing between the insurgents and other inhabitants of the city.

Josephus described how the Temple contained stores of food meant to supply peaceful citizens. Before the siege, the citizens collected food and filled the stores in the hopes that it would feed the population for the duration of the siege. In his description, Josephus stated how the insurgents raided the Temple and slaughtered the people hiding from the Roman forces.[45] During a siege, one tactic to force the enemy's surrender was to eliminate all food sources. The Roman forces destroyed everything in their path while traveling to Jerusalem. Josephus stated that "Every fence and palisade with which the inhabitants had enclosed their gardens and plantations having accordingly been swept away".[46] This quotation identifies how Titus wanted to force Jerusalem to surrender and foreshadowed the suffering that would occur during the siege. The Romans left no fruit trees standing during their invasion of Judea. Humans need more than just food to survive: the Romans also destroyed the water sources with the demolition of cavities and gullies across the region. Left without outside replenishments, what happened to the food already inside the walls?

Hunger forces people to do unimaginable acts in the search of food; Josephus described acts of pure savagery. Not all the people suffered during the siege as some still possessed stores of food. Raiders included both the Roman soldiers and Jewish insurgents engaged in the conflict. Those with concealed supplies were targeted by raiders because their physical appearance indicated they were being fed. Raiders tortured people who were well-fed until they revealed their hidden food. People consumed raw grain to prevent raiders from seeing the smoke from the ovens; even if they did cook the food, no one would wait for the food to bake, thereby

[45] Josephus. *The Jewish War,* 231.
[46] Ibid., 233.

consuming half-cooked food. According to Josephus, the hungry people of Jerusalem were similar to mad dogs: "battering upon the doors in the manner of drunken men, and in their perplexity bursting into the same house twice or thrice within a single hour." [47] Raids on homes with no food did not seem worth the time and so the inhabitants were left to die of starvation. [48] In some instances, raiders included family members with mothers taking food away from their children. Rebels conducted horrific acts of torture to feed themselves for continuing the battle. Insurgents even went as far as stealing provisions from the Roman outposts surrounding the city. All the examples of starvation indicate war in the surrounding area. [49] If people could not find food, they ate anything they perceived as edible.

Josephus described pile of "600,000" poor dead people tossed over the wall and highly inflated food prices, implying drastic measures taken in the search for food. With the gathering of herbs no longer possible, the people remaining in the city went to the sewer in search of food. Starvation changed their definition of food, with the people devouring old cow dung, leather, grass, and human flesh. [50] The most horrific event came from Mary of Bethezuba. Her family became refugees, immigrated to Jerusalem, and took part in the eventual siege. During the course of their journey from Peraea to Jerusalem, while transporting their family fortune and any food they could carry, their items were pillaged by the "tyrants," a term Josephus used to refer to the Romans. Before the initial siege, Mary and her family had arrived in the city and suffered from the daily raids by local Judaeans and Roman soldiers rummaging for food. Mary then did the unthinkable: killing, cooking, and eating her own infant child to stay alive. Roman soldiers discovered the remaining half of the cooked infant during a raid, and fled immediately in

[47] Ibid., 443.
[48] Ibid., 333-335.
[49] Ibid., 437-439.
[50] Ibid., 443.

horror. [51] The lack of edible food forced the people trapped in the city to find new ways of evading the Romans and the Rebels.

The Jerusalemites did not possess the energy to escape the city and were left vulnerable to slaughter. The scene depicted victims of both slain and starved lifeless bodies throughout the city. To escape the fires in the city, the people ran to the subterranean trenches to flee. Unknown to those taking flight, the Romans lay in wait to prevent anyone from escaping. The food hidden by the victims became spoiled due to blood tainting the food. This did not stop the starving Roman soldiers from consuming spoiled food and fighting each other for the scraps. Josephus also reported that if the Roman soldiers did not consume the spoiled food, they would have resorted to cannibalism. [52] This raises the question of how people still had food when trying to escape if they were supposedly already starving?

When it comes to the question "Did the Jerusalemites suffer during the siege?" the answer is: yes. It remains to enquire to what extent did the people suffer? Remembering the biases and audience of Josephus makes the modern historian wonder about the credibility of his work. He displayed famine and savage moments from both sides of the conflict. The question remains did the translator add to the questionable credibility of Josephus?

Analysis of the Translation of *The Jewish War*

When analyzing a translated ancient text, it is critical to understand how the translations reflect what the author truly meant to portray. Mistranslations alter the meaning of the text for those who are not literate in the source's language. Translations of *The Jewish War* took Josephus' ancient Greek handwritten texts and converted them into many languages, including English. How does the translation of *The Jewish War* affect the meaning of the text? This section

[51] Ibid., 435-437.
[52] Ibid., 483-485.

focuses on the translation of the Loeb Edition of *The Jewish War* and compares it to *A Greek and English Lexicon* which used influential historical figures' works to create a dictionary of ancient Greek to English. Comparing and contrasting will display how the translator chose to convert the ancient text and how translations may have altered the meaning of the narrative. This section checks the credibility of the translation when the original text has its own biases.

Translating ancient Greek to English comes with its own set of difficulties that modern historians often have such as understanding the emotions of the ancient narrative. Konstan acknowledges two difficulties when translating that include: "sympathy" and "anger". He argues that emotions are uniform in various cultures. Emotions evolve with natural selection, while the opposing hypothesis states that emotions depend on the given society. The ancient emotional terms represent either a subtle or a blunt narrative when translating to modern languages. Aristotle inferred how we interpret the behavior and motives of past through emotions. [53] How do the emotional implications of the ancient Greek language affect Josephus' narrative?

The Jewish War describes scenes of suffering during the Siege of Jerusalem in 70 C.E. The English translation described the city's inhabitants in a horrific manner enabling the audience to comprehend the suffering during the siege. A statement that emphasizes the emotions of Josephus includes "τροφην ασεβεοτατε, τουτον ηγησαι πολεμιον, αντονν δ΄ον της αιωνιου θρησκειας εστερησς θεον ελπιζεις συμμαχον εχειν εν τω πολεμω;" that Thackeray translates to "Most impious wretch, should anyone deprive you of your daily food, you would consider him an enemy:". [54] This statement follows the aforementioned theme of a blunt emotional text. Πολεμοω is defined as to make hostile or make an enemy of, which aligns with

[53] David Konstan, "Translating Ancient Emotions," *Acta Classica,* No. 46 (2003): 5-6.
[54] Josephus. *The Jewish War,* 404-405.

the meaning of the statement. [55] Denying people their food directly represents a form of hostility towards the enemy and demonstrates the suffering of the Jerusalemites.

Terms in ancient Greek have the same meaning as other terms that seem to be interchangeable. Josephus wrote in ancient Greek "τομ δε πορυς υθελκοντες ετ ωμα τα σιτια διηρπαζον." which Thackeray then translated to "they snatched the food half-cooked from the fire and tore it in pieces." [56] In the dictionary, there are several forms of the statement "tear in pieces" including "καταδυναοτευμ" which is defined as to tear in pieces, rend. [57] If Josephus used this term, it offered little to no difference in the statement. The translation would not have changed since the two terms have almost the same meaning. Thackeray did change the tense of the verb to past instead of present to fit the English language.

In some instances, the translation hinders the understanding of the original text. Josephus wrote that "και το μηδ οψει φορητον παλαι τοτε γενεσθαι τροφην." Thackeray translated this as "and what once would have disgusted them to look at had now become food." [58] The word τροφην can directly be translated to nourishment, food, or victuals which means exactly what Josephus intended the statement to portray. However, the word τοτε is defined as at times, or now and then, which infers that Josephus' description of the consumption of inedible items is less severe than Thackeray's translation. The word νυν is defined as now at this very time, and might have properly represented Josephus' statement in a more suitable manner. [59] This leaves the readers wondering how the English translation would have changed if he stayed true to what Josephus wrote in the original text.

---

[55] H.G. Liddell, H.S. Scott and Mckenzie, *A Greek and English Lexicon (1940) A simplified Edition,* by Didier Fontaine, 523.
[56] Josephus. *The Jewish War,* 334-335.
[57] Liddell, Scott, and Mckenzie, *A Greek and English Lexicon,* 326.
[58] Josephus. *The Jewish War,* 376-377.
[59] Liddell, Scott, and Mckenzie, *A Greek and English Lexicon,* 438, 651, 657.

With the majority of people not knowledgeable in ancient languages, translations create a window to the past. Josephus' works represent one of the world's most translated texts. It remains a question of how the translator affects the true meaning of the narrative. The Loeb edition of *The Jewish War* translated ancient Greek to English and accomplished a difficult task. For the most part, this translation stayed true to Josephus but had some errors.

Conclusion

The siege concluded in the complete destruction of Jerusalem and the Temple, ending the Second Temple period. The remaining citizens of Judea who survived and continued to revolt fled to Masada (a Herodian palace) for their final stand. During 73 C.E., Rome crafted a ramp of earth that led directly up the side of fortress. Predicting their impending demise, the surviving rebels decided to take their own lives instead of falling victim to the Roman forces. The result of the Jewish Revolt caused the greatest diaspora of Jewish citizens away from the Holy Land.

The destruction of an ancient civilization can be a gold mine for archaeologists. The destruction of a city means that whatever remained was hidden until excavated. Depending on Josephus' credibility, the artifacts from the Early Roman level may vary. Rubble, burnt layers, corpses, remnants of the city wall, and many other artifacts related to war appeared in excavations. Archaeological excavation of the siege will result in uncovering the tragedy that ensued. If the people suffered to the extent he described, there would be little to no food remaining; if not credible, plenty of food remains would be discovered in the Lower City of Jerusalem.

The Mount Zion archaeological site represents an area of one of the elite classes of Judeans residing in the Upper City that did not escape at the beginning of the siege. On this site,

a gold Nero Coin from 68 C.E. identified the site as a home of an elite family. [60] Along with identifying the class of the site, the coin also represented that the site's inhabitants may not have fled before the siege. Josephus stated how when fleeing, the people would swallow their gold coins for safekeeping, and no one would intentionally leave such a valuable item.

Due to the complicated nature of Josephus, whoever studies his text must understand his biases. This study makes it clear that Jerusalem did in fact have hidden stores of food, with Josephus crafting his story depicting the entire city suffering from the lack of food. Historians have debated the credibility and how his Roman audience influenced his narrative. The apparent narrative blames the insurgents, but before his appointment as the Flavian family historian, he rebelled against the Romans. He placed the Romans as heroes, citizens of Jerusalem as victims, and insurgents as villains. Raiders only attacked people with food, mostly elite.

The aforementioned sections indicated how the writings of Josephus needs to be analyzed in a different manner. The mistranslation of the text stated how the people may not have suffered to the extent described. Changing the translation from consuming from now and then to inedible items now and then only makes the suffering seem less severe. Knowing how the translation seems incredible makes it difficult to trust his text. The credibility and mistranslations create a gap in determining how Josephus should be used as a primary source in historical texts.

The question remains concerning the true living conditions of the people trapped in the city during the siege. An acceptable method to discover the food consumption rate from a siege, is the archaeological method of flotation. This technique takes soil samples from the living surface to extract micro-artifacts to determine the dietary patterns of a site. Flotation has the potential to reveal the actual quantity of food consumed on the Mount Zion site in each period.

---

[60] Shimon Gibson, James Tabor, Rafael Lewis, Steve Patterson, *"New Excavation on Mount Zion." Ancient Jerusalem Revealed: Archaeological Discoveries, 1998-2018, 306-309.*

Chapter Two

Introduction

This section will focus on the flotation element of this thesis. Flotation is an underutilized archaeological technique that finds the micro-artifacts not visible to the naked eye. The food staples will be included to show the possible finds flotation will produce and what the people consumed during the Early Roman period. It will demonstrate the difference between light and heavy fraction and how both methods are needed to properly display this technique. The statistical difference between the two methods will demonstrate the importance of including heavy fraction in all experiments that incorporate flotation. Knowing how the flotation process works will help identify the importance of this technique in the post archaeological process. It will include the flotation reports for the Mount Zion site's three periods: Early Roman, Byzantine, and Medieval. The Early Roman report will contain case studies of special loci and

features. The case studies will emphasize the importance of different features and how they influenced the site's understanding of the siege.

Food Staples of Jerusalem During the Early Roman Period

During the Second Temple period, the city of Jerusalem was subject to a great deal of foreign influence that shaped many aspects of the culture including its food staples. By the time of the Early Roman period, Judea thrived in the global trade market, importing and exporting various food-related products. Different methods of cooking and the preservation of food also reached the region. Evidence shows how many of the food staples of Judea did not originate in the Near East but were adapted to meet the needs of the people. Knowing when various food staples became popular allows the archaeologist to predict in which stratigraphic levels they might find corresponding artifacts.

Regarding protein, chickens represent the most consumed livestock animals from antiquity to modern times. First domesticated in Southwest Asia, chickens transported to the Near East and finally to Europe. Along with the meat of the chicken, eggs were widely consumed and used in culinary recipes. Eggshells are not a common artifact found on archeological sites due to their minuscule size, hence the use of flotation.

The first chickens arrived in the Near East around the third millennium B.C.E. but did not become widely available until the Hellenistic period (333 B.C.E to 31 B.C.E.), well before the Early Roman period; between the Persian (539 B.C.E. to 333 B.C.E.) and Hellenistic periods, chicken bones more than doubled in quantity. After the Hellenistic period, the number of chicken remains continued to increase. Rome even went as far as enforcing laws permitting only one chicken to be consumed per meal to preserve the population of the species. Due to their small

physical size, chickens are an easily transportable food staple. [61] Although an important source of protein, it did not represent the only livestock raised in the region.

Another food staple that had foreign influence involved faunal. Livestock consumed revealed the economic status of the inhabitants as well as the influence of foreign cooking techniques. During the Early Roman period, the main source of faunal consumption came from the following: sheep, goats, and cattle. The most frequently consumed wild animals were gazelle, red deer, and fallow deer. [62] In the Jewish faith, consuming pigs is taboo, but foreigners did import and consume pigs which influenced dietary patterns.[63] Jerusalemites did not just depend on livestock for protein sources but also consumed aquatic food sources.

The city of Jerusalem had no direct connection to any body of water, but a variety of different fish bones have been discovered in the city. Fish discovered in Jerusalem also indicate the site's economic status; the city was far from any body of water, so fish prices were high compared to coastal cities. The closest bodies of water include the Mediterranean Sea, Nile River, Yarkon River, and the Jordan River. [64] All the fish consumed in the region came from the same species so all fish are discovered in the various stratigraphic levels. With Jerusalem being so far away from the coast, the people had to devise a way to keep the fish from spoiling before reaching the city. They dried and salted the fish before transporting them to prevent spoilage.[65]

---

[61] Lee Perry-Gal, Adi Erlich, Ayelet Gilboa, and Guy Bar-Oz. "Earliest Economic Exploration of Chicken Outside East Asia: Evidence from the Hellenistic Southern Levant," *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 112, No. 32 (2015): 9848-9853.

[62] Lidar Sapir-Hen, Guy Bar-Oz, Ilan Sharon, Ayelet Gilboa, and Tamar Dayan, "Food, Economy, and Culture at Tel Dot, Israel: A Diachronic Study of Faunal Remains from 15 Centuries of Occupation," *American Schools of Oriental Research*. BASOR 371 (2014):88-89.

[63] Ibid., 96-97.

[64] H. Lernau and O. Lernau, "Fish Remains." Excavation at the City of David 1978-1985: Final Report. Vol III. Qedue 33, The Institute of Archaeology, The Hebrew University, Jerusalem, (1992): 131-134.

[65] Ibid., 135-136.

Fish did not just come from bodies of water; fresh fish farms were discovered throughout Judea. This allowed the availability of fish to Jerusalemites on a seasonal basis. [66] Fish did not represent the only food source derived from bodies of water.

Found in both the sea and fresh water sources, mollusks served as another food staple coming from the same bodies of water. Along with being a food source, the shells were used as jewelry. Land snails occurred on most sites on their own accord, during and after the site's usage. [67] Similar to other forms of food, mollusks characterize socio-economic status; the consumption of shellfish indicated low economic status, especially for those who resided near bodies of water. For those who lived far from sea, smoking preserved the shellfish for travel. Known as another taboo food source in the kosher diet, shellfish mainly supplemented the diet of the poor. Ancient Jerusalemites did not just eat an animal-based diet but consumed plant-based food staples as well.

Native to Judea, wild olive trees became domesticated and a necessary part of the diet for both poor and rich. Olives may be pickled or turned into oil, with olive oil representing the main product of olives. They were only pickled when there was enough oil already produced. To make the oil, large quantities of olives were sent to oil presses that had many different applications, such as wine production. Used for more than just cooking, olive oil also helped light homes in oil lamps and protected metal from rusting. [68] Olives symbolized plenty, peace and serenity during the time of antiquity but it was not the most important fruit of the region.

---

[66] Sára Lantos, "Late Antique Settlements of the Negev – Prosperity and Crisis: Imported Fish and Exported Wine." PhD Diss., (University of Haifa, 2018). 55-65.
[67] Daniella E Bar-Yosef Mayer, "Shell Beads, Freshwater Clams, and Landsnails from Tel Qashish'", Tel Qashish: A Village in the Valley of Jezreel. Report of the Archaeological Excavations (1978-1987) 2003, 415-418.
[68] Asaph Goor, "The Place of the Olive in the Holy Land and its History Through the Ages'," *Economic Botany*, Vol. 20, No. 3 (1996): 223-228.

By the time of the Early Roman period, vineyards had spread to every corner of the region. Although not natural to the region, grapes became more than just a food source for the people; they became a part of the culture for thousands of years. Grapes had many different applications including raisins, wine, fermented liquor, and vinegar. Grapes were consumed in the summer, and raisins in the winter. [69] Judea produced some of the ancient world's best wine, with wine jug remains discovered throughout the Mediterranean region. Wine even took the place as the primary source of hydration when they lacked clean water. Vineyards also symbolized peace, tranquility, and security. [70] All the aforementioned food staples did not compare to the quantity of bread consumed in Judea.

Bread represented the main food staple of the region that shaped the culture of Judea. Bread was cooked in an oven commonly known as *tabun* with different types representing unique baking styles. Ebeling and Rogel give seven examples of methods of baking but on the Mount Zion site, the oven was a *tannur*, a cylindrical clay oven in which fuel was lit at the bottom and dough was baked on the upper inner walls. [71] Bread baked in a *tannur* produces a flat bread. Along with creating food for the people, these ovens also produced heat for the winter. [72] It remains to be asked how does the food source affect the ancient civilization?

Unlike modern humans, ancient peoples' diets greatly differed in various food staples, preparation methods, and quantities consumed. The study conducted by Elizabeth Wing and Antoinette Brown focused on prehistoric sites similar to that of Jerusalem, before modern farming equipment. The five main categories of essential nutrients included amino acids,

---

[69] Asaph Goor "The History of the Grape-Vine in the Holy Land," *Economic Botany*, Vol. 20, No. 1 (1966): 46.
[70] Ibid., 47-50.
[71] Jennie Ebeling and M. Rogel, "The *Tabun* and its Misidentification in the Archaeological Record," 47, No. 3 (2015): 328-330.
[72] Ibid., 334-339.

carbohydrates, fats, minerals, and vitamins. Diets depended on the specific region, with the food staples remaining for centuries. The preservation and recovery of food remains varied based on the environmental and external factors of the specific region. Some artifacts found on archaeological sites did not originate from human sources, with natural botanical remains and animals dying on the site after its abandonment. Understanding the foodways of ancient civilizations includes the techniques and devices used to prepare food for consumption. [73]

Humans have the exact nutritional requirement of protein and minerals to provide the energy needed to survive. Children's calories increase to match their bodies' growth, while adults' calories meet the need to maintain their body weight; when they reach 12 years old, the nutrient values required by males become greater than that required by females. The amount of food also depends on the physical activity of the individual, with more physical activity requiring more calories. Undernutrition leads to a lack of energy and uses stored fats to supply the body with its required energy. Overnutrition leads to obesity and the extra calories having nowhere to go after consumption. [74] Storing food for long periods leads to a loss in nutritional value and may spoil if not properly stored. The preparation of raw food changes the nutritional value by altering the nature of the food staple. This includes trimming and discarding the inedible or undesirable parts of the organic items. Cooking all forms of food also causes the loss of some nutrients but may create an edible food source. In the Middle East, bread represented the most calories consumed. [75]

[73] Elizabeth Wing and Antoinette Brown, *Paleonutrition: Method and Theory in Prehistoric Foodways* (San Pedro, California: Academic Press. 1979), 1-10.
[74] Ibid., 17-35.
[75] Ibid., 61-66.

The skeletal remains of ancient people indicate whether they met their nutritional needs through diseases evidenced in the human remains. Humans' high nutrition requirements meant that many ancient individuals did not have a healthy diet. The skeletal remains of this experiment showed that most people did not consume enough nutrients and calories to sustain their needs. [76] During antiquity, food supplies followed a seasonal pattern with highs and lows. Births even centered around when food was plentiful so the mother could have enough energy to feed her infant. When obtaining food, it was important not to expend more energy than the nutritional value of the food collected. During ancient farming, an unsuccessful harvest meant a shortage of food for the entire civilization. An essential part of nutrition includes consuming all food groups. Ancient civilizations primarily survived on one crop in the form of grain. Only consuming grain leads to an unbalanced diet depriving people of important nutrients. The quantity of food produced in a civilization determines the population size. Ancient people adapted to fit the availability of food and convert food into missing essential nutrients as needed. Human bodies can convert stored nutrient of all sorts to energy when food is unavailable. This establishes the means for ancient people to survive on little food and an unbalanced diet. [77]

During antiquity, water usage was just as minimal as food consumption. Water usage included drinking, cleaning, and cooking. The study by Tsvika Tsuk compared modern Bedouin tribes to determine how much water the people of antiquity used. On average, the Bedouin people used 1.5 cubic meters (1 cubic meter equals 1000 liters or 264.172 gallons) of water a year. The people of antiquity used one cubic meter per year and around 2.7 liters (.71 gallons) a day in ancient Judea. In Jerusalem, they used 5 liters (1.32 gallons) a day. So, during the almost

[76] Ibid., 73-91.
[77] Ibid., 161-174.

half year siege, the population was approximately 60,000 people [78];therefore, Jerusalem needed roughly 30,000 cubic meters of water. This means that one individual would need about 486 liters (128.39 gallons) of water during the siege.[79]

It remains to be asked what the diet of Jerusalem was during the Early Roman period. Without including the siege, it can be surmised the population consumed a well-balanced diet, especially those at the Mount Zion site. A crucial factor in consuming the five primary nutrients was the economic status of the inhabitants along with the status of the entire city. Even Josephus described the abundance of plantations surrounding the city. This creates a scenario with the Jerusalemites having the ability to reach at least their minimal dietary needs leading up to the siege.

Mount Zion Identification to the Siege of 70 C.E.

Currently located just outside the Zion Gate, the Mount Zion archaeological site was historically located within the city's walls. When documenting the site's involvement during the Siege of 70 C.E., there is a profusion of evidence of the first century. A "multi-room dwelling or mansion" dated between the late 1st century B.C.E. to 70 C.E. contained three preserved rooms and an intact ceiling. The basement-level residence included a ritual bathing pool (*miqveh*) and the remains of storage jars from the first century. Additionally, another adult-sized *miqveh* was also excavated from the site. A cistern, constructed during the time of Herod the Great, revealed a few complete cooking pots from the Early Roman period.

[78] Lee Levine. *Jerusalem: Portrait of the City in the Second Temple Period (538 B.C.E.-70 C.E.) (*Philadelphia: The Jewish Publication Society, 2002), 343.

[79] Tsvika Tsuk, *Water at the end of theTunnel: Touring Israel's Anceint Water Systems.* Jerusalem: Ben Zvi. 2011: 8.

Inside the courtyard, three bread ovens (*tannur*) date to the Early Roman period. The finds dating to the first century included a bowl/lamp made of black stone, an ornamental stone window-screen, stucco and wall paintings, murex shells, stone scale-weights, and stone vessel fragments. Several finds indicate the presence of an "upper class" - murex shells were used to dye clothes purple. Lapis (blue) and ochre (yellow) were also found at the site. Stucco and wall paintings were evidence of wealth as only the wealthy could afford to decorate their homes. Along with many coins, a golden Nero coin best represents the prosperous status of the site that dated between 56/57 C.E. The full extent of the site is unknown to the archaeologist since it stretches past the excavation area. In addition, the structure housed multiple stories that remained intact until destroyed by the siege. [80]

Along with the finds listed above, an inscribed stone vessel was discovered on the site. Stone vessels are less common on archaeological sites than previously thought. They were most prevalent between the first century B.C.E. to the second century; this specific find dates to before the siege. Crafted by hand out of limestone, these vessels were highly decorated and symbolized socio-economic status. [81] The specific stone mug discovered on Mount Zion had an inscription not yet translated but clearly with religious purposes. [82] Artifacts help the archaeologist identify the time period of the stratigraphic level.

Normal archaeological methods of Israel identify the time period by the potsherds and coins. Potsherd designs changed with the specific era, and coins followed the design of the current authority. Arlene Miller Rosen wrote the article, ""BA" Guide to Artifacts:

---

[80] Shimon Gibson, James Tabor, Rafael Lewis, Steve Patterson, *"New Excavation on Mount Zion." Ancient Jerusalem Revealed: Archaeological Discoveries, 1998-2018, 306-307.*

[81] Shimon Gibson, "Common and Uncommon Jewish Purity Concerns in City and Village in Early Roman Palestine and the Flourishing of the Stone Vessel Industry: A Summary and Discussion," *Journal for the Study of Judaism,* Vol. 53 (2022): 157.

[82] Ibid., 80-82.

Microartifacts and the Study of Ancient Societies." Taking the microartifacts from the Tel Miqne-Ekron site, she studied the social organization, economic systems, political structure, and religious lives of the ancient inhabitants. She included three reasons why the artifacts are dated to when the site was last inhabited: artifacts were purposely removed from the floor and thrown away in a different location, sweeping removed many of the microartifacts, and broken items were dumped in a separate location. Under normal circumstances, the inhabitants left a few usable items behind unless forced to leave immediately. [83] The experiment described how the common acts of cleaning identified the microartifacts extracted through flotation to date to the site's last usage. In addition to Rosen's article, Egon Lass noticed how the ovens of the site were periodically cleaned, so few artifacts were discovered in the remains. Ash pits often include bones rather than botanical remains due to the nature of fire. [84] This article influenced how flotation finds identified to the corresponding period.

Various Flotation Methodology

First used in America, flotation incorporated the natural landscape of the region to extract microartifacts. Stuart Struever noticed how few archaeologists studied botanical remains and animals with smaller bones. Knowing the bias regarding the smallest of artifacts, he introduced flotation as an archaeological technique that focused on discovering food staples. He conducted two different methods of flotation, water-separation and chemical-flotation, which he combined to extract small-scale food remains.

Struever used shallow rivers to remove the soil from the sample in his method. It required two people, one to hold the tub with a mesh bottom and the other to use a small tea strainer to

[83] Arlene Rosen, ""BA" Guide to Artifacts: Microartifacts and the Study of Ancient Societies," *The Biblical Archaeologist*, 54, No. 2 (1991): 98-100.
[84] Egon Lass, "Quantitative Studies in Flotation at Ashkelon, 1986-1988," *Bulletin of the American Schools of Oriental Research*, No. 294 (1994): 28-30.

extract the bone and botanical remains that rose to the surface. While removing the soil from the sample, the different cultural materials settled at various rates. The bones and botanical remains skimmed off the surface were known as light fraction. The materials that remain at the bottom of the tub are known as heavy fraction. Chemical flotation separates the remains into three visible sections - botanical remains at the top, bones in the middle, and stones, sherds, and other heavy material on the bottom. Only obtainable with a body of water that has a slow current, this method seemed plausible. Knowing how not every site had a water source nearby, he developed another method to compensate.

After the water separation of the light fraction, chemical flotation used a solution of zinc chloride to separate the botanical seeds and bones into different layers during the flotation process. Combining the solution and water caused almost one hundred percent of the botanical seeds and bones to float to the top. The botanical remains are extracted in the same method as the water separation. The mesh basket was lifted to the top to expose all the bones. Due to the hygroscopic nature of the zinc chloride, the remains were rinsed to remove any contaminants. [85] After the creation of this method, it spread to other archaeological sites around the world and was altered to fit the individual regions.

Eleven years after the invention of archaeological flotation, Michael Pendleton developed an apparatus to extract microartifacts. This machine weighed 90 pounds (40.8 kgs) and had a 35-gallon tank (132 liters). Adding the chemical Cyanamid Aerofroth 65 as a frothing agent increased the buoyancy of the botanical remains. Inside the machine, several screens of various sizes captured the remains in stages. The machine washed away all the soil from the sample and

[85] Stuart Struever, "Flotation Techniques for the Recovery of Small-Scale Archaeological Remains," *American Antiquity*, 33, No. 3 (1968): 353-356.

left only the cultural material. This apparatus produces both the light and heavy fraction. [86] The question remains: is this machine more reliable than human eyes or leaves the remains unharmed.

The first Israeli excavation that adapted Struever's flotation technique came from Tel el-Hesi. Robert Stewart and William Robertson followed Struever's method of separating the light and heavy fraction. Due to the site's physical location, the archaeologists had no natural running water and were forced to use other means to conduct the process; they placed the sample in a bucket and stirred until the water and soil completely combined, forcing the light fraction to the top. A screen placed at the bottom of the bucket removed all the silt. After drying the material, the picking process removed the cultural material from the rubble. The heavy fraction produced bones, general artifacts, and any carbonized remains that did not float to the top. They found it redundant to include the zinc chloride solution with few bones floating with the light fraction.[87] This methodology inspired Egon Lass to conduct flotation and adapt the methodology to fit their needs.

Egon Lass also performed flotation on the site of Tel Ashkelon where he conducted a simple but effective flotation method heavily influenced by Stewart's methodology. His method follows that of Struever's and the only difference occurs with the lack of the landscape to use to his advantage. Samples taken from living surfaces contained significant amounts of material, and he did not remove any large cultural material from the samples. He weighed the sample to assess the gross weight of all finds per kilogram. A 1 mm mosquito screen was placed at the bottom of a barrel. After adding the sample and water to the barrel, he skimmed the light fraction off the

[86] Michael Pendleton, "A Flotation Apparatus for Archaeological Sites," *First Annual Conference on Ethnobiology in Honor of Lyndon L. Hargrave,* (1979): 89-93.
[87] Robert Stewart and William Robertson, "Application of the Flotation Technique in Arid Areas," *Economic Botany,* 27, No. 1 (1973): 114-116.

top. Shaking the screen removed the silt from the sample, revealing only the heavy fraction. Then he administered a natural drying process that involved placing fractions on newspaper. After they are completely dried, the fractions are carefully picked using a magnification device and separated into various categories. [88] Although none of the Israeli archaeologists added anything to the water, others have tested flotation with interesting additives.

Recognizing how flotation did not extract 100% of the botanical remains, Tristram Kidder tried adding sugar to increase the buoyancy of the charcoal and seeds. Named Sugar Reflotation, this technique countered the zinc chloride solution that almost successfully separated the light from the heavy fraction. The main drawback of the chemical separation was the possibility of contaminating the remains and the solution's high price. In addition to the discouragement of using chemicals in flotation, Kidder also stated how Fred Cook attempted two different solutions when practicing chemical flotation. Using chemicals damages all organic remains, and he did not recommend chemical separation to extract the botanical remains. [89]

Knowing how chemical methods seemed to contaminate the light fraction and the tedious nature of picking, Kidder implemented his new technique. Adding sugar to the saturated sample segregated the organic and inorganic material. More importantly, this did not contaminate the organic material and was a cheap alternative to chemical solutions. The Sugar Reflotation was the second step after conducting normal flotation methods described by Struever. This allowed the remaining botanical material, fish scales, and small bones to float to the surface. He claimed how 99% of the botanical remains float to the surface when using both methods with little damage to the remains. Sugar may also contaminate the sample, prohibiting radiocarbon dating

[88] Egon Lass, "Soil Flotation: A Window into Ashkelon's Environment and Economy," *Final Reports of the Leon Levy Expedition to Ashkelon,* (2001): 659.
[89] Tristram Kidder, "Sugar Reflotation: An Alternative Method for Sorting Flotation-Derived Heavy Fraction Samples," *Journal of Field Archaeology,* 24, No. 1 (1997): 39-41.

from establishing a negative aspect to the method. In conclusion, Sugar Reflotation was an inexpensive and effective method of properly separating the light and heavy fraction. [90]

Each of the flotation methodologies mentioned above followed the original technique by Struever but altered it to fit specific circumstances. They all followed the same methodology of separating the light and heavy fraction. Archaeologists who described their methodology allowed future flotation students to utilize their efforts and convert the various techniques into their own experiment. Everyone who eventually does flotation needs to understand past methods and then alter them to fit their circumstances. Sugar Reflotation seems redundant since the heavy fraction are picked anyway and will result in the same outcome; with the knowledge that not all the botanical remains float to the surface, how do the two methods differ when archaeobotanists only use the light fraction?

Light versus Heavy Fractions

After the washing process of the sample, the light and heavy fractions remain left to be analyzed. Regarding the picking process, the light fractions produce primarily botanical remains, and heavy fractions produce a wide variety of artifacts and gravel. Some archaeologists presume that flotation revolves around the extraction of the light fraction while disregarding the heavy fractions. If their goals were to extract the seeds and charcoal from the sample, they still have not collected all the botanical remains that should have floated to the top. During my research, I picked the light and heavy fractions, where I deduced that light fractions remained at the bottom with the heavy fractions. So, along with missing some of the botanical remains, archaeologists would also miss out what the heavy fractions hold. The archaeologist who only researches the light fractions overlooks a significant amount of the information that the flotation process offers.

[90] Ibid: 41-44.

This section argues that only using the light fractions does not properly represent the archaeological site, with the heavy fractions needed to complete the analysis.

The Tel Burna excavation discovered silos that enticed the archaeologist to conduct flotation. The flotation technique used in this excavation produced only the archaeobotanical remains, with nothing stated about the heavy fractions. Shai and Uziel deduced in their experiment that the silos were storage rather than refuse pits. They also presumed that the processing of the crops grown in the area did not transpire in the vicinity of the silos. [91] This report stated nothing about rodent bones that presumably should have appeared with the picking of the heavy fractions. The population of rodents in an area depends on the quantity of food and water; the more food and water in an area result in more rodents in the area and vice versa. [92] If rodent bones had been collected on the site, an archaeologist would have a better understanding of the quantity of crops stored in the silos.

Flotation was performed at the sites of the Negev Desert to study the archaeobotanical remains of the Roman-Byzantine wine trade. The study referred to trash mounds of three sites from the region to find evidence of the economic and urban growth of the export of wine to the Mediterranean region. [93] The flotation method was applied to this site to extract cereal grains; it also included the charcoal pedicels, grape seeds, and pollen from the site that only exhibits what could be found in the light fractions. Pottery found through normal excavation methods, not

---

[91] Itzhaq Shai and Joe Uziel. "All for Archaeology and Archaeology for All: The Tel Burna Archaeology Projects Approach to the Community Archaeology," *Journal of Community Archaeology & Heritage*, 3, No. 1 (2016): 60.
[92] Tal Fried, Lior Weisbrod, and Guy Bar-Oz, "A Glimpse of an Ancient Agricultural Ecosystem Based on Remains of Micromammals in the Byzantine Negev Desert." *Royal Society Open Science*, 2018: 2.
[93] Daniel Fuks, Guy Bar-Oz, Yotam Tepper, Tali Erickson-Gini, Dafna Langgut, Lior Weissbrod, and Ehud Weiss, "The Rise and Fall of Viticulture in the Late Antique Negev Highlands Reconstructed from Archaeobotanical and Ceramic Data," *Proceeding the National Academy of Sciences*, 2020, 294 (1994): 1.

flotation, included foreign pottery that represented long-distance trade. [94] Although the archaeologist concluded the economic shift and the downfall of the wine trade, how could the study be enhanced with the inclusion of the heavy fractions?

Naomi Miller recognized the heavy fractions in her description of flotation but did not properly give attention to them. She gave two methods of gathering the heavy fractions: picking the remains with one's eyes before drying, then disposing of the rest, and drying the remains, then using a nested geological sieve. While these methods collected heavy fractions, the archaeologist needs some form of magnification tool to collect the most miniature artifacts. The nest geological sieve method either missed or destroyed the fragile remains. [95] Although Miller did collect heavy fractions, this ineffectual method needed to be adjusted to retrieve the heavy fractions properly.

Beginning with Stuart Struever, flotation was adapted as an archaeological technique that separated samples into light and heavy fractions. Admittedly, one of his primary purposes for conducting this experiment was the retrieval of botanical remains in light fractions, with the heavy fractions being a bonus to the study. His definition of light fractions included carbonized plant remains and small bones. He also experimented with chemical flotation that used zinc chloride solution to separate the botanical and bones into two different layers during the washing that established bones as a light fraction. While excavating in Iran, Flannery and Hole learned that a pre-dried sample produces a higher percentage of plant remains. [96] Struever collected light and heavy fractions while understanding how not all light fractions float to the surface.

---

[94] Ibid: 4-6.
[95] Naomi Miller, "Recovering Macroremains by Manual Flotation and Sieving," *Flotation Instructions,* (2012): 2.
[96] Struever, "Flotation Techniques for the Recovery of Small-Scale Archaeological Remains,": 353-355.

Egon Lass then brought this method to the Near East site of Tell Ashkelon and followed in the steps of Struever. Lass used his methodology to produce both light and heavy fractions. Before Lass introduced flotation, the Palestinian flotation only consisted of light fractions to study subsistence and environment. This only scratched the surface, with the heavy fractions presenting the archaeological strata. [97] With the heavy fractions collected and analyzed, Egon recognized the specific pattern of each room. [98] Unlike American sites, Near Eastern sites have a different structural frame like Ashkelon being an established building instead of an open-air site. The different style of the archaeological site makes the heavy fractions of Tel Ashkelon more necessary to determine the site's function.

Regarding the archaeobotanical use of flotation, light fractions are the main source of information. Excavations at Caesarea Maritima studied the botanical remains by employing flotation. The experts mainly concentrated on the seeds but did pick for bones, glass, metal, pottery, coins, etc. Although the purpose of this study concentrated on the botanical remains, they realized that picking the heavy fractions uncovered all the organic remains. [99] During my research on the botanical remains, I discovered certain seeds did not float to the surface. Without the heavy fractions, the report's results would not have been as thorough if only using the light fractions.

When it comes to light versus heavy, it can be concluded that heavy fractions significantly enhanced the understanding of the site. Sites that only used the light fraction missed a significant amount of botanical remains from the heavy fractions. The heavy fractions enhanced the analysis

[97] Egon Lass, "Quantitative Studies in Flotation at Ashkelon, 1986-1988," *Bulletin of the American Schools of Oriental Research*, No. 294 (1994): 23.
[98] Ibid: 35.
[99] Jennifer Ramsay and Kenneth Holum, "An Archaeobotanical Analysis of the Islamic Period Occupation at Caesarea Maritima, Israel," *Vegetation History and Archaeobotany*, 24, No. 6 (2015): 661.

of the site with bones and other finds complementing the botanical remains. Archaeobotanists need to incorporate heavy fractions into their studies to fully interpret the site's diet and how the ancient civilizations functioned.

Light Versus Heavy Case Study

After discussing how different excavations used flotation and the various methods of some not incorporating the heavy fraction, the question remains what percentage of finds did they miss? This section focuses on the quantitative analysis of what percentage of light fraction artifacts remain with the heavy fraction of the Mount Zion site. It will discuss the phenomenon of why some light fraction does not float to the surface, which locus contained this phenomenon, and how not picking the heavy fraction affects the final analysis. It will compare the overall percentage of light versus heavy and the anomalies that do not fit in the average. With the first publication on flotation including light and heavy fraction, how did these archaeologists utilize Stuever's methodology? Out of all the forementioned examples of flotation, the only article that cites Struever was Lass. His article differed from the others by dealing with more than just botanical remains. Based on the multitude of artifacts found, the mollusk, seeds, and charcoal best represent the phenomenon. I am arguing that it is necessary to include heavy fraction when doing any sort of flotation. This quantitative analysis will demonstrate how only using light fraction does not properly represent flotation.

Mollusks are ancient invertebrate with various species at least 550 million years old. In this study, the Gastropods species have a single shell and the subspecies are whelks, winkles, garden snails, and limpets. These mollusks adapted to the specific environment where they

resided. [100] In total there were 807 mollusks, 704 with the light fraction, and 103 with the heavy fraction. This means that 87% of mollusks floated to the top and 13% remained with the heavy fraction. The statistics of the total number represent the whole, with the individual loci demonstrating various statistical outcomes.

The sample with the closest to the overall statistics is L816 B6899A with 84% extracted from the light fraction and 16% in the heavy fraction. This represents just one out of 71 samples total which contained mollusk. L1165 B8356C produced 97% light fraction which represented the highest percentage of light when both fractions were present. L668 B6293E produced 25% light fraction which represented the lowest percentage of light fractions. The aforementioned examples only represent the samples with both fractions, but what about the samples with mollusk in only one of the categories? When it comes to mollusks extracted from only one of the methods, the light fraction produced more of these one-sided examples - 31 samples in the light and 13 in the heavy. The number of mollusks in the light fraction ranged from one in most of the samples to thirty-four in L844 B7014B. Heavy fraction produced a more condensed range fluctuating between one and four. The seeds of this experiment fit into a similar frame.

The seeds discovered during flotation included grapes, legumes, and olive pits. Seeds discovered on archaeological sites depict the food staples and economy of the region. [101] In total, there were 10,167 seeds, 8,480 with the light fraction, and 1,687 with the heavy fraction. This means that 83% of seeds floated to the top and 17% remained with the heavy fraction. The

[100] Michael Allen and Bas Payne, "Molluscs in Archaeology: An Introduction." In *Molluscs in Archaeology: Methods, Approaches and Applications,* edited by Michael Allen, (United Kingdom: Oxbow Books, 2017): 1.
[101] Ehud Weiss and Mordechai Kislev, "Plan Remains as Indicators for Economic Activity: A Case Study from Iron Age Ashkelon." *Journal of Archaeological Science,* 31 (2004): 1.

statistics of the total number represents the whole, with the individual loci demonstrating various statistical outcomes.

Seeds had several examples that closely represented the overall statistical remains with L596 B4903B having 84% extracted from the light fraction and 16% from the heavy fraction. L668 B6293E produced 96% light fraction which represents the highest percentage of light when both fractions were present. L767 B6614A produced 20% light fraction which represented the lowest percentage of light fractions. With the statistics of the seeds being so close to the mollusks, how will the seeds in only one method look? Seeds only found in one of the methods depicted a less severe scenario than mollusks, with 10 in the light and eight in the heavy. The range differed with the light fraction ranging from one to nine and heavy only differing between one and two. Mollusks and seeds can be counted and statistically analyzed, but charcoal must be studied in a different manner.

Charcoal discovered on an archaeological site result from various cultural activities. Cultural activities that produce charcoal include cooking, light, and warmth. [102] Due to the importance of fire in antiquity, charcoal was extracted from every sample in both methods.

[102] Struever, "Flotation Techniques for the Recovery of Small-Scale Archaeological Remains," 355.

Figure 1. Light fraction of charcoal

Figure 2. Heavy fraction of charcoal

Figures 1 and 2 represent both methods with the light charcoal being in smaller pieces to powder, and the heavy in larger pieces. This occurred throughout the experiment. The smaller pieces and powdered charcoal floated to the top while the larger pieces remained trapped with the heavy fraction. Radiocarbon dating has advanced to the point where any sized piece of charcoal can be used to date the sample. [103] The light fraction method produced more charcoal than the heavy, but the heavy fraction charcoal produced larger pieces.

When it comes to which method should be implemented during flotation, the answer is both. It is true that the majority of the light fraction-based artifacts floated to the top. There are

[103] Jim Cherry, "Carbon 14 Dating: Past, Present and Future A Simplified Explanation," *Central States Archaeological Journal,* 56, No. 1 (2009): 29.

even instances where artifacts were only discovered in one of the methods. If not including the heavy picking process, the analysis of the remains would be incomplete. Without including heavy fraction, some loci would be misrepresented due to specific loci having only mollusks or seeds in the heavy fraction. This section provides information on the importance of incorporating heavy fraction, with Struever stating that it is "often with surprising results." [104]

Narrative of Flotation

Before beginning the flotation process, a chart (LIST OF FLOTATION SAMPLES MOUNT ZION) was created to record the process. This chart contains the following sub-categories: WS no., locus no., basket no., area, description, dig date, weight/KG, comments, washed, light fraction, heavy fraction, light sorted, heavy sorted, specimen allocation, label, category bags, and statistic. The WS no. represents the personalized number for boxes in which the sample had been placed inside, each containing between one to four samples, depending on the sample size. A box may contain samples from the same locus, for the most part, or can contain samples from various other loci. Each sample taken from a box is recorded in the chart and then weighed to obtain the gross weight of the finds per kilogram. The boxes of the current project totaled 59 containing 145 samples (with three samples added following pottery sorting). After giving a WS no. to each box, I inserted all information provided on the locus tag into the chart, weighed all the samples, and placed the boxes in chronological order. After all of this was completed, I began the flotation process. My methodology followed that of Egon Lass described in his article "Quantitative Studies in Flotation at Ashkelon, 1986 to 1988" with the basic differences depending on the available space and supplies. [105]

[104] Struever, "Flotation Techniques for the Recovery of Small-Scale Archaeological Remains," 361.
[105] Egon Lass, "Quantitative Studies in Flotation at Ashkelon, 1986-1988," *Bulletin of the American Schools of Oriental Research*, No. 294 (1994): 24.

The first step of the flotation method begins with washing the sample to separate the light and heavy fractions. First, I placed the sample in a bucket to saturate the soil in the shower that produced a substance called slurry. Stirring the sample around caused the light fractions to float to the top. Skimming the light fractions off the top with a flour sifter revealed the botanical remains, which were carefully placed in a piece of aluminum foil that is folded so nothing can escape. This left only the heavy fractions and muddy silt remaining in the bucket.

Then I placed a sifter over a sewer drain in the bathroom that leads directly into the sewer system. The remaining sample is poured into the sifter (.5mm) for the purpose of removing the silt which left only the heavy fractions. Heavy fractions consisted of artifacts and debris that could not fit through the sifter. I filled a bucket with water and poured it over the sifter, stirring and shaking the sifter until only the heavy fractions remained. To begin drying the material I place the sifter at an angle with a brush to hold it up while water flowed out. After the heavy fractions were somewhat dry, I placed them in a plastic storage container lined with newspaper to absorb the remaining moisture. Using newspaper as an absorbent material began with Struever and passed down to all flotation experts. [106]

The locus tag was perforated in two sections with the bottom smaller section being clipped to the foil and the larger tag being connected to the container with a string. When both fractions had dried completely, the picking process began with the objective of discovering the artifacts hiding in the sample. The drying process usually took at least overnight, so I made sure I washed several samples during the day. Also, I was provided with an ID paper slip to be placed inside every find bag with a place for the sub-categories: date, locus, area, basket, and content.

[106] Struever, "Flotation Techniques for the Recovery of Small-Scale Archaeological Remains," 355.

First, I took the light fractions to be picked that identified what should be expected in the heavy fractions. Modern organic material appeared in the light fraction; these were not kept but recorded and discarded. Items found with the light fractions primarily consisted of charcoal, seeds, and mollusk. Then all the bags were placed in a large bag with the locus, basket, and light fraction written on it, along with the smaller locus tag.

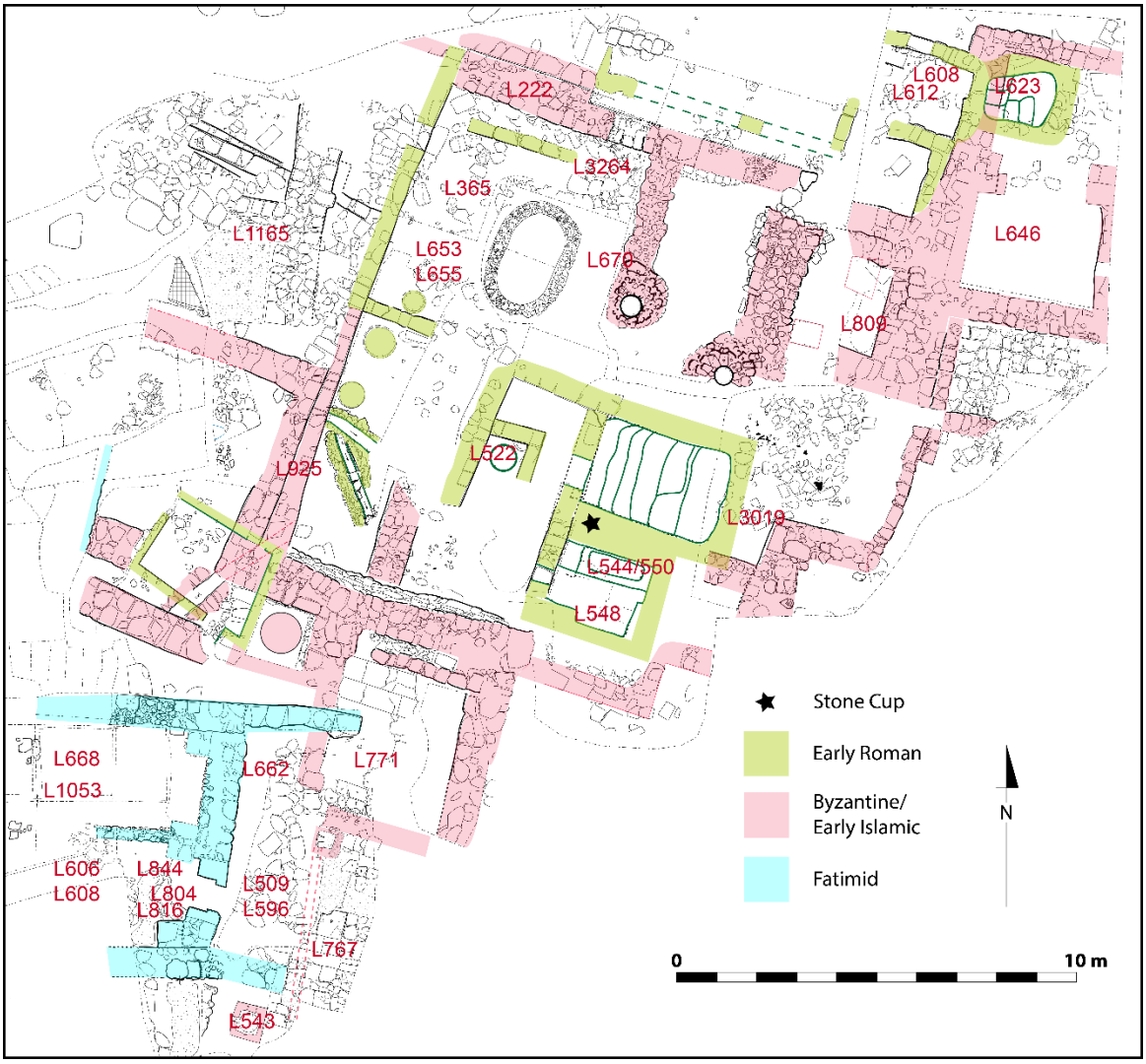
Next came the heavy fractions, which were weighed before picking for statistical means. Along with the weight of the heavy fraction, I created a new chart titled WEIGHT INFO that contained the locus, basket, sample weight, heavy weight, and gross weight. Then I started the picking process with a small pile carefully laid in front of me so I could easily pick through the fractions. The large finds, in both quantity and size, were placed in a pile above the picking pile. The smaller finds that are in large quantity were placed in spoons located to the right of the picking pile. The finds were primarily eggshells, iron, bone, sherds, *tannur*, plaster, and crystal. Any special find was placed in a bag immediately and recorded in a document labeled COOL STUFF IN FLOTATION. Coins were placed in a coin sleeve and labeled with all the information, then given to the site archaeologist for cleaning and recording, stating "taken away for cleaning". When finished, I place each category in its specific bag with the corresponding label. The heavy fractions were placed in their own bag, as were the light fractions, then placed together with the light fractions in a bag with the locus, basket, and the word “flotation” written on it, so it was clear this basket was completed. Then I returned to the LIST OF FLOTATION SAMPLES MOUNT ZION chart and x’d out the tags of light picked and heavy picked, which indicated the second step of flotation was complete.

Once all the flotation was sorted, each individual artifact was counted for the exact statistical information. To record each individual basket, a chart was printed with the sub-

categories: locus, basket, eggshell, bone, seashell, sherd, tesserae, mollusk, flint, glass, plaster, seed, iron, organic (fish scales), taboon (*tannur*)[107], and misc. The light and heavy fraction were counted separately to distinguish the two methods. Separating the two while counting helped me to identify how important heavy fractions are to the technique.

Finally, all the information collected was represented in one location excel sheet. Every sample, even the ones not floated, needed a place on this chart. All the information in the previously mentioned chart had a place on this final chart, including the light and heavy fractions, with a spot for the total of the two. Each individual find was given its own category in this chart to ensure each artifact received the recognition needed. In addition to the information already obtained, this chart needed more information that included era, pottery reading, and small finds reading.

[107] Jennie Ebeling and M. Rogel, "The *Tabun* and its Misidentification in the Archaeological Record," 47, No. 3 (2015): 329.



(Map of Flotation Samples Locations may not accurate)

Flotation Results from Mount Zion: Early Roman Period

This flotation report will highlight the finds that date to the Early Roman period. This will show the quantitative analysis of the data produced by the flotation technique. It contains 24 samples from locus 522, 543, 550, 548, 612, 623, 662, 670, and 3019. It incorporates both the light and heavy fraction that totaled to 18,913 finds with the weight of the samples totaling to 135.85 kilograms. Per kilogram the samples produced 139 finds. The samples produced 1,182 eggshells, 1,469 bones, 56 seashells, 2,859 sherds, 39 mollusks, 18 flint chips, 140 pieces of

glass, 442 pieces of plaster , 7 seeds, 68 fish scales, and 1,611 *tannur*. Other finds included nails, feces, bronze, metal and flint arrows, fibers, hair, and fossils. The finds came from a wide assortment of different loci incorporating a *miqveh*, cistern, *tannur*, chamber, and living surfaces.

Eggshells

Ancient Judea possessed four different types of fowl that include: pigeon, chicken, goose, and ostrich. As discussed above, the domestication of chickens reached every corner of Israel. Although none of the eggshells were measured, it can be assumed that most of the eggshells are from chickens. Out of the 24 samples taken from the Early Roman period, all of them contained eggshells. This implies the importance of the food staple in the region. Every kilogram contained 8.2 eggshells indicating how the domestication of fowls occurred during this era. The number of eggshells proves the wide availability of chickens in Jerusalem. The wide availability comes from the small stature of the chicken and the ease of caring for the animal.

Botanical Remains

This era only produced seven seeds signifying the lack of botanical consumption, with three grape seeds, two olives, and two legumes. Every kilogram of soil sample produced .07 seeds and only in four of the 24 samples. While legumes and olives undergo a process to preserve them for a long period of time, grapes do not. The lack of grapes seeds represents the lack of fresh produce at the end of the period.

Animal Remains

During the beginning of the Early Roman period, the domestication of livestock had become commonplace in Israel. Every sample contained animal bones ranged from 5-154. The bones primarily comprised chicken, goat, sheep, cow, and fish. At this time, consuming pork appeared as taboo and not kosher. During Roman military ventures, the forces travelled with

pigs, so if pig remains come from flotation, they may have come from the Roman soldiers. [108] One kilogram of soil contained 10.8 bones. In locus 543, flotation acquired one fish skull for each locus proving that few fish reached Jerusalem whole. This period only contained 68 fish scales, with .5 per kilogram. This percentage seems appropriate considering the distance from any body of water. Found in every locus but not every sample, fish did not make up an important part of their diet.

Sea Shell

Flotation for this period did not produce many seashells and even fewer when considering only four remained whole, two from L543, one from L548, and one from L3019. Since none of the shells have holes, which would indicate they were once part of jewelry, they were likely used as food. When only considering the fully intact shells, there were only .03 shells per kilogram. If including all the pieces, there were .41 shells per kilogram. This proves how few edible mollusks reached and were consumed in Jerusalem due to the distance from bodies of water and dietary restrictions.

Flint

During this era metal tools became the norm with flotation corroborating this statement. With a total of 18 pieces of flint, there were .13 per kilogram. The few numbers of flint chips demonstrate that the site did not contain a flint industry, but flint did still play a part in the site during the Early Roman period.

[108] Liora Kolska Horwitz and Jacqueline Studer. "Pig Production and Exploitation During the Classical Periods in the Southern Levant." In *Archaeozoology of the Near East VI.* Edited by H. Buitenhuis, A.M. Choyke, L. Martin, Bartoseivics, and M. Mashkour. 222-239 (The Netherlands: ARC Publications, 2005): 234.

Discussion

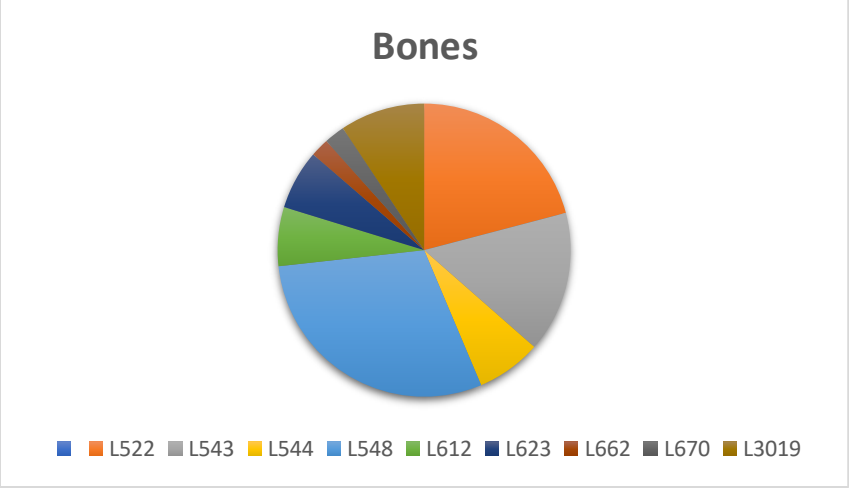
In conclusion, the Early Roman period produced a wide variety of finds with varying quantities. The different installations found on this site and the diverse finds created a unique interpretation of the use of living surfaces. The clumpy fiber pieces found in this era may represent a form of carpet or rug on the site. One metal arrowhead may not have originated in the city, but the era ended in a siege, indicating the conflict reached the site. A flint arrowhead created a new scenario (not yet determined) with flint-based weapons not being a standard in military practices. The token represents a form of coinage and the only item of monetary value during this era. The *tannur* ovens did not survive, with pieces found in every locus besides L670 but primarily in L543, which included the oven. The 10 pieces of feces found in the chamber may have come from animals or humans hiding from the Romans.

Mount Zion met the same fate as the rest of Jerusalem after the Siege of 70 C.E. Under Roman rule, the city of Jerusalem experienced a global trade influencing the economy until the beginning of the siege. Since Rosen concluded how common cleaning practices removed all items considered trash, all the finds represent the last remains of the siege. The site primarily represented a residential area and few industrial remains were found. Overall, the study revealed that the Mount Zion site during the Early Roman period was a residential area. Few remains discovered through flotation indicated the economy other than the fish remains. Nothing coming from this experiment demonstrated starvation or deprivation. Each feature also gave a different explanation, which will be discussed below.

	L522	L543	L544	L548	L612	L623	L662	L670	L3019

Gross Weight (kg)	38	24.5	12	26.1	6.5	10	3	3.25	12.5
Sherds	338	333	305	496	299	633	46	30	379
Bones	286	213	98	4	89	91	28	31	228
Fishscales	18	15	5	9	0	0	1	8	12
Flint	1	2	4	5	0	1	0	0	5
Mollusc	5	20	2	2	1	1	1	3	4
Eggshell	151	347	98	157	127	29	70	18	185
Seashell	6	21	4	13	0	5	2	0	5
Seeds	1	2	0	0	2	0	0	0	2
Tesserae	1	10	0	0	0	0	0	0	1
Glass	30	19	22	31	20	3	0	2	13

	L522	L543	L544	L548	L612	L623	L662	L670	L3019
Sherds	8.9	13.6	25.4	19	46	63.3	15.3	9.2	30.3
Bones	7.5	14.7	8.2	15.5	13.7	9.1	9.3	9.5	18.2
Fishscales	.5	.6	.4	.3	0	0	.3	2.5	.96
Flint	.03	.08	.3	.2	0	.1	0	0	.4
Mollusc	.1	.8	.2	.08	.2	.1	.3	.9	.3
Eggshell	4	14.2	8.2	4.9	19.5	2.9	23.3	5.5	14.8
Seashell	.2	.86	.3	.5	0	.5	0	0	.4
Seeds	.03	.08	0	0	.3	0	0	0	.2
Tesserae	.03	.4	0	0	0	0	0	0	.08
Glass	.8	.8	1.8	1.2	3.1	.3	.6	.6	1.04



Graph 1: Statistical Comparison of Bones

Graph 2: Comparison of Seeds

Early Roman Cistern

A cistern (L522) located on archaeological sites represents a drinkable water source, but this cistern held artifacts. The cistern had a narrow shaft less than a meter long, while the bottom had ample open space. It had a shape similar to a wine bottle and could hold large quantities of water. When artifacts appear in cisterns, it indicates contamination or that the cistern is no longer in use. This means by the end of the Early Roman period, this feature did not contain fresh water. In addition, full cooking vessels, located in the bottom of the cistern, were also visible during the initial excavations. The fully intact vessels at the bottom of the cistern must have been placed there on purpose and used as a trash receptacle.

There were ample food remains and charcoal inside the cistern, along with the fully intact vessels, indicating a fire was lit inside. The bones averaged to 48 compared to the total average of 67. Besides a few pieces of metal, plaster, and tesserae, the majority of artifacts identified with food remains. The number of finds related to food inside the cistern revealed how people may have used it as a living space. A large cow knee bone found suggested that people either ate

inside the cistern or dumped remains in it. Since fish bones appeared in the cistern, it is likely that people hid in there with smoked fish that reached Jerusalem and could be consumed later. Charcoal inside the cistern indicated the possibility of cooking occurring in this confined space. Due to grapes' short shelf life, only one grape seed appeared in the cistern.

Chamber

When arriving at the end of the subterranean vault, a chamber was located just before the *miqveh.* This well-preserved chamber had a floor before entering the *miqveh* to prepare the body for the ritual bath. Between the steps and *miqveh* laid smashed remains of storage jars. The remnants of the jars represented either destruction or hidden food stores. L548 encompassed the chamber with four samples taken. These samples produced six eggshells per kilogram, 15.5 bones per kilogram, 19 sherds per kilogram, .3 fish scales per kilogram, and 42.2 *tannur* pieces per kilogram. In the chamber, 10 pieces of feces from an unidentified source, with .4 pieces of feces per kilogram, indicated something hiding in the chamber. Being so close to the *miqveh,* this room remained clean during its usage. The remains found in the chamber seem to have come from the city's destruction.

Miqveh

After traveling through a subterranean vault and the chamber, a plastered *miqveh* was located at the bottom of the stairs. With the ceiling still intact, the *miqveh's* floor was covered with broken storage jars that dated to the Early Roman period. L544(550) incorporated the *miqveh* and contained two samples. Being a ritual bathtub, cleaning regularly occurred while in use. Therefore, the artifacts found dated to the time of the city's destruction and the intact ceiling prevented any find from falling from above. The lack of tesserae (a Byzantine style of floors) proved structural integrity of the chamber. Bones found equal 8.2 per kilogram, and

eggshells equal 8.2 per kilogram. The locus also contained five fish scales that equaled .42 scales per kilogram, with fish bones also apparent in the samples. Although the food remains averaged less than the total for the Early Roman period, they provide information that people consumed food in the *miqveh*. It also contained pieces of plaster and *tannur*, with the structure being crafted of plaster and the ovens located adjacent to the *miqveh*. The only piece of metal found resembled an arrowhead. This arrowhead symbolized the only form of modern weaponry found during this period. If the *miqveh's* purpose does not involve eating, why does it contain food remains?

The chamber and the *miqveh* remained in good condition, providing a strategic hiding place. Being located under the structure's main part, the room's location was not easily detected. These rooms remained standing after the destruction of Mount Zion, while the rest of the site did not fare so well. With that stated this does not mean the chamber and *miqveh* did not witness the Roman forces; the storage jars were either broken by soldiers scavenging for food or shattered over time.

Bread Ovens

Located inside a courtyard, L543 *tannur*-styled taboons ovens indicated that bread consumption occurred on the site. The *tannur* style ovens used burning wood to cook flat bread stuck to the clay wall's side. The ovens' physical condition remained decent, with all the structural integrity remaining under the surface. Besides the physical features of the ovens, the flotation resulted in no finds indicating the ovens' actual usage. Eggshells, bones, and two full shells came from the oven not displaying the intended usage. Rosen also indicated the frequent cleaning of ovens, so only a few grains should remain in the ovens. It contained 14.2 eggshells per kilogram and 8.7 bones per kilogram. The two legume seeds found in the oven have nothing to with its normal cooking method, but other food remains ended up in the oven as well. Two full

seashells represent most of the marine food in one locus during the Early Roman period. Unsurprisingly, it contained the second largest quantity of *tannur* pieces with 36.4 per kilogram. Four samples taken represented the top of the oven to the bottom, with L662 representing the bottom of the oven.

The bottommost level of the oven contained 23.3 eggshells per kilogram, 9.3 bones per kilogram, 15.3 sherds per kilogram, .3 fish scales per kilogram, and 56.6 *tannur* pieces per kilogram. Per kilogram, the bottom of the oven contained more finds than the samples taken from above. This indicates that the oven may have been used as a trash deposit instead of an oven during the end of the Early Roman period. It also did not contain any tesserae, so all remains at the bottom date to the Early Roman period. Although charcoal remains indicated fire, all samples contained charcoal, the ovens could still have been used to bake and not have been cleaned after its final usage.

"Hidden" Chamber

During the siege, the site's inhabitants hid in this small chamber in fear for their lives. [109] This chamber ranged from around 1.5 meters by 3.5 meters. The small chamber is surrounded by four walls of Early Roman rectangular stones and a stone floor. This "hidden" chamber (L3019) is located adjacent with the *miqveh.* Inside this "hidden" chamber came 14.8 eggshells, 18.24 bones, .16 seeds, and .96 fish scales per kilogram. It also contained 30.32 sherds, 16.32 *tannur,* and .4 flint pieces per kilogram. A piece of slag and bronze were also discovered in this chamber. It produced two seeds, both of which are legumes. These figures are, on average, higher than the total quantitative analysis of the Early Roman period. This proved how

[109] Gibson and Lewis, "The Subterranean Tunnel System Beneath Christ Church Near Jaffa Gate: 53".

people hid in this chamber and brought food with them. Inside this chamber, a jar was found at the bottom of the chamber.

Flotation Results from Mount Zion: Byzantine Period

This flotation report will highlight the finds that date to the Byzantine period. This report will show the quantitative analysis of the data produced by the flotation technique. It contained 13 samples from locus 365, 646, 655, and 1165. It incorporated both the light and heavy fraction that total to 3,616 finds, with the weight of the samples totaling 40.875 kilograms. Per kilogram, the samples produced 89.8 finds. The samples produced 711 eggshells, 10,799 bones, 69 shells, 774 sherds, 87 tesserae, 418 mollusks, 12 flint chips, 223 pieces of glass, 384 pieces of plaster, 629 seeds, 126 fish scales, and 58 *tannur*. Other finds include fiber, smooth stones, hair, metal, slag, gem, and a coin. The finds come from a wide assortment of loci and incorporate a mosaic floor and are on top of a Byzantine Street (L1171).

Eggshells

Ancient Judea possessed four different types of fowl that include: pigeon, chicken, goose, and ostrich. As discussed above, the domestication of chickens reached every corner of Israel. Although none of the eggshells was measured, it can be assumed that most of the eggshells were from chickens. Out of the 13 samples from the Byzantine period, all of them contained eggshells. This implies the importance of the food staple in the region. Every kilogram contained 18.9 eggshells indicating the domestication of fowls during this era. The number of eggshells proved the wide availability of chickens in Jerusalem. The wide availability comes from the small stature of the chicken and the ease of caring for the animal.

Botanical Remains

Seeds totaled 15.39 per kilogram, with only four samples containing seeds. The sample contained primarily legumes with few grape seeds and no olive pits. L655 contained 615 seeds that totaled to 91.1 seeds per kilogram. Grapes have a short shelf life, while processed legumes have a much longer shelf life. The large quantity of legumes indicated the importance of the seed during the period.

Animal Remains

During the beginning of the Byzantine period, the domestication of livestock became common place. Every sample contained animal bones that ranged from 14 to 95 bones. The bones primarily comprised chicken, goat, sheep, cow, and fish. Every kilogram contained 264.2 bone and without L365, contained 15.9 per kilogram indicating the domestication of livestock during this era. L365 possessed 93% of the bones (10,148 total all broken into pieces) in this period and is located north of the three *tannur* ovens. This locus contained Early Roman finds but comes from the Byzantine period and was probably dumped there deliberately, creating an outlier. [110] The samples being discussed showed no outliers in quantity. In loci 646 and 655, flotation acquired multiple fish skulls for each locus proving that fish that reached Jerusalem remained whole. The samples produced 113 fish scales, with 2.8 per kilogram. This percentage seems appropriate considering Jerusalem's long distance from any body of water. Found in every locus but not every sample, fish did not make up a substantial part of their diet as did livestock.

Seashells

Flotation for this period did not produce many seashells and even less when only including the seven shells that remained almost fully intact, from Locus 646 and 1165. None of

[110] Correspondence with Dr. Gibson.

the shells had holes, indicating that they were not part of a piece of jewelry but were used as food. When only considering the fully intact shells, there were only .17 shells per kilogram. If including all the pieces, there were 1.69 shells per kilogram. This proves how few edible mollusks reached and were consumed in Jerusalem due to the distance from bodies of water, but the quantitative analysis has increased since the Early Roman period.

Flint

During this era, metal tools became the norm, with the flotation analysis corroborating this finding. There was a total of 12 pieces of flint equal to .29 per kilogram. The few numbers of flint chips demonstrated that the site did not contain a flint industry, but flint did still play a part in the site during the Byzantine period.

Flotation Results from Mount Zion: Medieval Period

This flotation report will highlight the finds that date to the Medieval period. This report will show the quantitative analysis of the data produced by the flotation technique. It contained 47 samples from locus 222, 590, 596, 606, 653, 668, 767, 771, 804, 809, 844, 925, 1007, and 1053. It incorporated both the light and heavy fraction that total 36,605 finds, with the weight of the samples totaling 303.375 kilograms. Per kilogram, the samples produced 120.7 finds. The samples produced 12,280 eggshells, 4,803 bones, 243 shells, 3,300 sherds, 306 mollusks, 94 flint chips, 819 pieces of glass, 2,250 pieces of plaster, 9,507 seeds, 364 fish scales, and 287 *tannur*. Other finds included bronze, burnt stone, nails, fiber, smooth stones, hair, slag, beads, lapis, ochre, a bronze ring piece, and a gold flake. The finds come from a wide assortment of loci and incorporate an ash layer and a presumed market.

Eggshells

Ancient Judea possessed four different types of fowl that include: pigeon, chicken, goose, and ostrich. As discussed above, the domestication of chickens reached every corner of Israel. Although none of the eggshells was measured, it can be assumed that most of the eggshells were from chickens. Out of the 47 samples from the Medieval period, all contained eggshells. This implies the importance of the food staple in the region. Every kilogram contained 40.5 eggshells indicating the domestication of fowl during this era. The number of eggshells proved the wide availability of chickens in Jerusalem. The wide availability comes from the small stature of the chicken and the ease of taking caring for the animal.

Botanical Remains

Although this study produced a large number of seeds, L596 B4903A seeds were not counted due to the clumpy nature and not wanting to destroy the sample. One can predict it contained around the same as L596 B4903B with 8,350 total and 1,964.7 per kilogram. Not including (L596 B4903A) the seeds totaled 31.8 per kilogram. L596 B4903B held 8,350 seeds (with a scale used to count the seeds) representing the highest number of seeds in all the samples. L668 produced both grape and olive seeds, all burnt as was the entire locus. This showed legumes encompassed the most important botanical food staple of the Medieval period.

Animal Remains

During the beginning of the Medieval period, the domestication of livestock became common place. The bones primarily comprised chicken, pig, cow, goat, sheep, and fish. One kilogram of soil contained 14.7 bones indicating the domestication of livestock during this era. Bones fluctuated from seven to 204 bones per locus with no outliers. The samples also produced four otoliths from locus 653, 668, 844, and 1053. L653 and L844 were from a Sciaenidae and found in the Mediterranean Sea, a sea water source. L668 and L1053 were from a Cichlidae and

found in the Jordan and coastal rivers, fresh water sources. [111] These otoliths identified the fish species and how the fish reached Jerusalem whole. The samples produced 364 fish scales, with 1.2 per kilogram. This percentage seems appropriate considering Jerusalem's long distance from any body of water. Found in every locus but not every sample, fish did not make up a substantial part of their diet as did mammal livestock.

Seashells

Flotation for this period did not produce many seashells and even less when only including the four shells that remained almost whole, from locus 668, 767, 844, and 1053. None of the shells had holes, indicating that they were not part of a piece of jewelry but were used as food. When just considering the fully intact shells, there were only .001 shells per kilogram. If including all the pieces, there were .8 shells per kilogram. This proves how few edible mollusks reached and were consumed in Jerusalem due to the distance from bodies of water, but that has increased since the Medieval period. A major reason for consuming mollusks was its availability as a staple providing a food source for the lower classes, so this upper-class site may not have had the same problem.

Flint

During this era, metal tools became the norm, with the flotation analysis agreeing with this statement. There was a total of 94 pieces of flint that equaled to .3 per kilogram. The few numbers of flint chips demonstrate that the site did not contain a flint industry, but flint did still play a part in the site during the Medieval period.

[111] Lass, "Soil Flotation: 661.

Chapter Three

Introduction

This final chapter focuses on both flotation and Josephus to check his credibility against the results. To have a base for the starvation, the three periods are compared with the quantitative analysis. This shows how the different periods ended and the quantity of food consumed during their last usage. It explores other sites' evidence of the siege and examines how the destruction affected other parts of the city. Although Josephus' accounts represented the only eyewitness report of the siege, he was not the only Flavian scholar to document the siege. Knowing the circumstances under which Josephus wrote his works, historians have debated his credibility in various manners. Throughout *The Jewish War,* Josephus stated that both starvation and food stores with the flotation used to confirm his statements of the city storing food in rich area of the city. The flotation results and the finds during the excavation helped to identify the siege conditions. The chapter concludes by stating whether Josephus' works are credible as a historical source.

Compare and Contrast Flotation Results

Although the total numbers of samples and quantities of finds differed, the quantitative analysis allowed an equal comparison among the three periods. This section examines the Byzantine and Medieval periods to see how they compared to the Early Roman period. The Mount Zion Site contained levels from all three of these periods, so the comparison material all comes from the same location. If the periods produced differing outcomes, it offers evidence for this study. This provides the information to demonstrate whether the data conclude if the people were well fed, deprived of food, or starved during the siege.

The study proved the importance of eggs in all ancient Judean societies with every sample, with the quantity tallying from one to 818. Early Roman contained 8.2, Byzantine contained 18.9, and Medieval contained 40.5 per kilogram. The Early Roman difference was minimal but less by 10.7 between Byzantine and 32.3 between Medieval. Early Roman had 57% less than the Byzantine and 79% less than the Medieval. This analysis agrees with the study shown in "Earliest Economic Exploration of Chicken Outside East Asia: Evidence from the Hellenistic Southern Levant" where the later the period, the greater chicken availability in Judea.

Botanical remains depend on the environment of the society, with not all samples containing seeds. Early Roman contained .07, Byzantine contained 15.39, and Medieval contained 31.3 per kilogram. The Early Roman difference was less by 15.32 between Byzantine and 31.23 between Medieval. This provides evidence that the Early Roman period produced far less botanical remains than all the other periods, indicating the deprivation in the form of botanical products.

Faunal represented one of the most important food staples of ancient Judea with every sample containing animal bone remains. Early Roman contained 10.8, Byzantine contained 264.2 (15.9), and Medieval contained 14.7 per kilogram. The Early Roman contained less than the other two periods by 253.4 between Byzantine and 3.9 between Medieval, with these figures demonstrating an outlier of the Byzantine period. Without L365, the difference among the three periods greatly reduces.

While Jerusalem's location did not have any bodies of water in its vicinity, fish scales were found through flotation. Early Roman contained .5, Byzantine contained 2.8, and Medieval contained 1.2 per kilogram. The Early Roman difference was minimal but less by 2.3 between Byzantine and .7 between Medieval. This proves that fish did reach the city but not in a large

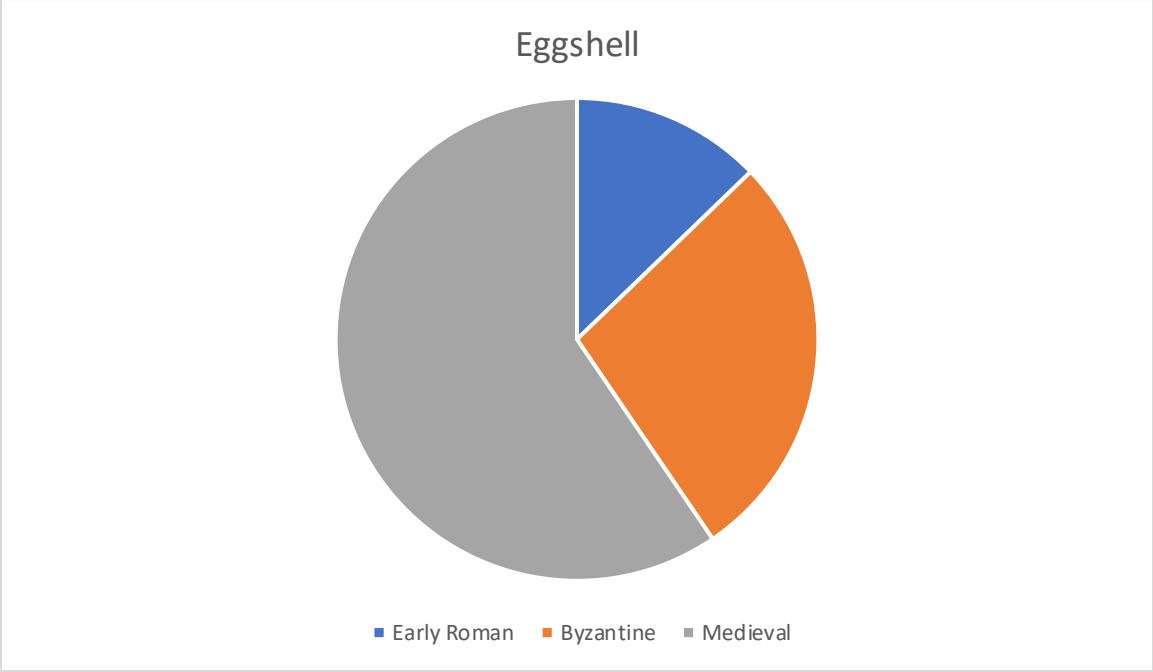
quantity, with the Early Roman possessing the fewest number of fish scales. It also represents the economic status of the site with fish being a delicacy during antiquity. This followed a similar pattern as the seashells.

Shellfish do not follow the kosher dietary restrictions so was only consumed when necessary. Early Roman contained .4, Byzantine contained .17, and Medieval contained .8 per kilogram. Early Roman contained .23 more than Byzantine and .4 less than Medieval. This indicates that none of the periods consumed shellfish in large quantities during antiquity.

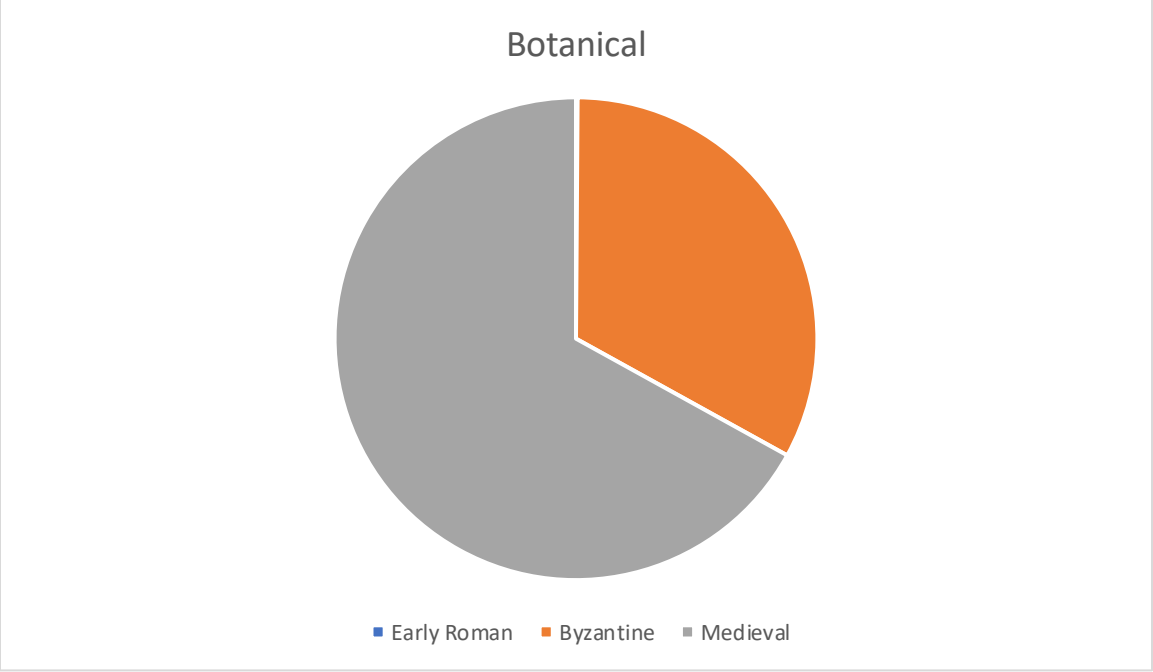
The comparison above demonstrates the flotation's different outcomes and different interpretations for each period. If not including L365, the difference among the three periods of bone remains is minimal. Even though the Early Roman period contained less, the difference is not enough to indicate starvation or deprivation. Botanical remains during the Early Roman periods became extremely rare compared to the other periods. The quantity during the Byzantine multiplied by 200 and during the Medieval by 400 compared to the Early Roman period. This proves how significantly more botanical food staples appeared at the end of the Byzantine and Medieval periods. It must be remembered that the Early Roman period ended with the destruction of Jerusalem along with the corresponding farms around the city, so few plants remained available to the city. Not as a difference in the statistical analysis as botanical remains, eggshells, and fish scales also contain less during the Early Roman period.

In all the periods, fish scales were minimal. The amount of fish scales illustrates the economic status of the site's ability to afford the luxury item. Unlike fish scales, eggshells are produced inside and around the city's limits. Although the Early Roman period possessed fewer eggshells, there were no signs of deprivation or starvation involving this food staple. Amongst all the food staples discussed, botanical remains demonstrated the only indication of starvation.

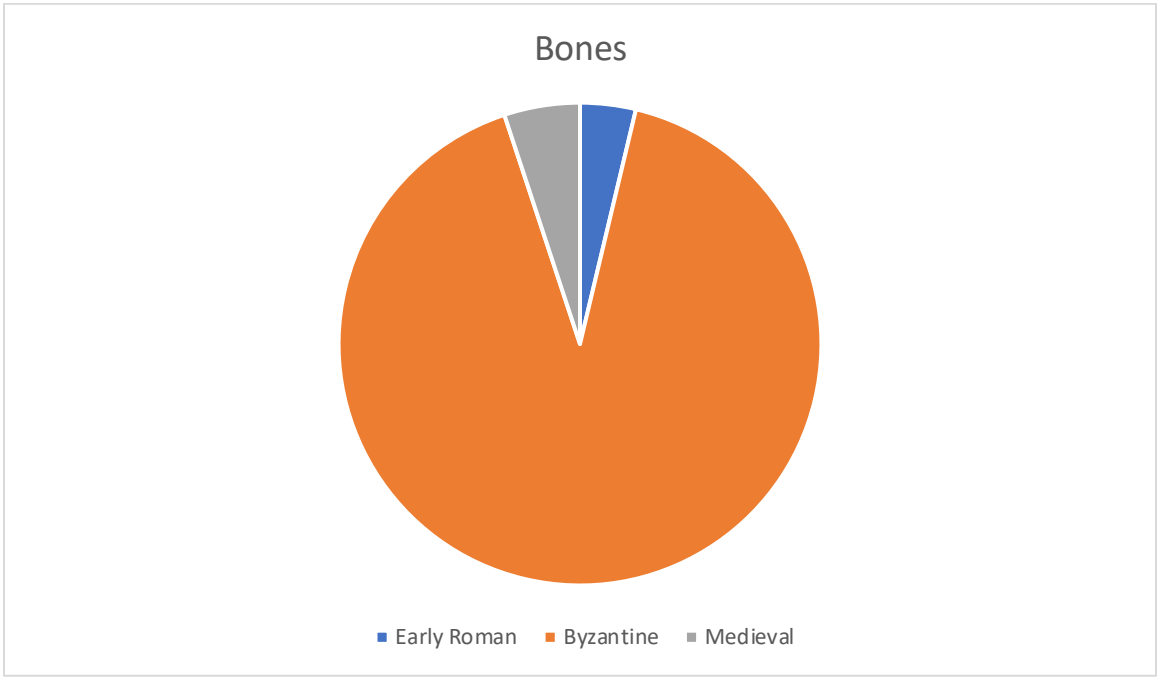
While the quantitative analysis of the seeds indicated starvation, other staples barely indicated the deprivation like the eggshells, bones, and fish scales. This study provides evidence of how the inhabitants of the Mount Zion site did not starve when comparing it to the other periods.



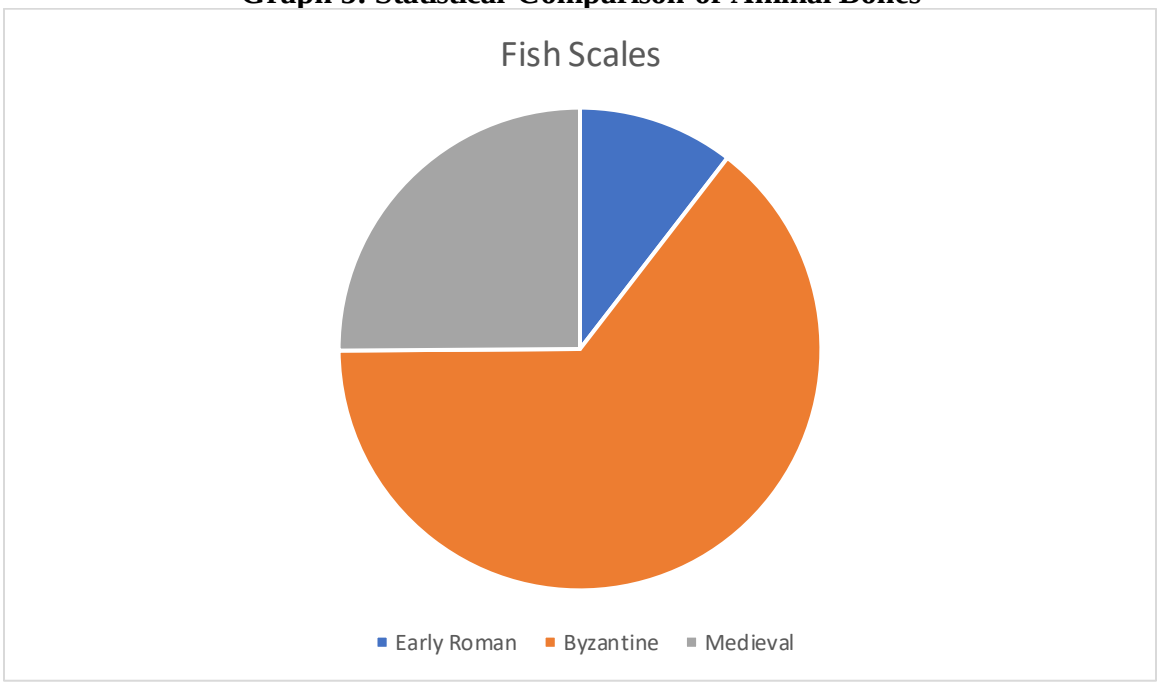
Graph 3: Statistical Comparison of Eggshells



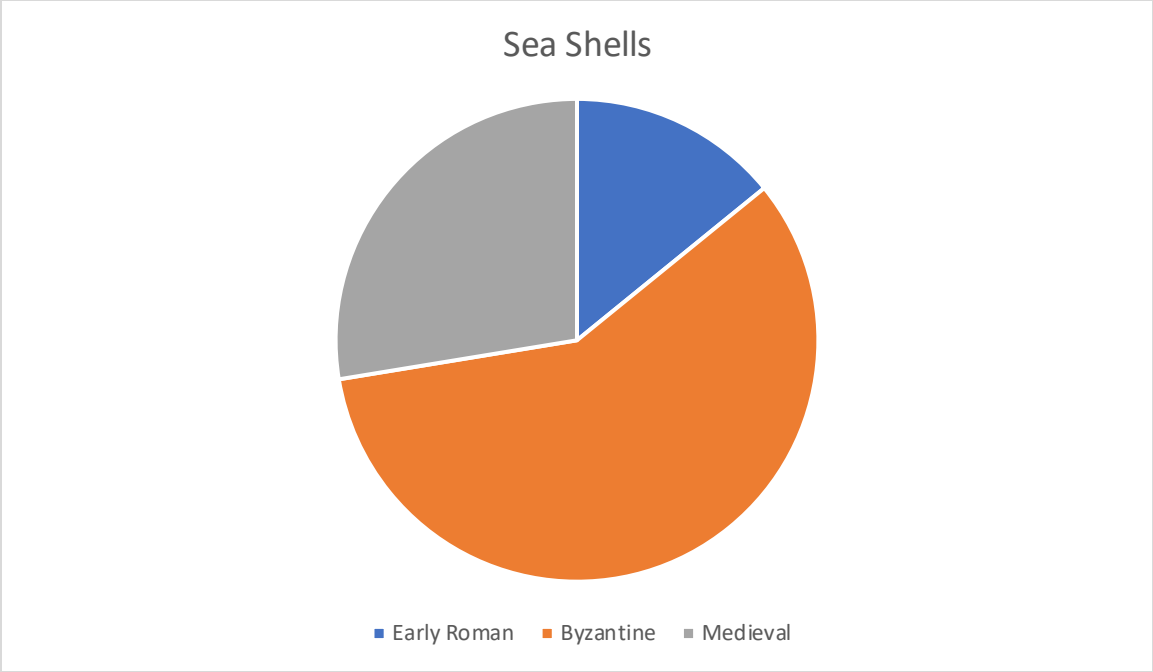
Graph 4: Statistical Comparison of Botanical Remains



Graph 5: Statistical Comparison of Animal Bones



Graph 6: Statistical Comparison of Fish Scales



Graph 7: Statistical Comparison of Seashells

Evidence of the Siege in Jerusalem

The end of the siege resulted in the absolute destruction of Jerusalem. For archaeologists, destruction created a treasure trove of artifacts that have remained in the same spot for centuries. Although this paper focuses on the Mount Zion site, plenty of archaeological sites hold evidence of the siege. The evidence found throughout the city confirmed what Josephus said in *The Jewish War* about the devastation of the city. Sites include the City of David, The Temple Mount, the camps of the Tenth Legion, and many more. The siege left the city in ruins with evidence of the fire and massive Herodian stones being discovered scattered around the Temple. An arm of a female covered in ash was discovered inside a kitchen cut off during the siege. [112] The Romans left just as much evidence of the siege as the city's inhabitants.

[112] Levine. *Jerusalem:* 441.

Although the primary archaeological evidence occurred inside the city, artifacts of the siege arose outside the city with the Roman camps. The site of the Tenth Legion covered the ridge of the City of David and Mount Zion near the Old City's fortified walls. According to Hillel Geva, the main indicator for the siege appears in the remaining western wall and the three towers, Phasael, Hippicus, and Mariamne, that served as the barracks for the Tenth Legion. Even though few remains associated with the Roman camp appeared inside the city, scholars have concluded the camps emerged inside of the city. The legion constructed temporary structures built with wood and clay roof tiles with only the roof tiles remaining. Excavations at the Citadel uncovered pipe drains containing the Tenth Legion symbol-stamped roof tiles and more outside the Early Roman city wall. The war killed numerous people on both sides, with a Roman cemetery discovered on the Hinnom Valley showing Romans died alongside the Jewish citizens during the siege. [113] Reconstruction began over the ruins of the old destroyed city, with this also being apparent with the new city walls. [114] The Roman forces left their mark on the city but left a larger mark with the destruction occurring inside the city.

The destruction of the Temple left the Jewish citizens in distress, with Josephus describing the horrific event. Under the direction of Benjamin Mazar, the results of the siege to the most religious place of Judaism were revealed. The excavations uncovered large blocks connected to the Temple's retaining walls and periphery scattered across the ground. The retaining walls identified the boundaries of the Temple and the magnificent decoration of the structure that once surrounded the Temple. Another excavation was conducted to the southern end of the western wall. This excavation revealed crushed debris from the Temple covering a

[113] Hillel Geva, "The Camp of the Tenth Legion in Jerusalem: An Archaeological Reconsideration," *Israel Exploration Journal*, 34 No. 4 (1984): 239-246.
[114] Ibid., 247-253.

street running along the destroyed wall. Twenty shops were discovered during the excavation at the base of the wall located adjacent to the wall that served as shops for the pilgrims and the Temple. Fragments of walls found in the excavation were too small to identify the decorative design crafted in the Temple. The destroyed remains are attributed to the devastation and fire during the siege. [115] According to Josephus, the Temple went up in flames destroying everything and leaving only burnt remains. The Temple's fire burnt so hot that it changed the chemical composition of the stones surrounding the excavation. The stones came in contact with burnt bones that left a residue proving evidence of those who did not escape the Temple during the fire. [116] The excavations produced evidence of the Temple's destruction, with the sifting project continuing to find artifacts dating to the siege.

The Temple Mount sifting project works to preserve the history of the historical site destroyed by the siege and modern construction. The sifting produced large quantities of burnt sheep, goats, and cattle bones. Bones found in the sifting indicate the sacrificial offerings at the Temple. It includes a silver count minted coin used to pay the Temple tax with a value of half a shekel. These coins were paid by men once a year for the prosperity of the Temple. [117] The City of David site is located south of the Temple, also destroyed during the siege.

Described as the home of King David, the City of David site contained the Siloam Tunnel and Pool. The Siloam Tunnel was used as a system to transport water throughout the city. The Siloam Pool incorporated several pools outside the city where water from the Siloam Tunnel ran into. The site was constructed during the first century B.C.E. and lasted until the destruction of

---

[115] Peleg-Barkat, Orit. *The Temple Mount Excavations in Jerusalem: 1968-1978 Directed by Benjamin Mazar."* (Jerusalem: The Hebrew University of Jerusalem, 2017): 25-29.
[116] Ibid., 34-36.
[117] Gabriel Barkay and Zachi Dvira, "Relics in Rubble: The Temple Mount Sifting Project." *Biblical Archaeology Review,* (2016): 47-52.

Jerusalem in 70 C.E. While excavating the site, it first seemed more like a dump than an occupation level. Landslides and collapses spread the debris outside of the area and all finds did not date to the Early Roman period. Included in the site, the 'First Wall' ran through the site. The wall's opening into the city was blocked as preparation for the upcoming siege. The agricultural and water installations did not receive proper maintenance during the siege and were eventually destroyed during the siege. The gardens and water systems show how inhabitants may have stored food before the siege. [118] The City of David site demonstrated the destructive nature of the siege and tunnels that led throughout the city.

During the siege, the insurgents used the tunnels under the city to wage a guerrilla-style warfare against the Roman forces. These aqueducts stretched throughout the city beginning at the Jaffa Gate and leading to the Upper City. [119] The tunnel contained potsherds from Late Hellenistic, Early Roman, Byzantine and Umayyad periods along with Tenth Roman Legion rooftiles. Underneath the Christ Church, the tunnels had the same form of plaster as *miqvehs,* similar to sites located in the Jewish Quarter. [120] Estimated to be constructed under the orders of Herod the Great, the aqueducts supplied water to the Upper City. The survey of the tunnel system found several exits in the Upper City used by residents to escape before the siege. The tunnels had exits at Herod's Palace, The Temple Mount, Christ Church, and many other spots inside the city, including various pools. Knowing the massive military power of the Romans, the Zealots are suggested to have used the tunnels as a strategic advantage against the

[118] Yigal Shiloh, "Stratigraphical Introduction to Parts I and II," In *Excavations at the City of David 1978-1985,* edited by Donald Ariel, 1-12 (Jerusalem: Hebrew University of Jerusalem, 1992), 4-12.
[119] Shimon Gibson and Rafael Lewis, "The Subterranean Tunnel System Beneath Christ Church Near Jaffa Gate: Evidence of Guerilla Warfare and Refugee Hideaway from the Time of Titus' Siege of Jerusalem," *New Studies in the Archaeology of Jerusalem and its Region,* Vol 13 (2019): 18.
[120] Ibid., 35-38.

Romans and other insurgents. [121] During the excavations of the pool and tunnel of Siloam, all but one potsherd did not date to the first century C.E. but to the Iron Age during its original construction. With Solomon's pool and the Siloam trenches mainly containing Early Roman pottery, this proves Josephus' statements of the tunnel's usage during the siege. [122] This only leaves the city dump located outside the Temple as the last evidence before the siege.

An Early Roman city dump discovered outside the city's walls demonstrated common "household garbage" that primarily comprised kitchen and building remains, with no special finds found. The dump contained artifacts dating from the first century B.C.E. to the end of the Second Temple period. Jerusalem's population consumed large quantities of meat with pilgrims bringing offerings for the Temple from outside the city. Excavations of the Temple generated no trash, so all the waste produced there must have been transported to the dump. Being located outside of the city, the dump represented a form of sanitation to remove the trash from the city. All the pottery and coins' dates do not exceed the end of the Second Temple period. [123] The faunal remains primarily composed sheep and goat but also contained cattle remains. The dump did not contain any pig remains, following Jewish kosher laws. The bones found originated from young animals consumed after sacrifice. Jewish sacrificial rituals also called for young lambs and cattle to be slaughtered at the Temple. Butchery marks on the bones displayed both primary and secondary butchery marks so bones found in the dump came from both commercial and residential areas. [124] Not wanting to travel home with heavy empty pottery, the pilgrims disposed of their pots in the dump. The addition of the pilgrim's trash demonstrates the difference between

[121] Ibid., 48-54.
[122] David Adan, "The 'Fountain of Siloam' and 'Solomon's Pool' in First-Century C.E. Jerusalem," *Israel Exploration Journal*, 29, No. 2 (1979): 96.
[123] Guy Bar-Oz, Ram Bouchnik, Ehud Weiss, Lior Weissbrod, Daniella Bar-Yosef Mayer, and Ronny Reich, "'Holy Garbage"": A Quantitative Study of the City-Dump of Early Roman Jerusalem." *Levant*, 39 (2007): 1-2.
[124] Ibid., 5-6.

a domestic and city dump. "Prestigious tableware, plant and animal foods" indicated the socio-economic of the elite class near the Temple Mount. [125] The city dump described the everyday life and economy during the Early Roman period.

Archaeologists conducted excavations inside and outside of the city's walls showing the immense destruction. The remains of the siege left burnt and broken artifacts scattered throughout the city. Being under siege for around five months, the Roman forces left their own artifacts. The temporary structures crafted by the Roman legion met the same fate as the city, providing evidence of Josephus' description of where the Romans established camps. The burnt and demolished Temple aligns with Josephus' description of the outcome of Judaism's holiest site. The City of David (Herod's Temple) also showed the destructive nature of the siege that did not survive the destruction. The enforcement of the wall revealed the preparation methods taken for the impending siege. The destroyed gardens and water installations show how the Romans destroyed everything in their path. The tunnel survey verified the tunnel system's importance during the siege. The Early Roman sherds in the tunnel confirm Josephus' statements of the Zealots hiding food in the tunnel. And finally was the dump located adjacent to the Temple. This dump may not have been used during the siege, but it gave viable information of what the people consumed daily and the city's economic status. These sites demonstrate the destruction that ensued during the siege and associated with what Josephus cites as the last occupation.

Tacitus

Although Josephus' text represented the only eyewitness account of the siege, Publius Cornelius Tacitus wrote his version 30 years later. Raised in a high-ranking Roman family, Tacitus gained his role as an historian through his family's name and his work as a Roman

[125] Ibid., 10.

Senator. Also employed by the Flavian family, he owed no loyalty to the citizens of Judea, so his narrative differed from Josephus'. While not witnessing the events occurring during the siege, he had access to the same sources as Josephus while writing his interpretation of the siege. The question remains; how did Tacitus describe the siege and how did the two Roman historians' narratives differ?

First, Tacitus described the Jews as the "meanest" population that resided in the Near East while praising the prosperous city of Jerusalem under the control of Rome. Far before the beginning of the First Jewish Revolt, the Jews fought for their independence from foreign authority and displayed their willingness to brutally kill their own people to gain sovereignty, portraying them as savages. He also described how Caligula attempted to erect a statue of himself in the Temple, with the only reason it failed due to his untimely death that prevented a Jewish uprising. Tacitus' tone displayed the citizens of Judea in a negative manner, who refused to submit to the "glory" of the Roman Empire. [126]

Tacitus described Vespasian as the savior of Judea, whose past military ventures guaranteed a victory in Judea. In the Year of the Four Emperors, Rome's irritation towards Judea's refusal to surrender influenced the war. After several skirmishes, the Jewish rebels fled to Jerusalem. Not wanting the insurgents to starve to death, they raided the city as a sign of mercy. He also described the Temple's architecture and cisterns for holding rainwater. During the siege, Jerusalem did not receive any rain, so these cisterns created a water source for the people. During the siege Jewish rebel leaders hid stores of grain throughout the city that was only meant to feed the rebels with Tacitus describing the stores as "a great store". Rebels had enough livestock even

[126] Publius Cornelius Tacitus. *The Histories* (Loeb Ed. Transl. Clifford Moore),189-191.

to offer sacrifices at the Temple. He stated how the rebels fighting against the Romans was deemed as unlawful. After the destruction of the Temple, the surviving Jerusalemites rallied together to defend their city. [127]

Ignoring the length of the two historians used to describe the siege, the two narratives completely differed. Josephus included a hidden apologetic narrative to his fellow Jewish people, while Tacitus had no remorse for the slain Jews. Similar to Josephus, he used his text as propaganda. He clearly stated a personal disdain for enemies of the Roman Empire with a tone displaying his personal thoughts of Roman superiority. When it came to the suffering of the Jerusalemites, Tacitus spoke about the suffering only once in his text by stating how the soldiers wanted to end the war before the people starved. This indicates that if the siege continued, the people inside the city would eventually starve. The other references to food came with the insurgents' hidden food stores and sacrifices at the Temple. These examples prove that the people had food stores in the city, but the grain fed the soldiers and not the citizens.

Scholars' Schools of Thought on the Credibility of Josephus

Although this study focuses on *The Jewish War,* Josephus also wrote *Antiquities of the Jews, Against Apion,* and *The Life of Josephus.* Scholars have committed their careers to determine if Josephus' texts were suitable as an historical source. Historians have evolved their explanation of Josephus by three different methods: understanding the evidence credibly and inclusively, hypothesizing the historical events, and then explaining how the evidence proves the previous hypothesis. [128]The hypotheses do not always agree with Josephus, but in some cases,

[127] Ibid., 193-199.

[128] Steve Mason, "Introduction." in *Understanding Josephus: Seven Perspectives,* edited by Steve Mason, 11-19 (England: Sheffield Academic Press, 1998), 12.

they do. Historians failed to ask how Josephus came to the conclusion and where he gained his hypotheses. Mason argued two themes of an alternative constitution and philosophy that presumed a sympathy for the Gentiles. Scholars focused on his audience/narrative, political perspective, terminology, and philosophical schools of thought.

Located throughout all of Josephus' works, his political ideology came forth and declared the Revolt as the "greatest conflict in human history." [129] Rajak implied Josephus' philosophy included the Jewish superiority and the freedom movement. Being proficient in both Greek and Hebrew, he gained influences from both Roman and Judean cultures. The main difference between him and Greek-based scholars like Philo, who influenced his works, was that he focused on historical events, not philosophy. This produced an explanation of his original ideas and theories of Jewish history, telling the history through the eyes of a Jewish citizen. [130] Although not mentioned in *The Jewish War*, one major aspect in his text included the Jewish strive for *politeia* or legal freedom. Freedom meant more to the Jewish faith than politics, demonstrating his continuing faith. [131] Unlike Greek fashioned political rule of autocracy, oligarchy, or democracy, the Jewish political system of a theocracy and monotheism believed in the sovereign rule of God. Josephus explained the importance of this in his works, demonstrating his personal religious belief and the reason for the rebellion to regain their Godly rule. [132]

Despite betraying the anti-Roman movement, he tried his best to show he did not denounce his people. [133] The Jewish polity followed a hierocracy system, with Josephus approving of a monarchic government in which the king is a high priest. Wanting a religious-

---

[129] Tessa Rajak, "The *Against Apion* and the Continuities in Josephus's Political Thoughts." in Understanding *Josephus: Seven Perspectives,* edited by Steve Mason, 222-246 (England: Sheffield Academic Press, 1998), 223.
[130] Ibid., 225-227.
[131] Ibid., 228.
[132] Ibid., 229-231.
[133] Ibid., 233.

based government of Judea portrays his high-born origins. This explanation of the priests' importance in Judaism implores the reader to understand the power and influence they held during the first century. Regarding having foreign authority over Judea, they did not replace the authority of Judaism. The people refused sacrificial offerings to Roman Emperors and did not allow their statues to be constructed in the Temple. In addition, the Temple refused foreign gifts and sacrifices, being the first step towards revolution. Foreign authorities implementing their personal religious beliefs directly went against Judaism. The political thoughts of Josephus also included the conflict between the rich and the poor. Originating from Greek political thought, Josephus identified the masses revolting as the Zealots or the poor. [134] In conclusion, Rajak noted how his political thoughts primarily revolved around the freedom of his people. Josephus comprehended the importance of God as the omnipotent ruler of Judea and placed him at the center of the desire for political freedom. [135] Josephus' desire for political freedom translated to the arrogance displayed in his writing.

Knowing Josephus' social, political, and personal background generated a debate about his credibility. Under the direct control of the Roman Empire, the requirement to write a pro-Roman text led future historians to distrust his reliability. His text depicted two narratives: to portray the Flavian family prosperously and represent his own people in the same fashion. He kept faith with both sides placing blame for the Revolt on the Zealots while not allowing Titus to comprehend his apologetic narrative. [136] A characteristic of his narrative was portraying himself in a favorable manner. One aspect that Uriel Rappaport argued is that Josephus lied about his military experience and ventures by stating the impossibility of Josephus raising an army and his

[134] Ibid., 238-240.
[135] Ibid., 242.
[136] Uriel Rappaport, "Josephus Personality and the Credibility of His Narrative." in *Making History: Josephus and Historical Method*. Edited by Zuleika Rodgers. 68-81 (Leiden and Boston: Brill, 2007), 69-70.

military tactics, with Josephus not having any prior military training. He proved his inexperience by noting how Jewish elites did not receive military instruction during their formal education. Josephus advised Titus during the Siege of Jerusalem, showing his arrogance and supposed loyalty to the Flavian family. The inclusion of his false military achievements demonstrated to the Roman elite, whose culture revolved around war, his dedication to his new family. During Josephus' description of his capture at Yodfat, he claimed that God sent him a message to survive in his attempt not to display himself as a coward and traitor. He included how Vespasian supposedly strived to capture Josephus, another demonstration of his ego. [137] Josephus' pretentious attitude established an unreliable source in Rappaport's interpretation. It needs to be understood how his arrogance affects the language used by Josephus.

Scholars understand the difficult situation in which Josephus wrote his works with the terminology needing further investigation. Folker Siegert elaborates on the language he described as "pseudo-problems" (misuse of language) so modern scholars do not get lost in his works. [138] Siegert classified words as symbols representing facts, places, and events in different categories. This re-evaluation acknowledged how some of the events he described represented words and not facts. The end of the Jewish Revolt had two possible dates that involved the fall of Jerusalem or Masada, which positioned the events of Josephus as a "problem of accuracy", a typical inaccuracy of human language. [139] When it came to his theory of language, his writing explained his personal values in the manifesting of past events. Including his personal values creates biases when reading his work, with not every aspect relating exactly to facts. [140] Whether

[137] Ibid., 71-75.
[138] Folker Siegert, "On Referring to Something, Meaning Something, and Truth: A Terminological Proposal." In *Making History: Josephus and Historical Method*. Edited by Zuleika Rodgers, 25-48 (Leiden and Boston: Brill, 2007), 26.
[139] Ibid., 28-29.
[140] Ibid., 41.

his writing contained facts and truths depends on the sources that determine the text's accuracy. The statements created claimed that may not mean the same as the events' truth. The fact that he saw the events with his own eyes did not come free from false facts, and he avoided taking responsibility for these falsities. [141] The three philosophies of Judaism incorporated language where Josephus tried to tell the truth.

Josephus closely watched the philosophical making of the "model Jews" that were classified as the Pharisees, Sadducees, and Essenes to describe the culture of Judea. Gunnar Haaland describes Josephus' use of the three Jewish schools of thought as a rhetorical device. The three excursuses (*War, Antiquities* twice) act as prerequisites for comprehending the Jewish people. [142] The first excursus seemed not to benefit the narrative but provide evidence on the region's political leaders. The political leaders, Rabbis, wanted to rebel against the Romans, the main theme of *War*. [143] In the second excursus, Josephus included the three Jewish nations, not just for political reasons, but to insert his peoples' culture and intellect. He included the description of his own people to overturn the barbaric representation previously left by the Greeks. The Jewish schools emphasized the "fate of free will" to judge the Jewish people, once more imploring the importance of freedom. [144] The third excursus involved the "fourth philosophy" and compared it to the other three. This fourth philosophy revolved around the afterlife and was identical to the Pharisees and their unrivaled passion for freedom. This implied

[141] Ibid., 46-47.
[142] Gunnar Haaland, "What Difference Does Philosophy Make? The Three Schools as a Rhetorical Device in Josephus," In *Making History: Josephus and Historical Method*. Edited by Zuleika Rodgers. 262-288 (Leiden and Boston: Brill, 2007), 262-263.
[143] Ibid., 264-268.
[144] Ibid., 270-273.

that all three models of Judaism now have an equal role in Israel. [145] Describing the sects of the Jewish population demonstrated another form of his apologetic narrative.

Historians have scoured his text to check Josephus' credibility by debating his various schools of thought. He used his political thoughts to reassure the reader of the Jewish people's final goal of freedom. His personal arrogance displayed his ability to produce an unreliable source. When it came to the language used it produced different means to facts and truths. By including the three philosophies of Judaism, Josephus changed the world's understanding of his religion without altering the narrative. The historians found ways to check his credibility and deduced he has both reliable and unreliable information in his sources.

Josephus' Statements Compared to Flotation on Food Stores and Consumption

This section compares Josephus' statements to the flotation results of the Mount Zion site. It encompasses how the samples from differing features correlated to what Josephus stated in his text, with a focus on how and where the Mount Zion site stored food or indications of starvation. In *The Jewish War,* Josephus clearly established that plenty of citizens prepared for the siege by collecting and hiding quantities of food. Hiding food from raiders and not allowing them to identify that they possessed food helped Mount Zion's inhabitants survive the siege. Comparing Josephus to the quantitative analysis demonstrates how much the site consumed and if they stored any food as well as the struggles they endured while under siege.

During the siege, raiders searched everywhere for any evidence of food and ransacked homes that showed signs of having food. The Jerusalemites created tactics to hide food and evidence of food they may or may not have. One of the methods involved not cooking food. This prevented raiders from seeing smoke and anticipating that food was present in the home. He even

[145] Ibid., 274-276.

clearly states how people hid in the most "remote recesses of their houses", but directly after that, he described starvation. [146] During flotation, all samples produced charcoal that either came from cooking or, more likely, when the city burnt down. Before the siege, the citizens threw their trash into the streets, which included food remains. Mechanisms cleared the streets with donkeys carrying the trash to the city's dumps or burning facilities. This continued until the beginning of the First Jewish Revolt, so residents needed to find other ways of disposing of their trash. [147] This raises the question of where did the people dispose of their trash while under siege?

Knowing how producing smoke indicates food, then throwing food into the street would also show raiders that the residents had food. According to Josephus, the entire city was filled with enemies on both sides who scavenged for anything edible. Raiders burst into homes multiple times a day, looking for food. If the people did cook bread in an oven, they usually consumed it before fully cooked, but that still produced smoke that attracted raiders. [148] The *tannur* style oven (L543 and L662) that produced bread contained no remnants of grain. Knowing how ovens are cleaned after each usage, why does the oven contain remains besides broken pieces of the oven? Animal bones, eggshells, seashells, seeds, and fish scales are usually not cooked inside the oven. Charcoal in the oven has different meanings depending on when last used. Knowing how the siege ended in fiery destruction and with Josephus stating how people tended not to cook food in free raiders, the charcoal in the ovens may have come from the city's destruction. Not showing a cooking signal, the ovens changed their purpose into a trash deposit during the siege. They also found places to hide their food and themselves.

[146] Josephus. *The Jewish War,* 335.
[147] OritPeleg-Barkat, "Herodian Jerusalem" In *The Handbook on Jerusalem,* edited by S.A. Mourad, N. Koltun-Fromm, and B. Der Matossian, 34-46. (Oxford: Routledge, 2018), 42-43.
[148] Josephus. *The Jewish War,* 335

The Jerusalemites knew the siege was impending and prepared by storing food. The examples Josephus gave mainly implied that upper-class citizens had the means to collect large quantities of food. The Temple contained stores of food and housed refugees. It served as a beacon of safety until the Zealots raided the Temple, keeping all the provisions for themselves. On a different note, he also described how the gardens, plantations, and fruit trees did not survive long in the city. [149] The Temple continued its ritual practice of offering wine and oil, displaying their availability during the siege. [150] Being able to provide offerings meant the city still possessed sheep, goats, and cattle. According to Yonatan Adler, the animals offered did not go to waste and were consumed after the sacrificial ritual. [151] Josephus also states how Zealot leaders hid days' worth of provisions in the tunnels under the city to be safe from raiders and Romans. [152] The tunnels also allowed non-combatants to hide from the violent soldiers so that people may have hidden in different parts of the city. These tunnels also served as a means for the Jerusalemites to gather food outside the walls. [153] The Jewish war prisoners starved to death by refusing food or not being offered food by the Romans. [154] This showed how the Romans did have food, unlike different interpretations that they starved alongside the Jewish citizens.

If producing smoke created a safety hazard that captured the eyes of the raiders, how did people prepare food that was still raw? During antiquity, salmonella did not represent such a problem as today. Every sample contained eggshells, so to avoid attracting attention, eggs may

[149] Ibid., 231-233.
[150] Ibid., 375.
[151] Yonatan Adler, *The Origins of Judaism: An Archaeological-Historical Reappraisal*. (New Haven and London: Yale University Press, 2022), 150.
[152] Josephus. *The Jewish War,* 513.
[153] Ibid., 483.
[154] Ibid., 497.

have been consumed raw as to not create smoke. [155] This generated a scenario that the people possessed food.

Knowing the city contained food, the Mount Zion site produced evidence of hidden food stores. Found in the cistern (L522), several full cooking pots indicated how this site's inhabitants hid food. This cistern housed the full cooking pots and did not hold any water. Cooking pots plus charcoal display the possibility that the people cooked the food in the cistern. If the cistern did possess water, the bones, and trash would create unsanitary water. This cistern has a narrow top and expands towards the bottom, demonstrating a strategic hiding place for humans and food, but difficult to enter and leave. Prepared to stay in the cistern for a long period, they brought plenty of smoked fish which meant fish bones were found. The one charred grape seed indicates how they might have started fires in the cistern while they waited out the siege. Proof that people resided in the cistern is revealed with the token found. Since it was so close to the bottom of the cistern, this token shows how the people wanted to save their money for after the siege, but this particular token has been lost while hiding in the cistern.

The chamber (L548) and *miqveh* (L544/550) remained primarily intact after the city's destruction. Created below most of the Early Roman layers, this feature had stairs to travel down to the chamber and then the *miqveh.* The broken storage jars found in this area showed how the people hid their food supplies during the siege. For a *miqveh* to meet Jewish standards, the water must have come from spring or rainwater. During the time of the siege, the summer represented the dry season, so the water came from springs that surrounded the city. According to Jewish purity rituals, before entering the *miqveh* one must first clean the filth, so the water remained

[155] Arlene Stadd, *Cooking with the Ancients: The Bible Food Book* (Colorado: Glenbridge Publishing, 1997), 10.

clean. [156] As mentioned above, the Romans destroyed the springs, removing the possibility of refilling the bath. Along with people, empty vessels underwent purification. This proved how sherds were discovered in *miqvehs,* but not food remains. [157] Located underground, the baths received water through the natural flow of gravity, following Jewish ritual practices. Created with hard limestone bricks and lined with plaster, these *miqvehs* established a well-built feature with many examples surviving until modern times. [158] All these factors created a secure place for people and food to hide during the siege.

This food remains of this *miqveh* indicated a different usage of the feature than its original purpose. The springs and systems of water did not remain intact, so no pure water could have filled the bath. All *miqvehs* needed to be located underground and crafted to endure, establishing a secure hiding spot. Ritually, all things brought into the *miqveh* were pre-cleaned to avoid contaminating the water. As previously mentioned, all artifacts excluding sherds and plaster, did not typically appear in *miqvehs* during excavations. Food remains found in this bath differed from other sites around ancient Judea; this indicates how the last usage of the Mount Zion *miqveh* may have been as a hiding place. The total lack of seeds indicated that this feature may have represented one of the last the inhabitant's final refuge. Either stored or consumed, the bath contained artifacts that it normally would not.

The "hidden" chamber produced evidence of hiding from the insurgents and the consumption quantity during the siege. Plenty of evidence proved the violent events of the siege, and the chamber's use as a hiding place confirms the violent event. This feature involved the only confirmed hiding spot of the site. All the other hiding places are just speculations, but Dr. Gibson

---

[156] Shimon Gibson, "The Pool of Bethesda in Jerusalem and Jewish Purification Practices of the Second Temple Period." Proche-Orient Chertien, 55 (2005): 276.
[157] Adler, *The Origins of Judaism*, 83.
[158] Ibid., 61-63.

and Dr. Lewis confirmed the room was a hiding place. In the article "The Subterranean Tunnel System beneath Christ Church near Jaffa Gate: Evidence of Guerilla Warfare and a Refugee Hideaway from the Time of Titus' Siege of Jerusalem" Gibson and Lewis concluded that this chamber was transformed into hiding places during the siege. The subterranean features were adapted to enter and leave the tunnels without the Romans noticing, including cisterns, drains, *miqveh,* water tunnels, tombs, and basements. This study may show how the *miqveh* and cistern were used as hiding places. [159] Josephus stated that people hid from raiders but did not have food while hiding. This confirms Josephus' statements on how people did hide in their homes, but his description of starvation is disproven with the food remains.

One consistent thing with all the food remains of the Early Roman Period is that the food stores were primarily comprised of items that could survive long periods of time. Although olives and legumes survival rates are long, grapes did not have a long shelf-life. Legumes are consumed whole, so in a time of famine, few remains mean the people consumed all the staple. Olives had a long shelf-life if properly treated, but only two are found in this era. Any botanical remains not properly cured, like grapes, probably were consumed at the beginning of the siege. All grape seeds found were charred from either being burned in a fire or during the city's destruction. All the sources that produced botanical remains did not survive the siege, so no new fruits were available.

Comparing the Flotation Results to Josephus' Credibility

With every example stated above, the last step is to prove or disprove his credibility as a historian. In the *Jewish War,* Josephus describes a scene of horrific events where people starved and scavenged for anything edible. At the same time, he included examples of food stores in

[159] Gibson and Lewis, "The Subterranean Tunnel System Beneath Christ Church Near Jaffa Gate: 53.

different areas around the city. Giving significantly more emphasis on starvation, a normal analysis of the *Jewish War* revealed food scarcity during the siege. Knowing how many historians and archaeologists have rightfully debated his reliability as a historical source, they have undertaken different experiments to check his credibility. This section will focus on taking the flotation data from the Mount Zion site to see if the results indicated starvation, deprivation, or a healthy diet.

Having proof of the elite status of the Mount Zion site, the golden Nero coin, it is safe to say the inhabitants possessed the capability to accumulate food stores to last during the siege. Before the siege, Jerusalem's population reached a new height of economic prosperity. Although the economy strengthened during the Early Roman Period, the growing population created more mouths to feed. [160] The city's economic demographic of Jerusalem saw the lower, middle, and upper classes lived alongside each other. This created a situation where a wealthy neighbor might live next to a poor neighbor. Therefore, one household could have food while the other starved. [161] Siege warfare leads to the starvation of the people trapped in the city; a strategy taken during antiquity. Similar to Roman culture, Greek warfare practiced starving the enemy during sieges that caused terror in the city. After the depletion of resources, inhabitants of besieged cities consumed inedible objects and turned to cannibalism in order to survive. End results of Greek sieges saw the destruction of the city and the enslavement of the inhabitants. [162] This raises the question - did Josephus just copy common siege warfare results or did this scenario happen during the siege of Jerusalem?

[160] Goodman, *Rome and Jerusalem*,156.
[161] Levine. *Jerusalem:* 230-232.
[162] Michael Seaman, "Early Greek Siege Warfare." In *New Approaches to Greek and Roman Warfare.* Edited by Lee Brice, 29-38 (New Jersey: John Wiley & Sons, Inc., 2020), 36.

According to the flotation results, it seemed the people of the Mount Zion site were neither starved nor deprived of food as Josephus stated. Flotation produced on average less food remains than the other two periods, but it did not mean the people went hungry. Botanical seeds did show the inhabitants' complete lack of organic remains during the siege. Josephus did clearly state how the vegetation that produced fruit did not survive the events of the siege. Having no means of gathering new botanical food sources, this explains the lack of botanical remains in the Early Roman period. This can also translate to the lack of fish scales in the Early Roman Period. Fish either arrived in Jerusalem from far away natural bodies of water or fish farms. A strategy of war conducted by the Romans would have eliminated all methods of trade. Destruction of the fish farms may have occurred during the war similar to other botanical farms. With flotation demonstrating the Early Romans' lack of fish scales, it means the inhabitants were deprived of botanical food and fish remains.

Knowing how chicken meat incorporated the most consumed protein in ancient Judea, eggs should be just as important in the diet. Chicken remains in the Southern Levant experiment followed the same pattern of chicken remains increasing with each new period. Even though the experiment counted chicken bones, the eggshells followed the same pattern. The bones from the Early Roman period may have been statistically less but not by enough to indicate starvation or deprivation. Knowing how the number of eggshell remains increased over time, this means the eggshell and bone differences do not indicate starvation or deprivation during the siege.

Bones included all animals consumed in Jerusalem. As did the golden Nero coin discovered on the Mount Zion site, the quantity of the various bones also demonstrates the economic prosperity of the site. The only two food staples discovered in large quantity involve protein sources, establishing an unbalanced diet. Although they did not consume a balanced diet,

the consumption of protein meant a healthier diet than only consuming grain or nothing at all. Flotation provided evidence that the inhabitants were deprived of fresh products but did have stores of food.

The most influential evidence of the adequate food supplies came from the *miqveh* and cistern. Found in both features were storage and cooking jars. The two features' purpose was to hold water; with both features having artifacts, it means they did not possess any water or were no longer in use. This proved two different aspects: that the people did not have any sources of water, and they may have hidden their food from intruders. Not having a source of water may reveal a more dangerous situation than no food. The "hidden" chamber proves the people hid in homes during the siege and consumed food while hiding. It needs to be plainly asked - did the people of the Mount Zion site starve during the siege?

The simple answer to that question is no. As stated above, the flotation experiment produced what seems to be a sufficient amount of food. Although protein sources indicate they had food on the site, not all the essential nutrients were available to the people. Several food remains such as forms of vegetables and various other foods that did not become visible with flotation. The main food staple, bread, did not appear during flotation. This indicates how the site did not have any grain or consumed all the grain with great care. This aligns with Josephus stating how the people consumed grain raw. Do the cooking pot and storage jars in the cistern and *miqveh* respectively indicate hiding of food during the siege?

Conclusion

After considering everything stated during this thesis, what is the outcome of the experiment? Before debating the outcome, the time of the sieges must be discussed. All three periods ended in the city's destruction, creating an equal interpretation. So, the above-mentioned

comparison of the periods proved that the quantitative analysis does not show any starvation of the Early Roman level. According to the flotation results, the quantitative analysis only displayed the deprivation of fish and the almost complete lack of botanical remains. The site contained five different water sources, two *miqvehs* and three cisterns, so there is a chance the site had plenty of water for the siege. Even with these two food staples signifying less than the other two periods, it does not mean the people starved. The fully intact cooking pot found in the cistern with food remains tells a different story. Assuming that the storage and cooking jars ended up in the cistern and *miqveh* as a method to hide food from raider proves the site contained food, there is no definite proof available to support this claim. The "hidden" chamber proves how people concealed themselves and disproves the starvation as food remains were found in it. Overall, this experiment only takes the flotation samples from the Mount Zion site into consideration, so I cannot speak for the entire city of Jerusalem. When only talking about this one small space in Jerusalem, the people did not suffer the way Josephus described in the *Jewish War*.

Bibliography

Primary

Josephus, Flavius. *The Jewish War, Books IV-VIII* (Loeb Ed. Transl. Thackeray.)

Tacitus, Publius Cornelius. *The Histories* (Loeb Ed. Transl. Clifford Moore.)

Secondary

Adan, David. "The 'Fountain of Siloam' and 'Solomon's Pool' in First-Century C.E. Jerusalem." *Israel Exploration Journal,* 29, No. 2 (1979): 92-100.

Adler, Yonatan. *The Origins of Judaism: An Archaeological-Historical Reappraisal.* New Haven and London: Yale University Press, 2022.

Allen, Michael, and Bas Payne. "Molluscs in Archaeology: An Introdution." In *Molluscs in Archaeology: Methods, Approaches and Applications,* edited by Michael Allen, 1-4. United Kingdom: Oxbox Books, 2017.

Bar-Oz, Guy, Ram Bouchnik, Ehud Weiss, Lior Weissbrod, Daniella Bar-Yosef Mayer, and Ronny Reich. ""Holy Garbage": A Quantitative Study of the City-Dump of Early Roman Jerusalem." *Levant,* 39 (2007): 1-12.

Bar-Yosef Mayer, Daniella E. "Shell Beads, Freshwater Clams, and Landsnails from Tel Qashish'". Tel Qashish: A Village in the Valley of Jezreel. Report of the Archaeological Excavations (1978-1987) 2003.

Barkay, Gabriel and Zachi Dvira. "Relics in Rubble: The Temple Mount Sifting Project." *Biblical Archaeology Review,* (2016): 44-64.

Bilde, P. "The Causes of the Jewish War According to Josephus." *Journal for the Study of Judaism in the Persian, Hellenistic, and Roman Period,* 10, No. 2 (1979): 179-202.

Broshi, Magen. "The Credibility of Josephus." In *Bread, Wine, Walls, and Scrolls,* 71-77. New York: Sheffield Academic Press, 2001.

Cherry, Jim. "Carbon 14 Dating: Past, Present and Future A Simplified Explanation." *Central States Archaeological Journal,* 56, No. 1 (2009): 28-30.

Fried, Tal, Lior Weisbrod, and Guy Bar-Oz. "A Glimpse of an Ancient Agricultural Ecosystem Based on Remains of Micromammals in the Byzantine Negev Desert." *Royal Society Open Science,* 2018.

Fuks, Daniel, Guy Bar-Oz, Yotam Tepper, Tali Erickson-Gini, Dafna Langgut, Lior Weissbrod,

and Ehud Weiss. “The Rise and Fall of Viticulture in the Late Antique Negev Highlands Reconstructed from Archaeobotanical and Ceramic Data.” *Proceeding the National Academy of Sciences,* 2020.

Geva, Hillel. “The Camp of the Tenth Legion in Jerusalem: An Archaeological Reconsideration.” *Israel Exploration Journal,* 34 No. 4 (1984): 239-254.

Gibson, Shimon. “Common and Uncommon Jewish Purity Concerns in City and Village in Early Roman Palestine and the Flourishing of the Stone Vessel Industry: A Summary and Discussion.” *Journal for the Study of Judaism,* Vol. 53 (2022): 157-197.

Gibson, Shimon. James Tabor. Rafael Lewis. Steve Patterson. *“New Excavations on Mount Zion.” Ancient Jerusalem Revealed: Archaeological Discoveries, 1998-2018.* 304-313.

Gibson, Shimon. “The Pool of Bethesda in Jerusalem and Jewish Purification Practices of the Second Temple Period.” Proche-Orient Chertien, 55 (2005), 270-293.

Gibson, Shimon and Rafael Lewis. “The Subterranean Tunnel System Beneath Christ Church Near Jaffa Gate: Evidence of Guerilla Warfare and Refugee Hideaway from the Time of Titus’ Siege of Jerusalem.” *New Studies in the Archaeology of Jerusalem and its Region.* Vol 13 (2019): 18-56.

Goodman, Martin. *Rome and Jerusalem: The Clash of Ancient Civilizations.* New York: Alfred Knopf, 2007.

Goodman, Martin. *The Ruling Class of Judaea: The Origins of the Jewish Revolt Against Rome A.D. 66-70.* Cambridge, New York, Port Chester, Melbourne, Sydney: Cambridge University Press, 1987.

Goor, Asaph. “The History of the Grape-Vine in the Holy Land.” *Economic Botany,* Vol. 20, No. 1 (1966): 46-64.

Goor, Asaph. “The Place of the Olive in the Holy Land and its History Through the Ages’.” *Economic Botany,* Vol. 20, No. 3 (1996): 223-243.

Haaland, Gunnar. “What Difference Does Philosophy Make? The Three Schools as a Rhetorical Device in Josephus.” In *Making History: Josephus and Historical Method.* Edited by Zuleika Rodgers. 262-288. Leiden and Boston: Brill, 2007.

Horwitz, Liora Kolska and Jacqueline Studer. “Pig Production and Exploitation During The Classical Periods in the Southern Levant.” In *Archaeozoology of the Near East VI.* Edited by H. Buitenhuis, A.M. Choyke, L. Martin, Bartoseivics, and M. Mashkour. 222-239. The Netherlands: ARC Publicaties, 2005.

Huntsman, Eric. “The Reliability of Josephus: Can He Be Trusted?” *Masada and the World of the New Testament.* BYU Studies 36.3, 1996-7, 392-402.

Kidder, Tristram. “Sugar Reflotation: An Alternative Method for Sorting Flotation-Derived Heavy Fraction Samples.” *Journal of Field Archaeology,* 24, No. 1 (1997): 39-45.

Konstan, David. “Translating Ancient Emotions.” *Acta Classica,* 46 (2003), 5-19.

Lantos, Sára. “Late Antique Settlements of the Negev – Prosperity and Crisis: Imported Fish and Exported Wine.” PhD Diss., University of Haifa, 2018.

Lass, Egon. “Quantitative Studies in Flotation at Ashkelon, 1986-1988.” *Bulletin of the American Schools of Oriental Research,* No. 294 (1994): 23-38.

Lass, Egon. “Soil Flotation: A Window into Ashkelon’s Environment and Economy.” *Final Reports of the Leon Levy Expedition to Ashkelon,* (2001): 659-698.

Levine, Lee. *Jerusalem: Portrait of the City in the Second Temple Period (538 B.C.E. – 70 C.E.).* Philadelphia: The Jewish Publication Society, 2002.

Lernau, H. and O. Lernau. “Fish Remains.” Excavation at the City of David 1978-1985: Final Report. Vol III. Qedue 33. The Institute of Archaeology, The Hebrew University, Jerusalem. (1992): 131-148.

Liddell, H.G., H.S. Scott, and Mckenzie. *A Greek and English Lexicon (1940) A Simplified Edition,* by Didier Fontaine.

Mason, Steve. *A History of the Jewish War, A.D. 66-74.* New York: Cambridge University Press, 2016.

Mason, Steve. “Of Audience and Meaning: Reading Josephus’ *Bellum Judaicum* in Context of a Flavian Audience.” In *Josephus and Jewish History in Flavian Rome and Beyond, 71-100.* Leiden and Boston: Brill, 2005.

Mason, Steve. “Introduction.” In *Understanding Josephus: Seven Perspectives,* edited by Steve Mason, 11-19. England: Sheffield Academic Press, 1998.

Miller, Naomi. “Recovering Macroremains by Manual Flotation and Sieving.” *Flotation Instructions.* (2012) 1-5.

Peleg-Barkat, Orit. “Herodian Jerusalem” In *The Handbook on Jerusalem,* edited by S.A. Mourad, N. Koltun-Fromm, and B. Der Matossian, 34-46. Oxford: Routledge, 2018.

Peleg-Barkat, Orit. *The Temple Mount Excavations in Jerusalem: 1968-1978 Directed by Benjamin Mazar.”* Jerusalem: The Hebrew University of Jerusalem, 2017.

Pendleton, Michael. “A Flotation Apparatus for Archaeological Sites.” *First Annual Conference on Ethnobiology in Honor of Lyndon L. Hargrave,* (1979): 89-93.

Perry-Gal, Lee, Adi Erlich, Ayelet Gilboa, and Guy Bar-Oz. "Earliest Economic Exploration of Chicken Outside East Asia: Evidence from the Hellenistic Southern Levant." *Proceedings of the National Academy of Sciences of the United States of America,* Vol. 112, No. 32 (2015): 9849-9854.

Rajak, Tessa. *Josephus: The Historian and His Society.* Great Britain: Duckworth, 1983.

Rajak, Tessa. "The *Against Apion* and the Continuities in Josephus's Political Thoughts." In *Understanding Josephus: Seven Perspectives,* edited by Steve Mason, 222-246. England: Sheffield Academic Press, 1998.

Ramsay, Jennifer and Kenneth Holum. "An Archaeobotanical Analysis of the Islamic Period Occupation at Caesarea Maritima, Israel." *Vegetation History and Archaeobotany,* 24, No. 6 (2015): 655-671.

Rappaport, Uriel. "Josephus Personality and the Credibility of His Narrative." In *Making History: Josephus and Historical Method.* Edited by Zuleika Rodgers. 68-81. Leiden and Boston: Brill, 2007.

Rosen, Arlene. ""BA" Guide to Artifacts: Microartifacts and the Study of Ancient Societies." *The Biblical Archaeologist,* 54, No. 2 (1991): 97-103.

Sapir-Hen, Lidar, Guy Bar-Oz, Ilan Sharon, Ayelet Gilboa, and Tamar Dayan. "Food, Economy, and Culture at Tel Dot, Israel: A Diachronic Study of Faunal Remains from 15 Centuries of Occupation." *American Schools of Oriental Research.* BASOR 371 (2014): 83-101.

Seaman, Michael. "Early Greek Siege Warfare." In *New Approaches to Greek and Roman Warfare.* Edited by Lee Brice, 29-38. New Jersey: John Wiley & Sons, Inc., 2020.

Shai, Itzhaq and Joe Uziel. "All for Archaeology and Archaeology for All: The Tel Burna Archaeology Projects Approach to the Community Archaeology." *Journal of Community Archaeology & Heritage,* 3, No. 1 (2016): 57-69.

Shiloh, Yigal. "Stratigraphical Introduction to Parts I and II." In *Excavations at the City of David 1978-1985,* edited by Donald Ariel, 1-12. Jerusalem: Hebrew University of Jerusalem, 1992.

Siegert, Folker. "On Referring to Something, Meaning Something, and Truth: A Terminological Proposal." In *Making History: Josephus and Historical Method.* Edited by Zuleika Rodgers. 25-48. Leiden and Boston: Brill, 2007.

Stadd, Arlene. *Cooking with the Ancients: The Bible Food Book.* Colorado: Glenbridge Publishing, 1997.

Stewart, Robert, and William Robertson. "Application of the Flotation Technique in Arid Areas." *Economic Botany,* 27, No. 1 (1973): 114-116.

Struever, Stuart. "Flotation Techniques for the Recovery of Small-Scale Archaeological Remains." *American Antiquity,* 33, No. 3 (1968): 353-362.

Tsuk, Tsvika. *Water at the end of theTunnel: Touring Israel's Anceint Water Systems.* Jerusalem: Ben Zvi. 2011. (Hebrew)

Weiss, Ehud, and Mordechai Kislev. "Plan Remains as Indicators for Economic Activity: A Case Study From Iron Age Ashkelon." *Journal of Archaeological Science,* 31 (2004):1-13.

Wing, Elizabeth, and Antoinette Brown. *Paleonutrition: Method and Theory in Prehistoric Foodways.* San Pedro, California: Academic Press. 1979.