Seeds of Knowledge:
Palaeoethnobotany in the Classical World

by

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Introduction

At first glance palaeoethnobotany is simply the study of plant matter. The casual observer might think that it is simply an examination of dried seeds and fruits as archaeologists come across them in the course of their excavations, but it is much more than that. It is even more than the study of pollens and phytoliths and osteological analysis. The use of all of these methods of research must in the end combine to contribute to an attempt to come to a complete understanding of the ecology and environment of a site and how it affected and was affected by the humans who inhabited it. It is the study of how that changed over the years, whether through the evolution or domestication of the plants or the lifestyles of the inhabitants.

Professor Geoffrey Dimbleby discusses this in depth in his book *Plants and Archaeology*. In his introduction, he declares his dissatisfaction with simply examining the role of plants in archaeology, without looking into the role of animals, geology, soils, and various other factors involved in creating the environment of a site. The entire gamut of factors must be taken into consideration to form a complete image of the setting in which the lives of the human inhabitants took place. However, as Professor Dimbleby willingly acknowledges, it is virtually impossible to take into account every soil type, animal, insect, and plant in any given area.\(^1\) Therefore, the study of archaeological environments must be broken down into smaller components.

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\(^1\) Geoffrey Dimbleby, *Plants and Archaeology*, New Jersey, Humanities Press, Inc. 1978, 11
One of these components, clearly, is the study of plants, but even that can be broken into smaller components, as there are numerous ways to study them, other than the traditional scientific examinations.

While both traditional and experimental uses of palaeoethnobotany can be informative when carried out at Classical sites, the temperate climate of the area often makes it difficult to carry out such examinations. Land sites often offer up only charred seeds, and sometimes not even that. Some sites were excavated before archaeologists believed plant remains to be significant, and all seeds, phytolith remains, or other organic materials, were destroyed. Because of this, it is often impossible to analyze actual organic remains from Classical sites. Therefore, we must take other measures to arrive at any sort of understanding of the roles various plants played in society.

Ancient plants and the ways in which humans interacted with them can be explored through the traditional methods, examining organic remains in the lab and under the microscope. Archaeologists can also study plants through paintings, coins, or soil impressions, among other things. Therefore, this thesis will explore a number of case studies in which the archaeology of plants can be and have been examined.

The first few chapters will explore the study of organic remains of various types as they present themselves in the Classical world. These include the analysis of the Franchthi Cave excavation, which employed a wide range of the traditional scientific methods like phytolith analysis and palynology. The excavation of the Ulu Burun shipwreck off the coast of Turkey employs traditional underwater methods of examination and preservation. The third of this set of chapters looks into a type of
study that is a bit more unusual. When the eruption of Vesuvius covered the city of Pompeii in ash, the ash hardened and encased everything, including plants, in a solid sheath. The plants then decomposed and left holes in the hardened ash. In the 1960s, an archaeologist by the name of Wilhelmina Jashemski came up with the idea to make plaster casts of the shape of those holes and study them to determine what type of plants were grown in what areas of the city and possibly draw conclusions about their significance.

The second set of chapters will deal with specific plants that have left behind varying degrees of evidence. The pomegranate, mentioned as a significant part of the Ulu Burun excavation, has left behind a relatively large amount of organic remains, found in tombs and shipwrecks. The crocus and silphium, on the other hand, leave behind no known organic remains. To add to the difficulty of analysis, not only are there no organic remains of silphium from Classical cultures, but the plant itself is extinct.

In order to come to any understanding at all of the roles crocus and silphium played in Greek and Roman cultures, and a deeper understanding of the role that pomegranate played, one must look to other sources of information. In particular, one looks to works in art and literature in which the various plants are portrayed. I will examine pomegranate, silphium, and crocus because these three specific plants are each symbolically and culturally significant in various ways, and thus appear in artwork and literature enough to make an in-depth analysis of the role each of them played in Greek and Roman culture. However, while other plants are not as significant in such a wide range of areas in the lifestyles of people in Classical
societies, they still leave behind evidence in art and literature, and can be examined in the same way as silphium, crocus, and pomegranate. The use of these three examples is important because between the three of them, they appear in virtually every situation that plant imagery or remains can be found.

Through the analysis of the various excavations and plants I hope to show how important the study of plants is in the archaeology of the Classical world by pointing out and describing the various situations in which plants have been found and are believed to have been used. While it has long been acknowledged that plant life has played a significant role in human social structure, this is often dismissed in favor of analysis of architecture or pottery.

Palaeoethnobotany and the study of plants in artwork and literature must take its place as a primary aspect of archaeological study, or we will be ignoring one of the most important and long-standing parts of human existence. We depend on plants in every aspect of our lives, and that has been the case since humans came into existence. Before tools, before manufactured shelter, before clothing, human beings depended on plants. To ignore this is to dismiss an area of research that we cannot afford to ignore. In the past Classical archaeologists have tended to push it to the side because the climate of the region seems to prohibit palaeoethnobotanical research, but I hope to show that this is not the case, and that even without organic remains it is still possible to examine the role of plants in the Classical world.
Chapter One

Palaeoethnobotany

People often think of archaeology as the recovery only of objects like pottery sherds and stones. While objects like these are vital, and tend to be the most durable of archaeological remains, another integral aspect of archaeology is the study of ancient organic materials like wooden artifacts, animal remains, and plant remains. Often, little remains of these organic materials but chemical traces, and so other approaches must be used. Information about ancient plants and animals can be gathered from documents and artwork. However, if there are extant organic remains, one can study plant remains using palaeoethnobotany. Palaeoethnobotany is the examination of past human-plant relations through the analysis of pollen grains, charred wood, seeds, and other plant remains. This is done through methods like flotation, pollen analysis, and phytolith analysis, as well as stable isotope analysis and the examination of skeletal remains. Paleoenthnobotany is used to study how the environment and plant life affected lifestyle and diet.

Because this paper is an examination of the archaeological evidence of various plants significant to the Classical world, it is important to examine the methods by which the actual plant material that has survived and been excavated from ancient Greece and Rome is studied. While little organic material survives in the temperate Mediterranean environment, burnt material and material that has been completely submerged in water has survived, as has some desiccated material in tombs and other sealed areas. In addition to this, unique situations like that of
Pompeii also preserve information. Although the organic matter itself often disintegrates, the volcanic material can preserve the shapes and locations of organic material. The scorched and submerged material tends to be extremely difficult to extract and require sensitive techniques that will be explained subsequently.

Although the use of paleoethnobotany in the Mediterranean has not been particularly prevalent in the past, the study of organic plant materials has increased in the past few decades, allowing archaeologists to understand more fully the significance of plants in Classical cultures.

*Macroremains*

Macroremains are botanical remains that are large enough to be seen by the naked eye. Materials such as charred wood, desiccated fruits, seeds, and nutshells can be identified with low powered microscopes. Studying them has contributed a great deal to what we know about plant domestication and dietary practices in the past. They can be collected through flotation, screening, or even *in situ*, depending on the situation and the type of material archaeologists hope to recover.²

Collecting material *in situ* is a rather biased recovery method. Excavators rely only on the naked eye to catch bits of charcoal or tiny seeds and bones. They tend to recover only the larger remains, and it is difficult to discern remains in darker soils or dimly lit areas, therefore limiting recovery of material. However, it is by far the least complicated of the recovery methods, and can contribute valuable information in regards to the associations of botanical remains and other recovered artifacts.

Recognition of the problems inherent in *in situ* recovery of botanical remains led to the development of screening, a method that results in far less biased samples and a greater variety of collected remains. Soil is passed through screens of varying sizes in order to sift out the soil itself and leave botanical remains and other small artifacts behind. Differently sized screens recover different amounts and types of materials. A screen size of 1/16” recovers many times more material than a screen with mesh of ¼”. Smaller screens may catch more material, but they also retain a lot of soil, and the samples then take much longer to sort, increasing the cost and time of the process. Water screening can separate the soil easily, leaving less to be sifted through later, but it can also be harmful to the remains.³ Screening can also damage the remains a great deal. Pushing soil through the mesh can ruin charcoal, and water screening also damages materials like charcoal.

Flotation uses the different densities of organic and inorganic material in relation to water to separate the organic remains from the rest of the soil. This method can separate many classes of botanical material form the soil, making it possible to analyze the entire range of organic samples. Flotation has been around for about sixty years, and archaeologists at many sites have used this method.⁴ It is integral to the recovery of small botanical and even faunal remains. There are many different ways to use the flotation method, some more appropriate for certain sites than others. The use of flotation can entail something as low-tech as manual flotation with the use of a bucket in a river or canal, or something as advanced as the use of an

³ Pearsall, *Palaeoethnobotany*, 102
air bubbler to create froth that then separates the materials. Sometimes materials are too similar in density to the water, or are heavier than water and therefore fail to float. In that situation denser liquids like ZnCl2 or CCl4 are used instead.\(^5\) While the variety of flotation methods is considerable, providing an appropriate method for any situation, there are still downsides to the use of flotation. One of the most important is the question of what to do with the water-soaked soil that remains. In addition to this, the process is time-consuming, certain variations of flotation are complicated, and some of the equipment and materials like ZnCl2 are quite expensive.

Like any other material recovered in an archaeological excavation, macro-botanical remains must be sorted, catalogued, and identified. The first step is to remove the organic remains from the flotation devices. This can be difficult as it is occasionally unclear what materials are organic and what just appear to be. Then the remains must be sorted and conserved. The conservation of botanical materials can be quite complicated, given the delicate state of most organic remains. To lift materials, ethnobotanists use such tools as tiny paintbrushes, watchmaker’s forceps, pieces of index card, and other items that can be use to handle fragile botanical remains. Plastics cannot be used because of the static electricity of the material.\(^6\) Seeds are sorted by size, shape, and appearance and stored in large gelatin capsules or tiny vials. Other materials are also sorted and stored appropriately. Waterlogged samples are stored in sealed plastic bags, allowing them to retain their moisture, and

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\(^5\) Pearsall, *Palaeoethnobotany*, 117
\(^6\) Pearsall, *Palaeoethnobotany*, 109
therefore their size and shape. Desiccated remains must not be allowed to absorb too much moisture from the air, and so must be stored in an area with low humidity.\(^7\)

Identification is a complex process. One of the first requirements for identifying organic remains is to compile a complete comparative collection in order to build a foundation from which to work. Materials can then be identified either with the naked eye or under the microscope.\(^8\) Methods like chromatography and spectrophotometry have been studied as possible methods of identification. Some samples can be identified using chemical compounds developed to use proteins, tannins, and lipids in the identification process. Lately, DNA analysis and isotopic analysis have been used to sort and classify plant and bone matter from excavations.\(^9\)

Macroremains are integral to the study of ancient food production and dietary practices. Except for the extreme cases in which plant matter is preserved through aridity or waterlogging, most materials are preserved through charring, a process that is very connected to human actions. In addition, the charring does not interfere with attempts to date the materials. Macroremains, especially those observed in situ, allow archaeologists to examine the past interactions of humans with the plants around them.

*Pollen Analysis*

Palynology, also known as pollen analysis, first appeared in the eighteenth century, but its full potential was not recognized until the early 1900s. Archaeologists were quick to adopt the use of the new technique, although

\(^7\) Pearsall, *Palaeoethnobotany*, 118  
\(^8\) Pearsall, *Palaeoethnobotany*, 264  
\(^9\) Pearsall, *Palaeoethnobotany*, 135-140
archaeologists in some areas adopted the practice earlier than others. By the 1960s the use of palynology was widespread. In the last decade archaeological pollen analysis has become an integral part of many excavations, and archaeologists often incorporate palynology into the research stage of a project.\textsuperscript{10} Pollen can be recovered from soil or coprolites (preserved human feces), providing insight into how plants in the area were used. Archaeologists have also examined pollen left in tombs to gain knowledge of burial and religious practices.

Palynology allows archaeologists to examine how humans interacted with their environments in the past. Palynologists study coprolites and soil samples for types of pollens and the amounts of those pollens from certain times. Pollen is difficult to study, as differing pollination mechanisms and factors in the destruction of pollen can bias samples immensely. Autogamous or water-based distribution of pollen can distort levels of pollen in the environment. Soil acidity can also be a factor in the preservation of pollens.\textsuperscript{11}

Natural deposition of pollen can make it difficult to separate information about the natural vegetation from information about human activity. Pollen on coprolites could be deposited before the feces are buried, so the information they reveal could be misleading. In addition, coprolites generally only stay preserved through waterlogging or aridity, so it can be difficult to find samples. From these examples, it is clear that palynology is a complicated and difficult method of analysis of botanical remains. However, pollen analysis can reveal a great deal of information in the correct circumstances.

\textsuperscript{10} Pearsall, \textit{Palaeoethnobotany}, 250
\textsuperscript{11} Pearsall, \textit{Palaeoethnobotany}, 260
Pollen deposits in burial sites can indicate what plants were put into graves, and remains of pollen on various tools and other artifacts can help identify for what purpose they were used. Palynologists also test fire pits and other areas in domiciles to determine what sort of plants were brought into homes and for what they were used. Pollen depositions in decayed colons of skeletal remains are also examined to determine diet. Artifacts that are to be tested must be carefully treated after excavation, and covered to make sure no modern pollen is deposited.

Palynological research has expanded considerably in the last two decades. It is now included in the research designs of many archaeological projects. When utilized, palynology can offer information about the development of agriculture by showing when in the stratigraphic layers domesticated plants began to show up. It can also reveal what types of plants are used in a society, whether plants are included in burials, and during what seasons settlements are occupied. Using palynology along with the other methods described in this chapter can expose much information about the role of plants in ancient cultures.

**Phytolith Analysis**

Phytoliths are ‘opal silica bodies’ that are present in many species of plant. The silica is absorbed through ground water into the leaves, roots, and stems of the plant. The cells formed by the opaline silica are usually quite distinctive and retain their shape even after the actual plant matter has been burned or has decayed, and can often be identified using thermoluminescence. Plants such as the cactus, grape, and

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12 Pearsall, *Palaeoethnobotany*, 268
13 Pearsall, *Palaeoethnobotany*, 265
olive have particularly distinctive phytoliths.\textsuperscript{15} Phytolith residue cannot always be extracted from the soil, but they can also be present in coprolites, storage vessels, and stone tools. The silica also contributes to the wear on the teeth of animals, and the study of wear patterns can help to determine the presence of specific plants at a site.

Grasses and other such plants, known as monocots and dicots, have been studied quite thoroughly in recent years, while the study of gymnosperms (spruce, fir, juniper, and the like) and pteridophytes (ferns and the like) has yet to catch up.\textsuperscript{16} Are some problems with the use of phytolith analysis in certain areas, as plants like maize can have phytoliths that have a very similar makeup to various other grasses, but as the science develops, identification of specific plants will become more exact and the phytolith analysis will become far more useful.

Dietary Indicators

While botanical remains are quite fragile and rare in the Mediterranean, paleoethnobotanical information can still be gathered through analysis of osteological remains. Osteology is a comparatively new aspect of archaeology and it is a relatively scientific way to approach the interpretation of the past. The primary approach to analyzing human remains is objective testing using a variety of methods including DNA sampling, CAT scans, and stable carbon isotope testing. One can examine conditions as enamel hypoplasias of the teeth, porotic hyperostosis, periosteal reactions, and osteophytes in the attempt to analyze diet and health.

Bioarchaeology is a “multidisciplinary science” that draws upon methods from

\textsuperscript{15} Pearsall, *Palaeoethnobotany*, 356-360
\textsuperscript{16} Pearsall, *Palaeoethnobotany*, 360
chemistry, geology, physics, biology, and anthropology.\textsuperscript{17} It is not only bones that scientists examine for dietary indicators, but remains such as coprolites, which can retain information about dietary intake.

An important method of examination is stable isotope analysis of bone, and one can use bone structure and mass to examine the health of the person to whom the bones belonged. Different kinds of plants use carbon in different ways. Plants from temperate climates tend to be ‘C3’ plants, while tropical plants are usually ‘C4’ plants. When humans consume the plants, information about what kind of plant they consumed is stored in the bones. Plants such as corn, a C4 plant, leaves a distinct signature on bones of people who generally only eat C3 plants, like the prehistoric Indians. Nitrogen isotopes are also useful in determining diet, as they, like carbon isotopes, leave information in the bone.\textsuperscript{18}

\textit{Radiocarbon Dating and Tree-ring Analysis}

The two primary dating methods used in archaeology were developed over the last fifty years or so. These methods are radiocarbon dating and tree-ring analysis, also known as dendrochronology. Both are based entirely on the study of ancient plant material.

Radiocarbon dating is an analysis of the amount of radioactive carbon-14 present in organic material after it has died. Every plant is carbon based, and in addition to having stable carbon in its makeup, possesses a small amount of radioactive carbon as well. If one can determine the amount of radioactive carbon present in the atmosphere when the plant died, and the original amount of radioactive

\textsuperscript{17} Larsen, \textit{Skeletons in Our Closet}, Princeton, Princeton University Press, 2000. 4-5
\textsuperscript{18} Larsen, \textit{Skeletons in Our Closet}, 80-85
carbon present in the material is known, one can calculate the rate of radioactive carbon decay in the plant. This is based on the amount of carbon dioxide still present in the plant remains. Using this technique one is able to come to a conclusion as to how approximately how old the plant matter is, allowing people to also date the material excavated in the surrounding stratigraphic layers.\textsuperscript{19}

Although radiocarbon dating is an incredible helpful method, the development of which had led to some important archaeological breakthroughs, it can also be quite inaccurate. Because carbon levels in the atmosphere fluctuate over time, the amount of radiocarbon in organisms does not remain stable, leading to errors in the calculations. Another way radiocarbon dating can lead to error is that the analysts can use wood from the deadwood at the center of trees, since the radiocarbon in the deadwood begins to decay long before the tree dies.\textsuperscript{20} These errors can be corrected using dendrochronology. This is more simply known as tree-ring dating. In temperate zones, trees go through seasonal growth cycles, leaving rings that denote each of those seasons. The ring sizes are influenced by atmospheric makeup, rainfall, and temperature. Therefore, each ring is different and it is possible to determine when each ring was formed. One can then use this method to judge dates alone or to correct the radiocarbon dates.\textsuperscript{21}

\textit{Paleoethnobotany in the Classical World}

The temperate climate of the Mediterranean is far from conducive to palaeoethnobotanical research. This is not necessarily the case with other places in

\textsuperscript{19} Geoffrey Dimbleby, \textit{Plants and Archaeology}, New Jersey, Humanities Press, Inc. 1978, 156-157
\textsuperscript{20} Dimbleby, \textit{Plants and Archaeology}, 157
\textsuperscript{21} Dimbleby, \textit{Plants and Archaeology}, 157
the world. Some areas have consistently dry or wet climates, and so do not put nearly as much wear on the cellular makeup of the botanical materials. Therefore, these locales offer much more in the way of ancient plant materials to study than the sites in the Aegean. However, this does not mean that one cannot conduct palaeoethnobotanical research in the Mediterranean.

While it may be difficult to conduct palaeoethnobotanical research in the temperate environment of the Aegean, it is far from impossible, and there have in fact been many excavations where palaeoethnobotany was employed. Palaeoethnobotany in the Classical World began in 1878 with the first recorded finding of ancient botanical remains. Minos Kalokairinos discovered carbonized beans and peas in pithoi from Knossos in the Bronze Age. For the following few decades occasional references are made to the discovery of botanical remains, but the only ‘specialist’ consulted at any of the Aegean sites was Professor H. Wittmack, who in 1886 identified remains at Heinrich Schliemann’s Tiryns excavation, as well as a number of other organic remains over the next decade or so.

The organic finds from the eighty years or so of organized excavation in Greece were mostly from large caches in pithoi or small containers, if not in large heaps on the floors.\textsuperscript{22} The most common method used to sort these remains from the soil matrix they are often mixed with is a type of swirling flotation first developed by Dr. Jane Renfrew in 1968.\textsuperscript{23} Because carbonized macroremains tend to have a lower density than the material in the soil matrix, putting unsieved earth into a bucket and

\textsuperscript{22} Julie Hansen, \textit{The Palaeoethnobotany of Franchthi Cave}. Indianapolis, Indiana University Press. 1991, 23

\textsuperscript{23} Hansen, \textit{The Palaeoethnobotany of Franchthi Cave}, 24
swirling it gently usually separates the soil from the botanical remains. The botanical material is then removed and dried slowly, to avoid cracking the seeds. The development of this procedure was the first time any serious effort was made to recover botanical remains while maintaining a context from which to draw conclusions.

While Dr. Renfrew was refining her process at various Greek sites, archaeologists in the United States and England were developing their own processes, and they were working on ways to mechanize the process to allow for large-scale retrieval of material. These methods have been used at sites like Franchthi Cave, which shall be discussed later, and have led to the recovery of materials that were previously passed over.

Further advances in macroremain analysis, palynology, and other methods have also been very helpful. These developments have led to an increasingly larger role for palaeoethnobotany in Classical archaeology. Submerged shipwrecks are a venue that has proved very useful in Mediterranean archaeology, since the sea is notoriously dangerous. Organic materials last far longer when kept in a constant environment, and so keeping the plants underwater preserves them very well. There are some problems with preservation after the materials are removed from the site, but once that obstacle is overcome, shipwrecks prove to be incredibly useful in Mediterranean palaeoethnobotany.

Presence of Plants

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24 Pearsall, *Palaeoethnobotany*, 118
When asked how plant matter influences their lives, most people will respond with a comment about food, or possibly the use of wood for shelter, but in fact plants play a role in nearly every conceivable aspect of human life. Not only are plants used to provide fruits, vegetables, grains, and nuts for food, or wood for building, but plants like flax and cotton are also commonly used to provide clothing. Plants can provide the means to construct many household objects, from wood for furniture to reeds for baskets, to gourds for various containers. The use of wood for fuel has been a natural part of human existence since the discovery of fire.

Even today, plant derivatives provide the majority of our drugs, from everyday headache remedies like aspirin to cancer treatments derived from periwinkle and crocus, and before the advent of modern pharmaceuticals the use of those plants would have been far more obvious to the average observer. The use of plants as drugs does not just extend to medicinal drugs. The use of plants for ritual purposes also goes back millennia. The ritual practices of many religions involve the use of substances to induce hallucinogenic or peaceful states, among others, and these have primarily been plant-derived substances. Plants also play symbolic roles in religions, such as Dionysus’ association with the grape vine or the idea of the Fruit of the Tree of the Knowledge of Good and Evil in Judeo-Christian mythology.

Plants also help humans more indirectly. Groundcover holds soil in place, preventing landslides and soil erosion, allowing people to remain in their settlements with less fear of natural disaster or famine. It also reduces extremes in temperature by breaking the force of precipitation and absorbing water.²⁵

²⁵ Dimbleby, Plants and Archaeology, 18
All of these factors add up to point out the vital nature of plants to human existence. Therefore it is important to utilize whatever methods are available to analyze plant material at archaeological sites. These methods have not been around for very long. Most of the practices described in this chapter have only been around for the last few decades, but considering the advances made in those last thirty years, it does not seem unreasonable to believe that progress will continue to be made. Today it may be difficult to find organic remains of any sort in certain Mediterranean sites, but it is possible that within the next decade we will be able to do so. We must continue to make efforts toward developing palaeoethnobotanical technology, and barring that, we must use the methods we have at hand to make as thorough a study of the subject as possible.
Chapter Two

Franchthi Cave

While archaeologists have found it difficult to incorporate paleoethnobotany in Mediterranean excavations, due to the temperate climate causing organic material to decompose quite thoroughly, there have been some excavations that have utilized paleoethnobotanical studies and have resulted in some very interesting finds. One such excavation is that of Franchthi Cave. Franchthi is a headland located on the western coast of the Peloponnese. Excavations at Franchthi Cave began in 1967, and the results recovered from that excavation have been quite impressive. Radiocarbon dating puts the oldest recovered organic remains at an age of 25,000 years Before Present, and the most recent remains at around 3,000 B.C.E. These remains, therefore, do not actually occur in what is generally thought of as a “Classical” period, in the broader sense. They are in fact Neolithic remains, for the most part. Nevertheless, despite the fact that these organic remains date from long before the Greeks or even the Minoans came to power, they can still reveal a great deal about those later cultures. The study of the organic remains can reveal the changes in environment over the centuries, the various flora and even fauna that lived in particular areas, and how the inhabitants of the Franchthi Cave area used that flora and fauna. That, in turn, can indicate the way in which the inhabitants of the site developed and changed as time progressed. An in-depth analysis of the site, the

excavation process, and the findings, contribute a great deal to the understanding of
the use of palaeoethnobotany in the Classical World.

The excavation at Franchthi Cave is one of the few excavations in the
northern Mediterranean to undertake a complete palaeoethnobotanical examination of
the site. Most excavations confine studies to the art, architecture, manufactured
artifacts, and human remains found at the site. This is primarily because up until very
recently archaeologists could only research macroremains, as palynology and
phytolith analysis\(^{27}\) and unfavorable weather or indelicate handling could destroy the
plant matter, it takes a great deal of extra time and effort to recover, preserve, and
study the remains. In the past most archaeological excavations in the northern
Mediterranean conducted a rather casual survey of any botanical material recovered
and moved on, making no particular effort to include palaeoethnobotany as an
integral part of the excavation.

The excavations began in 1967, and have undergone many changes in the last
few decades. The first two years were primarily spent on testing. The 1967 and 1968
seasons involved considerable experimentation with field techniques and recovery
and analysis techniques. At first small picks were the primary excavation tool, but by
the early seventies the trowel had replaced the pick. An important aspect of the
excavation that also underwent significant change is the use of sieving as part of
recovery.\(^{28}\)

\(^{27}\) Diamant, "A Short History of Archaeological Sieving at Franchthi Cave, Greece,"
\(^{28}\) Diamant, "A Short History of Archaeological Sieving at Franchthi Cave, Greece,"
Originally sieving was the sole method used to retrieve botanical material. By 1974, many methods of palaeoethnobotanical sieving had been used to recover materials from the cave trenches. The first method the excavators used at the site in 1967 was simple throw-sieving. The next year the excavators tried to build a new dry sieve based on a description by a Mr. Payne. The first sieves did not function, but Payne visited the site and supervised the construction of ‘shaker sieves.’ The sieves all possess three layers of mesh to separate materials of different sizes and to prevent crowding of material on a single layer of mesh. Although very small material can be lost through this method, and it becomes less useful when the earth is claylike instead of sandy and loose, a positive aspect of this method is that the materials to build such a sieve can be found virtually anywhere,

From the first year of excavations, all excavated earth from the Franchthi Cave site has gone through a sieve of one type or another.\textsuperscript{29} In 1969, the excavators began wet-sieving all the material they recovered at the urging Mr. Payne, who then supervised the process.\textsuperscript{30} All material continued to pass through the shaker sieves, but the residual material was then carried to a specially constructed mesh screen and agitated, retrieving more material. This continued in a very basic form until 1971 when the process became more mechanized. The sieving equipment was place on a platform jutting into the sea on the northwest tip of the headland, since a freshwater spring ran into the sea at that point. The water from the spring was drawn up through a hose inserted into the mouth of the spring. From there the water was pulled into

\begin{footnotes}
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\item[29] Diamant, 207
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reservoir tanks by a pump, for later use in sieving.\textsuperscript{31} Every bit of excavated earth in the 1971 season, and the seasons after that, passed through the water-sieve. While this method was quite expensive, the adoption of the wet-sieving method improved the material of materials by a tremendous amount. The archaeologists at the site made both the dry sieves and the water sieves out of easily replaceable and interchangeable parts to facilitate repairs and lessen the expense.\textsuperscript{32}

Unfortunately, soaking the earth in seawater can put the organic remains in danger. Soaking bones and botanical materials in seawater and then drying them out can destroy them. Over the long term, salts from the water can enter the remains and crystallize within, causing deterioration and breakage. Although this result has not yet been seen in the Franchthi samples, it is still a definite possibility. In addition, if the saline content of the water is too high, encrustation of the remains can prohibit identification.\textsuperscript{33} To prevent such an occurrence, all the delicate bone samples from the site are soaked in a poly-vinyl acetate solution to bypass soaking the materials in brine.

Another concern about the water-sieving process was that dumping too much soil matrix into the water on any one day might pollute the water, although at this site there was never enough pollution to threaten the intake of water by the dam. Two people had to be employed full-time to operate the sieve, and staff people are often untrained. Fortunately, one returning staff member grew attached to the sieve and

\textsuperscript{32} Diamant, 208-213
\textsuperscript{33} Diamant, 213
operated it for four years. While the water-sieve was expensive to build, caused a number of concerns, and took up considerable time, it also had a number of benefits. Not only did the construction of the sieve platform over the sea facilitate the disposal of the excess soil matrix, but the platform also served as a dock and a workspace. And while the obstacles may seem to make water-sieving not worth the effort, this is not the case. Not only has water-sieving at Franchthi Cave increased collection of categories of material already known, but it has also contributed to the collection of previously unseen materials.

Over the years archaeologists have uncovered thousands of samples of seeds and nutshells from the Franchthi Cave site dating to the Palaeolithic, Mesolithic, and Neolithic time periods. In the Palaeolithic stratigraphic levels excavators have uncovered carbonized lentil seeds, vetch, and calcified gromwell seeds, all recovered through flotation. These Palaeolithic plant remains are the earliest evidence for plant use in Greece. Mesolithic levels have yielded, with a few exceptions, almonds and *pistacia atlantica* nutlets. These have been recovered through both flotation and sieving. The Neolithic levels show the first signs of agriculture, a social shift first evidenced by the presence of the bones of domesticated animals. The only plant of all the later cultivated species to be present in a wild form in earlier levels is the lentil. The other species show up for the first time as cultivated plants in the Neolithic period. These plants include barley and wheat. Almonds and pistachios still appear in their wild form.

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34 Diamant, 214
Along with macroremains analysis, the Franchthi Cave archaeologists also employed palynology to study the botanical makeup of the site. While the site is not ideal for pollen preservation because of alkaline sediments and alternating dry and wet spells, there is still a significant amount of pollen evidence present at Franchthi Cave. While it is present only in low concentrations, even those low concentrations warrant further study. Many techniques were utilized in order to retrieve the greatest possible amount of information. The first technique used was the standard HF-acetolysis technique, a process that involves soaking the sample residue in an acetic acid, adding a few drops of acetolysis mixture to the residue, and putting the mixture into a boiling water bath for a few minutes, then decanting it and putting it in a centrifuge. Because this did not recover a great deal of information, the archaeologists at the site then employed an oil flotation technique and a heavy-liquid separation. These methods did not lead to a greater recovery of pollen, but there was still enough pollen to conduct an analysis.

One sample, taken from the deepest level of one of the trenches and dating to the late Palaeolithic, yielded fifteen grains from the Compositae, or sunflower, family, from two different tribes. Species from both tribes of this family are still present in the Argolid today, and are all thistle-like plants. Pollen analysis also identified eleven grains from the olive family, one of which was identified as olive. The rest of the grains from this sample included one grain of juniper, one from the

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teasel family, and ten grains too poorly preserved to be identified. From the level
directly above this scientists identified a single teasel grain and one oak grain.\textsuperscript{40}

Samples from ‘Pit A’ on the site yielded a wider range of pollen grains in both
time and species. The Mesolithic era material included one-and-a-half pine pollen
grains and six \textit{Compositae}. Samples from a Neolithic-Mesolithic transition zone
included one \textit{Compositae} and one very large grain from the lily family. Three
Neolithic levels, from oldest to youngest, yielded a \textit{Dipsacaceae} (teasel) grain, three
oak and six grass pollen grains, and a single oak grain. Late Neolithic samples
included two grass pollens, seven oaks, five \textit{Compositae}, three pistachio, two lily-
family grains, and two olive grains.\textsuperscript{41}

It is difficult to draw any conclusions from this little information, but it is at
least clear that these plants were present at the Franchthi cave site in the general time
period of the stratigraphic level from which they were extracted. Some of them may
have been used by the inhabitants, but it is impossible to say so with any certainty
without further evidence. Therefore, while it is necessary to continue pollen grain
analysis at the Franchthi Cave site, the practice has not yet led to any breakthroughs
or revelations.

In the twelve years during which the Franchthi Cave excavations took place,
more carbonized botanical material had been uncovered at the Franchthi Cave site
than anywhere else in the Aegean world. Workers at the site have spent years sorting
through the masses of recovered material, finally ending up with over 28,000 seeds

\textsuperscript{40} Jacobsen, “Excavation in the Franchthi Cave, 1969-1971, Part 1,” 70
\textsuperscript{41} Jacobsen, “Excavation in the Franchthi Cave, 1969-1971, Part 1,” 71
from twenty-seven different plant species, and numerous pollen samples and other types of organic remains.\footnote{Steven Mithen, \textit{After the Ice} London: Weidenfeld and Nicolson, 2003. 141}

The Franchthi Cave site represents the first time that palaeoethnobotany was a central part of an archaeological excavation in the Mediterranean. The recovery of so much botanical material in an area with considerable temperature and humidity shifts demonstrates that despite the poor quality of preservation in most Mediterranean sites, organic material can be found and analyzed. The amount of information that archaeologists have amassed from this material indicates that it should be. This is especially the case if one realizes that this excavation took place thirty years ago, and scientists have made great strides in various areas of palaeoethnobotany. Given the technology available today, even more evidence could be retrieved from the Franchthi Cave site, and from other sites throughout the Mediterranean.

This site represents a rather traditional use of palaeoethnobotanical analysis. The methods used include macroremain examination, palynology, flotation as a retrieval method, and dry sieving. In fact, the methods used at Franchthi Cave represent possibly the entire range of palaeoethnobotanical methods that can be used at a land-based excavation of a pre-historic site. However, there are other situations in which excavators can encounter ancient plant material, and therefore other ways to analyze that material. These situations and methods shall be explored in the following chapters.
Chapter Three
Wilhelmina Jashemski in Pompeii

It is not always possible to carry out traditional palaeoethnobotanical analysis. Much of the time, because of extensive decomposition, it is not possible to find macroremains of plant material, or even phytolith residue. However, that does not automatically mean that no on-site plant analysis can be done. There are options outside of the study of the organic remains themselves. One such option is possible only in unique situations, but is nevertheless quite informative. This is the study of the root cavities left behind by ancient plants.

Excavating in a place like Pompeii presents some unique possibilities in archaeology. It is a site where the ancient buildings have not been built over, and while the inhabitants and looters may have returned after the eruption of Vesuvius to collect various items, for the most part Pompeii is preserved just as it was when the volcano erupted nearly two thousand years ago. And it is not only the buildings and the artwork that have been preserved. When the volcano erupted, the ash and lapilli (volcanic debris) that spewed forth covered not just the buildings of Pompeii, but the trees, smaller plants, and wooden furniture as well. As the organic matter underneath decomposed, the volcanic lapilli slowly filled up the cavity left in the original soil. By the time the plant matter had disintegrated, The volcanic material had completely filled the holes, creating a very distinct separation between the soil and the places
where plants were growing at the time of the eruption. When excavated carefully, those distinct cavities can be preserved and examined.\textsuperscript{43}

Unfortunately, volcanic material is very fertile and when new plants take root the modern root systems can break into the older, preserved cavities. Therefore it is often just as difficult to find well-preserved root cavities as it is to find well-preserved organic remains. However, there are areas in the city of Pompeii where little new growth has taken place, or at least little new growth with deep root systems, so studying the cavities can still provide some interesting material as to the botanical life in ancient Roman settlements.

Despite the possibilities, archaeologists spent little time on the study of plant remains in Pompeii until the 1960s. Up to this point there had been no in-depth research regarding the gardens of Pompeii, as most of the energy had gone into studying the remarkably preserved buildings and the holes in the soil left by decomposed human remains. The state of these remains, like those of the plant remains, also presented unique research possibilities, and as human remains have a much greater shock value than that of roots and seeds, and the forms are more recognizable, archaeologists spent a great deal of time excavated and preserving the gaps left by decomposed human remains. The way archaeologists studied the human remains was, when they came across a hole filled with lapilli or a gap in the earth, to carefully remove any excess material from within the hole, fill the hole with concrete, resin, or plaster, and allow it to harden before digging it out of the earth. Giuseppe Fiorelli was the first to employ this method when he took over the excavation of

\textsuperscript{43} Wilhelmina Feemster Jashemski, "A Pompeian Vinarius," \textit{The Classical Journal} 62.5, 1967. 199
Pompeii in the 1860s, and it has continued, with minor variations in materials used, until this day.\footnote{Encyclopedia Britannica, “Pompeii,” \url{http://www.search.eb.com.ezproxy.wesleyan.edu:7790/eb/article-5860}, 3/20/08}

Wilhelmina Jashemski adopted this method one hundred years later, and starting in 1961 began her own studies of the gaps left in earth by decomposed plant remains preserved under the ash and pumice deposited by the volcano. However, instead of using plaster to make casts of human remains, she used it to make casts of the remains of root cavities. In the articles she wrote about her studies of the gardens throughout Pompeii and other areas in the Classical world, like Tunisia, she clearly outlines her process and the line of reasoning she followed to reach her conclusions about where the inhabitants of the sites planted which kind of plant.

In the late 1960s Jashemski worked at the site known as the \textit{Foro Boario} (cattle-market) of Pompeii, a large city block just north of the amphitheater. It was dubbed thus in 1755. A later excavation in 1814, lasting only a week, led the excavators to state that it was the burial ground for Pompeian gladiators. For more than a hundred years the ground there lay relatively undisturbed until excavations resumed in the 1950s, at which point nearly the entire site was uncovered. \footnote{Wilhelmina Feemster Jashemski, "Large Vineyard Discovered in Ancient Pompeii," \textit{Science} 180.4088, 1973. 821} Archaeologist excavated a number of rooms in the so-called \textit{“Foro Boario,”} including two rooms that were equipped for making wine. Despite this evidence hinting at the possibility that the area was used as a vineyard, people continued to believe that it was indeed the site of the cattle-market.
When Jashemski acquired the *Foro Boario* as her excavation site, she decided to explore the theory that Pompeians may have used the area as a winery, and set out to determine whether the area had been planted, and with what. In 1966 she began a subsoil excavation in order to determine what type of vegetation grew on the site in the first century C.E. She met with success early on when her workmen uncovered a hole filled with lapilli along the eastern wall of the square at the ground level of 79 C.E. Removing the lapilli and measuring the cavity proved that it was the root system of a small tree. Unfortunately, because of the earlier excavations, much of the rest of the excavation along the eastern and western walls proved profitless, as the archaeologists of the 1950s had uncovered most of the site and then backfilled it, destroying most of the evidence for root cavities. However, as excavations progressed toward the center, they came across evidence of smaller root cavities, as well as the root cavity of another, larger, tree. From this evidence it became clear that this area that had been dubbed a ‘cattle-market’ had in fact been rather heavily planted. As Jashemski and her workmen continued to excavate, they began to find many more cavities, and it soon became obvious that the plants had been grown in rows.  

After carefully emptying the cavities and filling them with cement, she allowed them time to dry. Pulling them up and observing the shape of the root cavities from the time of the eruption, she concluded that they were in fact vine roots. After just a couple of seasons her excavation had revealed 58 tree cavities and over

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46 Jashemski, “Large Vineyard Discovered in Ancient Pompeii” 821
47 Jashemski, “Large Vineyard Discovered in Ancient Pompeii” 825
2000 vine-root cavities. Jashemski believed were stake-holes. Through this evidence, Jashemski was able to conclude that the square was not a cattle-market, but had in fact been a vineyard.

Jashemski herself wrote that until this excavation there was little direct knowledge of ancient Roman viticulture. Most information came from the writings of Pliny, Columella, Cato, and Varro, all of whom provided detailed descriptions of how, when, and where to grow grapes. The authors wrote over a three-hundred year span, as Cato lived in the third and second centuries B.C.E. and Columella and Pliny wrote in the first century C.E. Cato, Varro, and Columella each had personal experience with agriculture, including growing grapes, and Pliny gathered his information from many sources. However, as thorough, accurate, and informative as these accounts were, they cannot substitute for direct archaeological evidence.

For example, by measuring the distance between the root cavities Jashemski determined that the vines were planted approximately four Roman feet apart. Pliny recommended that four feet be the distance between vines, (Book 17, Section 171) although Columella recommended that the vines be at least five feet apart if cultivated by hand. Columella also recommended that there be paths dividing the field to allow workers to reach the vines without stepping on them, (Columella, De Re

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48 Jashemski, “Large Vineyard Discovered in Ancient Pompeii” 824
49 Jashemski, “Large Vineyard Discovered in Ancient Pompeii” 822
50 Jashemski, “Large Vineyard Discovered in Ancient Pompeii” 822
Rustica, Book 11, Chp. 3, Section 13) and Jashemski did uncover pathways that bisected the site both north-south and east-west.\(^{53}\) From this and other evidence, it seems that for many aspects of viticulture the Pompeian vine-tenders carried out their work in the way Columella and Pliny recommended. However, there were far more trees scattered among the vines than Columella recommended. In his writings Columella says that any trees in a vineyard should be planted along the north side only, and even then there should not be too many of them, (Columella, De Re Rustica, Book 4, Chp. 30) but in this vineyard the 58 trees are scattered throughout the field. Comparing the differences and similarities between the written works and the material evidence can help to either confirm or deny the accuracy of the written work, and can help archaeologists interpret the material evidence in some sort of context. Literary and physical evidence must be used symbiotically to come to the most complete understanding possibly, and up to the time of this excavation there was little or no physical evidence of the viticulture process in ancient Rome.

The evidence provided by the cement casts also helped to at least shed some light on the argument concerning whether Pompeians staked their vines and allowed them to grow tall, as the local vine-growers stated, or pruned them low and left them without stakes, as fruit experts at the University of Naples declared. From the evidence Jashemski gathered, particularly the holes that she judged to be stake-holes, she strengthened the argument of the local growers.

Jashemski’s studies do not prove the species of any of the plants, as there are no actual organic remains to analyze to allow confirmation of her conjectures. She

\(^{53}\) Jashemski, “Large Vineyard Discovered in Ancient Pompeii” 824
concluded that the smaller plants in the *Foro Boario* were grape vines through their context and size, not from any plant material. However, her studies do at least begin to explore the possibilities of the various plantings throughout Pompeii. Using other methods of study can illuminate the matter further.

Jashemski did not only study the root and stake cavities her excavation uncovered. She also analyzed various organic remains found in the course of emptying the root cavities. Over the course of her excavation her workers retrieved numerous bone samples from dogs, horses, and cows, among others, most of which possessed tool marks. It may be that these osteological remains influenced earlier excavators in determining that the area was a cattle-market. The digging also uncovered some carbonized plant remains, one of which was identified as an olive. While it is a pleasant surprise that any botanical material remained extant after the traffic the site had experienced over the centuries, which was not only limited to the various excavations, it is not so surprising that the organic remains were that of the olive. Even today Pompeiian farmers plant olive trees amongst their other crops, and Pliny stated that vines could be trained on olive trees (Pliny, *Natural Histories*, Book 18 Section 110). This olive and the bone shards represent the limit of organic material found in the vineyard, but Jashemski still managed to uncover a great deal of information about how Pompeians planted and tended their vines, and what role the vines played in Pompeian society.

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54 Jashemski, “Large Vineyard Discovered in Ancient Pompeii” 826
55 Jashemski, “Large Vineyard Discovered in Ancient Pompeii” 827
56 Jashemski, “Large Vineyard Discovered in Ancient Pompeii” 826
In addition to excavating the area once known as the “Foro Boario,” Jashemski also excavated various small gardens in Pompeii. One such garden was behind the home of a “vinarius,” or wine-merchant. Jashemski, along with the archaeologists who preceded her at the site, believed the house to be that of a wine merchant because of the numerous amphorae, large and small, found in both the garden and the house.\(^{57}\) Having examined the house itself, Jashemski went on to excavate the rear garden, using the same approach she employed at the vineyard. Like the vineyard, the garden of the vinarius had been excavated before, in this case in the 1880s.\(^{58}\) Fortunately, few plants with deep root systems had grown up in this post-excavation garden, as had been the case with many of the other gardens. Besides a single cypress toward the rear of the garden, most of the ground cover was fern. Therefore, Jashemski believed there might still be salvageable root cavities in the garden. About two feet down, Jashemski’s excavators came across five circular holes filled with lapilli. After cleaning the lapilli out of the holes and filling them with cement, Jashemski determined that these were tree root cavities. There was also some evidence of vine roots in the garden, which seems appropriate if the owner sold wine for a living.\(^{59}\)

Despite uncovering little in the way of botanical remains, Jashemski’s excavation did much to further our understanding of ancient viticultural practices and the accuracy or importance of the literary works on the subject. By demonstrating that the unbuilt area in the middle of the city was a vineyard and analyzing the

\(^{57}\) Jashemski, “A Pompeiian Vinarius,” 193  
\(^{58}\) Jashemski, “A Pompeiian Vinarius,” 199  
\(^{59}\) Jashemski, “A Pompeiian Vinarius,” 199-202
specific traits of the planting, both in the vineyard and in the garden of the vinarius, Jashemski furthered our understanding of what role the grape-vine played in Roman society. She did so with very little use of traditional palaeoethnobotanical methods, as there was little organic matter to work with, but nonetheless her excavation and research does fall into the category of palaeoethnobotany.

She also took another approach, inspired by the many wall-paintings of fruits and flowers throughout Pompeii (Fig. 1 and 2). Scholars who had visited Pompeii in the 1800s had documented the plants they believed to be depicted in the paintings and whether they believed those plants had grown in Pompeii in antiquity, and in 1903 German botanist M.C.L. Wittmack had made a study of all the carbonized organic remains found in Pompeii up to that point. However, Jashemski realized that a thorough and up-to-date analysis of the botanical material at Pompeii was necessary. She began by re-examining the paintings, and her husband started to create a collection of photographs of all the paintings that had not yet been destroyed by time or weather. Unfortunately, as many of the paintings had been excavated over one-hundred years earlier and had not been properly preserved, an unknown number of those paintings had already disintegrated by the time the Jashemskis began their project, and the earlier scholars had not made drawings or photographs of them. Therefore some of the plant images described by the earlier scholars have been lost forever. She compared the plants in the paintings to the descriptions her botanical predecessors had made, judging which ones seemed accurate and which too far-fetched to possibly be true. One such case involved Professor Domenico Casella of the Faculty of Agriculture at the University of Naples who claimed that the Pompeian
painters had included images of pineapples and mangos in their wall-paintings. She also prepared herbarium specimens of all the plants found in the Pompeian area so she could compare them to the images in the paintings.

She then made a study of all of the carbonized remains available and compared them to the plants and the paintings, confirming that many of the plants in the paintings and growing in Pompeii today were in fact growing in Pompeii in the first century C.E. An analysis of wood-fragments and ash found in root cavities showed that the wood was in fact aboveground wood, and there were often numerous species of wood found in the root cavities. Jashemski explains this by referencing ancient authors works on agriculture in which they recommend burning wood in the planting holes to prepare the soil. At one point archaeologists found what appeared to be a branch at the Villa of Poppaea at Oplontis. Scientists at the Smithsonian institute examined the branch and declared that although most of the actual cellular structure had been destroyed, it could be confirmed as the branch of an olive tree. At the Villa Rustica in Oplontis, archaeologists uncovered over a ton of carbonized pomegranates that Jashemski examined (Fig.3).

Wilhelmina Jashemski is particularly well known for her examination of root cavities left in the volcanic material in Pompeii, as that project is quite unique and striking, but she did in fact employ virtually every method possible to study the plants of Pompeii. In the book *The Natural History of Pompeii* Jashemski’s chapter on the plants of Pompeii includes a section documenting the artwork depicting various

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61 Jashemski, “Plants,” *The Natural History of Pompeii*, 80-81
62 Jashemski, *The Natural History of Pompeii*, 152
plants found at Pompeii and where there were located in the city, any carbonized organic remains of those plants (including photographic images of each), any references ancient authors may have made about the plants, and botanical information about the plants. She used root cavities, paintings, carbonized remains, the references made by ancient authors, cellular analysis, and a herbarium full of possible ancient Pompeiian plants to create the most complete picture possible about the role those plants played in Pompeiian culture.
Chapter Four

Ulu Burun

Organic materials on land in the Mediterranean are quite rare because the temperate climate, changing from warm to cold and wet to dry, wears out the cells and causes the botanical matter to decompose. Most of the extant organic materials on land are scorched seeds and grains, and there are few fruits, spices, or oils. However, places with constant climate conditions preserve organic remains much better. One such kind of place is under water. Constant submersion preserves organic materials very well, and underwater archaeology has produced a mass of ancient organic materials that has not been equaled on land. The preservation of organic materials underwater works in almost exactly the opposite way as it does on land. Archaeologists have found thousands of examples of fruits and resins and even oils.63 By analyzing the organic materials found in shipwrecks, archaeologists are able to study what kinds of plant matter ancient cultures traded, where it came from, and what significance it had for the people of those cultures.

Although underwater archaeology has existed for many decades, it was not until the 1970s that archaeologists began to organize systematic retrieval of botanical materials from submerged sites.64 Before that point, much of the retrieval of material from shipwrecks was limited to containers, valuable items, and whatever was durable enough to survive the retrieval. Underwater retrieval and preservation methods had

63 Cheryl Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," World Archaeology 24.3, 1993. 349
64 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 351
not yet reached a point where organic matter could survive the change in environment. Any plant matter removed from the water without appropriate care tends to disintegrate rapidly. Before the 1970s the retrieval of plant tissue was not a priority, and so methods for that retrieval had not been developed to their full potential.

Then, in the 1970s, the Institute of Nautical Archaeology launched four excavations that incorporated archaeobotanical research as an integral part of the excavation. From that point on the study of organic materials became an important part of most shipwreck excavations in the Mediterranean, so archaeologists began to work on developing more efficient and safe ways of removing the organic material from the ships and preserving it afterward.

INA archaeologists have been working on various retrieval techniques since 1974. They began by emptying the contents of the containers onto a screen and picking out the plant remains after sifting out the matrix. However, as was explained in the description of macroremains analysis, such a method only allows the retrieval of larger seeds and organic fragments. Later analysis included suspension-flotation, which became standard procedure by 1980. Because plant material retrieved from underwater sites are water-logged, they do not usually float, so a small amount of the sample material is added to seawater, a denser medium, and spun in a vortex that suspends most plant matter for a short period. The plant matter is then removed and stored in water to be sorted.\(^\text{65}\) The use of this method at the eleventh-century C.E.

\(^{65}\) Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 351
Serce Limani shipwreck led to the discovery of five more plant taxa than had previously been identified, as well as rope and hair fibers and insect fragments.66

One difficult aspect of underwater archaeology is that the shipwrecks are not sealed deposits, so artifacts from later times often enter the excavation sites. This can make dating difficult.67 Another issue is the tendency of artifacts to spread due to the movement of the water, so that one might not know where much of the material was or what was originally on the ship. One way to deal with that is to make an experiment testing where the water moves, to see where the plant matter might move to. There is still no way to tell what plants reached the site in a random way, but at least one might be able to tell where the plants that were original on the ship have moved to. One excavation, the Ulu Burun shipwreck excavation, tested the movement of the water in 1984 by placing a wide-mouthed jar filled with almost 500 olive pits on the upslope of the wreck for about three months. Over the course of those three months, little sand and shell entered the jar despite intensive activity on the site, and only three stones had disappeared.68 The experiment showed that, at least on that particular site, waterborne contamination was not significant, but botanical material found on other sites may not be from that shipwreck, and excavators need to take care to make sure that the material collected is actually from the shipwreck.

The Ulu Burun excavation was a marine excavation of a fourteenth century BCE shipwreck off the coast of the city of Kas in Turkey. The ship sank less than a

66 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 351
67 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 349
68 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 349
hundred meters from a rocky cliff, with its stern toward the shore. The ship itself was fifteen meters long and made of cedar wood. The ship may have only had a partial deck, with walkways across the cargo hold. The cargo in the ship may have weighed from fourteen to fifteen tons and it included precious metals, amber, ostrich eggs, ivory, and resin, among other things. Twenty stone anchors sat in the cargo hold, along with copper ingots lining the hull, small closed ceramic vessels, and pithoi. Most of the cargo was in a raw form, and the metals and ivories had not yet been worked. These items have been identified as luxury goods because archaeologists have found them only in a small percentage of the elite residences and tombs of the time period. In addition, the cargo mirrors records of royal tribute exchanged between the rulers of Late Bronze Age Egypt and the Near East. Thus the excavation of this shipwreck allows the archaeologists to study trade routes and goods from the fourteenth century, and also look into the increase in conspicuous consumption in this period.

George Bass headed up the first excavation of the ship in 1960, and excavations continued for over thirty years. However, the INA became involved in the excavation in 1984, and after that the organic material found on the ship became a high priority for the excavation. Many archaeologists believe that the ship was headed toward Greece, Rhodes, or Crete carrying a luxury cargo. Over one thousand samples of botanical materials have been taken from ceramic containers, and those

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69 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 351  
70 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age,"348  
71 Cheryl Ward, "Pomegranates in Eastern Mediterranean Contexts During the Late Bronze Age," World Archaeology 34.3 (2003). 530  
samples have proven to be very informative in regards to the trade of organic materials from the Mediterranean Bronze Age. The containers present on the ship contained terebinth resin, almonds, olives, and spices. The jars also contained seeds, fruits, and sediment, possibly the remains of the stoppers. In many wrecks of ancient sea voyages it has been found that dried figs or wads of vegetation were used as container stoppers, and in many excavations much of the stopper matter remained, although some of the material dissolved after it was excavated.

While the precious metals, amber, ivory, and other valuable goods present much material for research, and are all fascinating, the most exciting aspect of the cargo of the Ulu Burun shipwreck is the multitude of organic remains stored in pithoi or scattered over the site. Some of the containers may have broken and spread the organic matter over the site when the ship sank, but over time more and more containers have shattered and spread over the floor of the cargo hold, and onto the other artifacts. Some of the botanical material even drifted into more protected areas of the wreck or outside the ship. Therefore archaeologists have taken samples from virtually every surface on or near the shipwreck. The Ulu Burun excavation has retrieved samples of dozens of different plants, including almonds, olives, figs seeds, grape seeds, various spices like coriander and cumin, charred grains, and pulses and seeds from over forty other types of plants.

The two-hundred year period between 1400 and 1200 B.C.E., the Bronze Age in Greece was a period of intensified trading and increased conspicuous consumption. The demand for expensive and rare items swelled as the demand for items that

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73 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 353
74 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 351
demonstrated wealth and prestige increased, leading to a boost in the importation of luxury items like those found aboard the ship. As well as luxury items like ivory and precious metals, and more common plant materials like that of olives and grapes, much of the cargo was made up of non-staple fruits, spices, and other materials, a sign that the cargo was elite-oriented.

The plant remains in the shipwreck site have undergone a great deal of analysis regarding the amount of each specific plant material present on the ship, and the significance of the plants. One Canaanite jar contained over 2,500 olive stones of unusually large size, making the deposit the greatest in number and size of seeds in the Late Bronze Age Mediterranean, an indication that the olives were being transported to Greece as luxury goods. There has been research into the use of olives and olive oil at this period in Mediterranean history. Little evidence of the olive has arisen at sites from the Late Helladic period or the Cretan Late Bronze Age. This could be an indication that the olive was in fact a rather rare and therefore valuable and luxury-associated trade good at the time of the shipwreck. There have been arguments that the Linear B tablets found at Mycenaean sites refer more often to wild olives than domesticate olive, and there are some indications that wild olive oil was preferred to the domestic variety for perfumes, soaps, and textiles.

In 1989 and 1990, J. Mills, R. White, H.H. and E.M. Hairfield, archaeologists who worked at the site, identified the content of 120 Canaanite jars as terebinth resin using chemical analysis, and given the sizes of the jars, they calculated the total weight of the resin to be approximately one metric ton. The resin was known to be a

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75 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 354
76 Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 354
luxury good, often used in perfumes and unguents. Pure terebinth resin has a very
distinctive scent, taste, and appearance, with the color ranging from dark golden
brown to a bluish-white. Even today the recovered samples retain their sharp odor.\textsuperscript{77} Some samples gathered from the wreck outside of the jars it was stored in
incorporated sand and shell, indicating that the resin might still have been liquid when
the ship went down and the containers broke. Some resin included far more
impurities. Resin chips on the ship included insects, weeds, sediment, charcoal, and
other materials. While an archaeologist by the name of Pulak has suggested that
these resin chips are the remains of imploded stops, Cheryl Ward Haldane, who has
written numerous articles on the Ulu Burun shipwreck, believes that the impure resin
chips are the result of containers being incompletely emptied of old cargo and mixed
with new resin.\textsuperscript{78}

According to Theophrastus, the people of Syria harvested the resin from their
terebinth trees by slashing the bark or burning the tree (Theophrastus, \textit{Enquiry into
Plants}, Book 3, Chp. 2, Sect. 6). Some of the wood and charred remains from the
impure resin chips could be due to that method of harvesting. While terebinth grows
all around the Mediterranean, only the eastern areas grow hot enough to produce
resin, a fact that allows archaeologists to narrow down the ship's point of origin.\textsuperscript{79}
According to Dioscorides, once removed from the tree the resin was boiled with rain
water in bronze vessels. The resin would then be strained to remove impurities, and
poured into a ceramic vessel that had not been coated with pitch. The resin would

\textsuperscript{77} Haldane “Shipwrecked Plant Remains,” 57
\textsuperscript{78} Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 352-353
\textsuperscript{79} Haldane, “Shipwrecked Plant Remains,” 57
then turn white, which was an indication of quality. Were the resin to be poured into a pitch-lined vessel the color would change. The resin would then be sold to those who could afford it for use as an astringent for perfumes and emollients, and for coloring oils.\(^{80}\)

Along with jewelry, bronze weights, ivory, spices, and resin, a large and very important part of the Ulu Burun cargo was pomegranate seeds and skin fragments. The excavators found over a thousand pomegranate seeds in a large pithos, measuring about 1.4 meters,\(^{81}\) in the cargo hold, and hundreds more scattered across the wreck site.\(^{82}\) This find represents the largest Bronze Age collection of pomegranate remains. The pomegranate shows up in many forms early in the Bronze Age, and by the time this ship set sail it was already well-established as a luxury good. Excavations have uncovered pomegranate-shaped vases made of gold, imported glass, faience, ivory, bronze, and high-quality ceramics. The use of these precious materials, closely associated with power and wealth, to create something in the pomegranate form indicates that that form was also associated with prestige and influence. Pomegranate, like the terebinth resin and olive oil, appears in various Classical lists of perfume ingredients, in this case in Pliny’s *Natural Histories* (Pliny, *Natural Histories*, Book 13, Chp. 2). It appears as a symbol of both fertility and death throughout the millennia in many Mediterranean cultures, and had already

\(^{80}\) Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 353
\(^{81}\) Haldane, “Shipwrecked Plant Remains,” 58
\(^{82}\) Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 355
taken on the role by this point, as evidenced by the fact that the pomegranate form is featured in tomb paintings and funerary garlands of Eighteenth Dynasty Egypt.\textsuperscript{83}

The presence of pomegranate indicates that the ship may have sailed quite late in the season. The sailing season in the Mediterranean is from late April to early September, and pomegranates do not ripen until late August. If this was not the case, the fruit in the shipment was from the previous season.\textsuperscript{84} This was a possibility, as Columella gave instructions on how to preserve pomegranate for over a year (Columella, \textit{De Re Rustica}, Book 12).\textsuperscript{85} Given this information, it is possible that the knowledge of how to do so developed as early as the fourteenth century BCE. As seen by this analysis, through the use of botanical evidence it is possible to gather evidence as to not only where the ship came from and where it was going, but also when it sailed.

Some of the other plants on the ship have also been identified as luxury goods used in perfumes and as displays of power, such as the coriander fruit, which served as an astringent to hold the scent of perfumes with an olive oil base. Coriander was also given to a Mycenaean god as a ritual offering. Linear B documents translated by Ventris and Chadwick record the use of coriander in wines and as a condiment. According to these documents, the Mycenaeans believed that coriander was of Cyprian origin, although it has been suggested that it was grown on Crete. The coriander seeds on the ship are scattered through the wreck, in jars, and beneath

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\item \textsuperscript{83} Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 356
\item \textsuperscript{84} Haldane, “Shipwrecked Plant Remains,” 58
\item \textsuperscript{85} Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 359
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ingots. This may indicate that the coriander fruit was originally stored in woven baskets which have since disintegrated and released the remains across the ship.\textsuperscript{86}

Among the conglomerate of resin and sediment, archaeologists have identified a number of grape seeds, but grape seeds have also been found lying loose in the bilge area. These two sets of seeds are very different shapes, and it seems that they have different origins.\textsuperscript{87} If Haldane’s theory about the materials in the conglomerate being picked up from remains of previous cargoes, the grape seeds in the conglomerate are probably from an early trade journey. Other species of plant present in the cargo have been analyzed and judged to be used in the role of packing material and fuel, like thorny burnet and various species of weeds, as a great deal of such plant material has been found packed between copper ingots (Fig. 4 and 5).\textsuperscript{88}

\textit{Conclusion}

While inorganic remains on shipwrecks have long been the subject of much fascination, it is only in the last few decades that the organic remains on those ships have begun to receive proper attention. It seems abundantly clear that studying inorganic remains alone cannot build a complete image of the ancient Mediterranean cultures.

Plant remains on shipwrecks tend to be better preserved than those on land, and because shipwrecks are such discreet samples of Classical life, they show far more clearly what plants were in use at what times. Naturally there are difficulties inherent in the study of ancient botanical remains, but while it can be difficult to

\textsuperscript{86} Haldane, “Shipwrecked Plant Remains,” 57
\textsuperscript{87} Haldane, “Shipwrecked Plant Remains,” 59
\textsuperscript{88} Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age," 356
preserve this evidence once recovered from the site, the amount of information that can be gained from thorough analysis of the organic material could be enormous. It has contributed greatly to our knowledge of ancient seafaring and trade, as well as luxury and dietary practices. The remains of shipwrecks in the Mediterranean also allow archaeologists to study links between cultures, as they sailed from port to port collecting goods and ideas from each culture they visited. Establishing a knowledge of trade routes across the Mediterranean in the Bronze Age will enable us to learn about the ways the cultures interacted and learned from each other. Over the past few decades, archaeologists have begun to realize how valuable the data from organic shipwreck material could be, and research at such sites has increased. It is to be hoped that such research will only continue to increase in breadth and intensity.
Chapter Five

Pomegranate

Plant life has always been an integral aspect of human existence. Not only are plants used as food, but also as medicine. They have been used in religion for millennia, either to induce ‘visions,’ or as symbols. Some plants have come to be more symbolically significant than others, and as well as being used in the aforementioned fashions, also often appear in artwork. Some plant imagery and use permeates every aspect of society. A few plants became significant in one culture and were then adopted by others. The pomegranate first developed significance in Mesopotamia, where the plant originates. Many people have proposed that the Garden of Eden was in Mesopotamia, and the pomegranate is thought to possibly be the “Fruit of the Tree of the Knowledge of Good and Evil” in the Bible.

As the pomegranate spread throughout the Near East, it became important to many cultures. Desiccated pomegranate fruits have been found in a grave site in Jericho, and pomegranate fruit, seeds, vases, and jewelry have been found in Jordan, Syria, and Egypt. When trade between the Near East and Greece developed in the Aegean Bronze Age, one product that often made its way across the Aegean was the pomegranate, if not in its organic form, then as imagery in artwork. The first pomegranate material in Greece was located in eighteenth century gravesites. Pomegranate seeds, fruits, and images continued to be present to some extent throughout the development of ancient Greek society. Eventually, the Romans also adopted the pomegranate as a symbolic image, and incorporated into their artwork.
Pomegranate imagery has been found in Roman art created well into the imperial period.

Few plants have been so important to so many cultures over such a great length of time. Pomegranate imagery can be found throughout the Mediterranean. The pomegranate is even today a significant symbol in Israeli culture, and a great deal of artwork is devoted to the pomegranate form.

**Botanical Information**

The pomegranate, Latin name *Punica Granatum*, is native to the areas once known as Persia and Mesopotamia. It has been imported and naturalized over the entire Mediterranean, beginning in the Middle Bronze Age. It is designated as a shrub or small tree, growing to approximately five meters in height. The plant is deciduous and possesses shiny, oblong leaves. The fruit is preceded by fleshy red flowers. Originally forming as a large, fleshy berry, the pomegranate develops into a leathery fruit, often so swollen looking that care was taken that it not burst. The fruit itself consists of dozens of seeds enclosed in a bright red pulp that is high in both Vitamin C and Iron. The rind of the fruit has a high tannin content. According to Pliny, there were nine ancient varieties of the pomegranate, each with different attributes. These included the Apyrenum, sweet, acrid, mixed, acid, and vinous (Pliny, *Natural Histories*, Book 13, Chp. 34).

Pliny wrote that the pomegranate was one of the few plants that could grow from cuttings. He stated that if one took a pomegranate branch, sharpened the end, and stuck it in the ground, the plant would begin to grow, and that it would graft in

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89 Ward, "Pomegranates in Eastern Mediterranean Contexts During the Late Bronze Age." 530
any way (Pliny, *Natural Histories*, Book 17, Chp. 21). It was a fast-growing shrub, needing frequent pruning, but the fruit itself developed slowly, and benefited from the late rains. (Pliny, *Natural Histories*, Book 17, Chp. 21).

*Origins*

The pomegranate originated in north-eastern Turkey and the southern Caspian regions. There is palaeobotanical evidence of the pomegranate fruit in Mesopotamia from the fourth and third millennia BCE. These areas contain evidence of the wild form of the pomegranate fruit, which is not found in the Levant, Egypt, or the Aegean. Evidence of the larger, domesticated fruit begins to appear elsewhere in the Mediterranean by the late 16th century BCE, when Ineni, a courtier of the pharaoh Thutmos I provided archaeologists with the first written reference to the pomegranate fruit.90

Evidence of the pomegranate first appeared in Greece as early as the Middle Minoan period, and representations of the pomegranate appear throughout the Mycenaean period, primarily in graves. After the Mycenaean trade routes were disrupted pomegranate vases and votives nearly vanished, with only a few representations appearing over the course of the Dark Ages. However, by the Early Geometric period evidence of the pomegranate began to return to mainland Greece.91

*Medicinal Uses*

The pomegranate is an integral part of the Persephone myth. It symbolizes death and infertility, among other things. In the Classical world the pomegranate was

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90 Ward, "Pomegranates in Eastern Mediterranean Contexts during the Late Bronze Age.” 536
used as a contraceptive and abortifacient. At the time women used it as a vaginal suppository. In the 1970s, scientists conducted studies to test the efficacy of the pomegranate as a birth control agent by feeding pomegranate seeds to rats. Unfortunately, it was not possible to test their efficacy as suppositories on the rats, and so we cannot know how effective pomegranate is in that capacity. While the results did not indicate a 100% decrease in fertility, the decrease was quite significant. The pomegranate was a very important anti-fertility drug for a long time. Pliny, who in general disapproved of abortifacients and contraceptives, mentioned that pomegranate “quickened the foetus.” (Pliny, *Natural Histories*, Book 28, Chp. 77) However, because the Greeks and Romans had access to more efficacious herbs for birth control, such as the now extinct silphium, the use of the pomegranate for that purpose died out.⁹²

In addition to being used as an antifertility drug, pomegranate was said to be efficacious in many other areas of medicine. Pliny reported that mixtures of pomegranate and various other ingredients could be used to treat problems of the ears, eyes, teeth, gums, excrescences, and nails. (Pliny, *Natural Histories*, Book 23, Chp. 43) It was thought that it could cure tapeworm, chilblains, gangrences, and much more. Pliny includes pomegranate rinds, seeds, and calyxes in over eighty remedies in the *Natural Histories*.⁹³ Columella suggests pomegranate as an ingredient of ‘fruit syrup,’ a remedy against colic. (Columella, *De Re Rustica*, Book 12) The flavonoids could possibly have been used as an anti-bacterial treatment. Egyptians, Greeks, and

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Romans may have used the bark and rind of the pomegranate to treat stomach problems.\(^9^4\)

**Other Uses**

Pomegranate did not only function as a medicinal plant. The rind of one variety of pomegranate (Apyrna) was used to tan leather and produced a strong yellow color.\(^9^5\) The pomegranate flower was used to produce a purple dye. Pomegranate was also used to flavor wines, and many dishes in the recipe book of Apicius and the collections of Pliny include pomegranate as an important ingredient. In addition, pomegranate was often utilized as an astringent in perfumes. Before people began growing the pomegranate in Greece, traders had to import the fruit from the east at much cost, and because of the low supply and high demand, it became a luxury fruit that could be used to establish an image of wealth and power. Many scholars believe that the wealthy of the Bronze Age imported pomegranate from the east as a way to indicate their influence.\(^9^6\)

The pomegranate was an important symbol of both fertility and death. The pomegranate’s significance as a symbol of death can be seen in the pomegranate’s presence as a grave good throughout the east and in Bronze Age Greece.\(^9^7\)

\(^9^4\) Ward, "Pomegranates in Eastern Mediterranean Contexts during the Late Bronze Age." 531-532
\(^9^5\) Jashemski, *The Natural History of Pompeii*, 154
\(^9^6\) Cheryl Ward, "Pomegranates in Eastern Mediterranean Contexts During the Late Bronze Age."
\(^9^7\) Cheryl Haldane, "Direct Evidence for Organic Cargoes in the Late Bronze Age."
Zoroastrian rites and customs included using the pomegranate as part of wedding rituals to symbolize fecundity.98

Art and Artifacts

The pomegranate fruit and image was important throughout the Mediterranean, not just Greece and Rome. The excavation of a ‘Hyksos’ tomb in Jericho dating to about 1600 BCE revealed six desiccated pomegranate fruits and a small wooden box in the form of a pomegranate. In the tomb of the late fifteenth century Egyptian pharaoh Amenhotep III, archaeologists found 19 faience votives in pomegranate form.99 The Ulu Burun shipwreck, described in detail in a previous chapter, is well-known for the thousands of pomegranate seeds that formed part of the cargo.

The pomegranate image permeates Classical art from the Minoan Period well into the Imperial period of Rome. The first evidence of the pomegranate in the area now thought of as Greece was a pomegranate-shaped vase from eighteenth century Crete. The ceramic vase was uncovered in an elite residence in Phaistos. An excavation of an elite residence in Knossos uncovered a number of bone inlays of pomegranate images, buds, and flowers from the late eighteenth century B.C.E.100 The first pomegranate image found on mainland Greece dates from the fifteenth century. Twelve hollow gold beads in pomegranate form were found in Shaft Grave III in Mycenae from approximately 1500 B.C.E. In a chamber tomb, also in

98 Ward, "Pomegranates in Eastern Mediterranean Contexts during the Late Bronze Age." 532
99 Ward, "Pomegranates in Eastern Mediterranean Contexts During the Late Bronze Age."
100 Ward, C., "Pomegranates in Eastern Mediterranean Contexts during the Late Bronze Age." 534
Mycenae, archaeologists discovered a golden pendant in the shape of a pomegranate fruit dating to the early fifteenth century.\textsuperscript{101} The fact that these particular representations of the pomegranate are made of gold clearly indicates that there were luxury items, and therefore that the pomegranate was at least in some way associated with luxury. From the 1400s to about 1200, evidence of pomegranate steadily increased. This was a period of intensified trading and, for the wealthy, a time of conspicuous consumption. The pomegranate was a luxury fruit, not a dietary staple, and the Greeks imported it from the east, probably at some expense. It seems likely that the wealthy of Late Bronze Age Greece used both the fruit and representations of the fruit as status symbols.\textsuperscript{102} Tombs from this period contain many such representations made of faience, glass, bronze, ivory, gold, silver, and fine ceramics. Such pieces were also found in elite residences. Pomegranate representations of the Late Bronze Age tended to be depicted with an open corolla, a form reflecting probably picked up, not from contact with the actual fruit on the tree, but from seeing pomegranate representations and fruits imported from the east.\textsuperscript{103} This indicates that the pomegranate plant was not at that point grown in Greece, but continued on as a luxury item procured through long-distance trade.

After this approximately two-hundred year period of intense trade, the connection with the east was suddenly cut off due to the collapse of Mycenaean trade routes. Over the next four hundred years or so there was little interaction with lands

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\textsuperscript{101} Ward, "Pomegranates in Eastern Mediterranean Contexts during the Late Bronze Age." 534
\textsuperscript{102} Ward, "Pomegranates in Eastern Mediterranean Contexts during the Late Bronze Age." 530
\textsuperscript{103} Immerwahr, "The Pomegranate Vase: Its Origins and Continuity." 398
in which pomegranate originated. However, pomegranate tree and the image of the pomegranate remained in Greek lands, and archaeologists have excavated a number of pomegranate-shaped pieces that date from the ‘Dark Ages’. Two faience vases that have been dated to the sub-protogeometric period, c. 900 B.C.E., were uncovered in the Toumba cemetery at Lefkandi. Various other pieces, such as ceramic pomegranates and pomegranate vases, have been recovered from Samos and Bootien that have been dated to the ninth and eighth centuries. The pomegranate pieces from the following centuries, throughout the Geometric period, tend to be shown with closed corollae (Fig. 6 and 7). This, as opposed to the open corollae vases, indicates that the creators may have had actual contact with pomegranate fruit hanging from the tree. By this point it appears that the pomegranate tree had been fully introduced to Greece and was being grown there.\textsuperscript{104}

As the ‘Dark Ages’ came to a close and writing began to reappear in Greece, some of the first works included mention of pomegranate. Primarily, the \textit{Homeric Hymns} used the pomegranate in connection with Persephone, possibly as a symbol of her rape and death, as well as the fertility of the land. (\textit{Homeric Hymn to Demeter}, Ln. 370-375) The symbolism was consistent with the symbolic significance the pomegranate held in the Bronze Age. The Greeks continued to place pomegranate shaped jewelry, votives, and vases in graves. Archaeologists have uncovered many pomegranate-shaped vases with geometric designs dating to the 700s B.C.E.\textsuperscript{105}

\textsuperscript{104} Immerwahr, "The Pomegranate Vase: Its Origins and Continuity.” 398

\textsuperscript{105} Friedrich Muthmann, \textit{Der Granatapfel}. Bern, Switzerland: Schriften Der Abegg-Stiftung Bern, 1982. 56
The Greeks depicted pomegranate in art for centuries after the ‘Dark Ages’ ended. Pomegranate forms appear on mirror stands and pottery. One particularly popular venue for the pomegranate, especially in the sixth century, was in the hands of various goddess figures, particular those that scholars have determined to be Hera or Demeter, the goddesses of marriage and fertility. Many of the images of pomegranate are associated with death. A fourth century lekythos was decorated with an image of Elektra mourning at the grave of her father Agamemnon, and there is also a plate with the image of both Elektra and Orestes at Agamemnon’s funeral monument (Fig. 8 and 9). In addition to that, there are quite a few images of pomegranates on sarcophagi and tombs.\footnote{Muthmann, \textit{Der Granatapfel}. 90-91}

The Romans began to incorporate pomegranate into their artwork when they developed relationships with cultures to the east. It was still used as a symbol of fertility, and as such was included in the carved garland decorations of the Ara Pacis when it was created in 9 B.C.E. It was also still used as a symbol of death, as demonstrated by its presence in the artwork on the first century C.E. Caffarelli Sarcophagus. The image was very popular in the first century, and has been found in wall paintings in both Rome and Pompeii, a monument in Veii (Fig. 10), and on the Altar of Julia Panthea (Fig. 11). The images are all connected to either fertility or death.\footnote{Muthmann, \textit{Der Granatapfel}. 105-108}

The city of Pompeii presents a great deal of material evidence of the pomegranate. On the wall of the entrance to the House of the Vettii is a painting of a woven basket full of grapes and a single large red pomegranate complete with a
corona on top,\textsuperscript{108} and there is also a painting of a fruit basket on the wall of the House of Julia Felix.\textsuperscript{109} The fruit is also depicted on the walls of the House of Menander, the House of the Lovers, and the House of Achilles, in different settings in each case. In the House of the Little Fountain there is a painting of a purple gallinule (a bird) eating pomegranate seeds.\textsuperscript{110} This is not even close to a complete listing of the Pompeiian paintings that contain pomegranate imagery. In addition to the artistic representations of pomegranate, the pyroclastic blast from Vesuvius successfully carbonized and preserved more than a ton of immature fruit stored between layers of straw at the villa rustica at Oplontis.\textsuperscript{111}

As the Common Era wore on the new Christian religion adopted the pomegranate image as part of its symbolic language, and it continues to be depicted in Christian art to this day, as well as in the art of numerous other religions and multiple Mediterranean cultures.

\textit{Literature}

The pomegranate also presents a rather prominent role in literary works. It plays a vital part in the story of Persephone in the \textit{Homeric Hymn to Demeter}, as a fruit that represents both marriage and death. Pliny makes over eighty references to the pomegranate. Often he compares other fruits to the pomegranate, such as when he says the Euonymos tree “bears some resemblance to the pomegranate,” (Pliny, \textit{Natural Histories}, Book 13 Chp. 38) and he spends some considerable time enumerating the nine varieties of pomegranate known in the world at the time. He

\textsuperscript{108} Jashemski, \textit{The Natural History of Pompeii}, 153
\textsuperscript{109} Muthmann, \textit{Der Granatapfel}. 100
\textsuperscript{110} Jashemski, \textit{The Natural History of Pompeii}, 153
\textsuperscript{111} Jashemski, \textit{The Natural History of Pompeii}, 153-154
also describes ways to keep the fruit from bursting (Pliny, *Natural Histories*, Book 17, Chp. 16) and how to propagate the tree (Pliny, *Natural Histories*, Book 17, Chp. 13). Columella, in his *De Re Rustica*, describes how he believes the pomegranate is best planted and grown. He references the “wild pomegranate trees which bear no fruit” in his poetry (Book 10, Ln. 296). There are hundreds more references to the pomegranate in Greek and Roman literature, all indicating the widespread influence of the fruit.

*Conclusion*

The pomegranate is one of the few plants of Mediterranean antiquity to possess extant organic remains to any great extent. It is also a plant that shows up more in ancient artistic works than almost any other. Literary works from the *Homeric Hymns* to Pliny’s *Natural Histories* reference it. It is still an important symbolic plant in many cultures, probably for the same reasons that it was significant in ancient Greek and Roman cultures. The pomegranate presents a plethora of material and literary evidence from which many conclusions can be drawn about its significance to the culture. Because there is such a variety and wealth of evidence, the study of the pomegranate also shows how well the different types of evidence can be used together to confirm or disprove ideas about the role plants played in Classical society.
Chapter Six

Silphium

*Botanical Information.*

Silphium is a plant that was native to North Africa, particularly the region of Cyrene in what is now Libya. The land around Cyrene has a noticeably different environment from most of the rest of Libya. It is a fertile hilly area, and Herodotus stated that there were three growing seasons in the area, differing according to the specific landscape (Herodotus, *The Histories*, Book 4, Chp. 169, Sect. 1). The first was along the sea coast, which Pliny said was covered in nothing but trees. The second was in the intermediate fertile plateau, an area that Pliny described as good for nothing but growing corn. (Pliny, *Natural History*, Book 5, Chapter 5) The third region was in the hills. It was in this elevated area that silphium was said to thrive.\(^{112}\)

Little is known for sure about the plant itself, as it is thought to have been harvested into extinction by about the second century C.E., but ancient images of the silphium plant on coins and in art have given scholars some idea of what it may have been. Physical descriptions in Theophrastus (Theophrastus, *Enquiry into Plants*, Book 4, Sect. 1o) and Pliny (Pliny, *Natural History*, Book 19, Chp. 15) indicate that the plant had a large, thick root, tall stem, and celery-like leaves. The images of silphium found on Cyrene coins support this description. The coins also indicate a rosette-like growth pattern for the silphium fruit.\(^ {113}\) Soranus, a man who wrote on

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gynecology during Trajan and Hadrian’s reigns, designated silphium as part of the *ferula*, or fennel, family (Soranus, *Gynecology*, Book 1, Sect. 63). The harvesting process was similar to that of asafetida, so Strabo referred to both by the same name (Strabo, *Geography*, Book 8, Sect. 199). Little else is known about the physical makeup of silphium.

There is evidence that although the plant was vital for both Greek and Roman cultures, it was in fact cared for and harvested by natives of the area. Silphium was a wild plant, and was not grown in commercial quantities within the cities. Thus, the colonists and conquerors traded with the Cyrenean natives to acquire their supply of the plant. During the royal period, which began in approximately 630 BCE when Theran settlers came to Cyrene, a tribute of silphium may have been required as a tax or a rent payment from the natives. When Rome annexed Cyrene and the surrounding areas, silphium again became a form of tribute and Cyrene sent silphium to the city as part of a gift or tribute. The supply seems to have dwindled rapidly through mismanagement and possibly foreign attacks. There is also a theory that as part of a rebellion the Cyrene natives put a torch to the silphium fields, burning a great deal of the plant and greatly diminishing the species (Strabo, *Geography*, Book 17, Chp. 3, Sect. 22). Whatever the case, by the time of Nero, the plant was nearly extinct. Pliny wrote that the last known silphium stalk was sent to Nero as a gift (Pliny, *Natural Histories*, Book 19, Sect. 40).

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114 Riddle, "Oral Contraceptives and Early Term Abortifacients During Classical Antiquity and the Middle Ages." 30
115 Gemmill, "Silphium." 296
Throughout the centuries, other plants have been identified as ‘silphium.’ Alexander, during his travels in the Hindu Kush near Afghanistan, came across a plant that he identified as silphium, although today it is called asafetida, and there were reports of such a plant in Syria as well (Arrian, *Alexander’s Expedition*, Book 3, Section 28). When the Cyrene silphium became extinct, Romans began to use this other plant in the same way, but Celsus recommended an increased amount of the ingredient in recipes if the Syrian plant is used instead of the Cyrene plant (Celsus, *On Medicine*, Book 12, Chp. 59). There have been reports of silphium being rediscovered in North Africa, but none of those claims have ever been proved.\textsuperscript{117} We know that silphium was a member of the *Ferula* family, or something very close, and that it must closely resemble asafoetida (Soranus, *Gynecology*, Book 1, Sect. 63). If silphium is ever rediscovered, it will be known by its similarity to the plant now known as asafoetida, and the traits described in the writings of Pliny, Theophrastus, and various other authors.

*Background*

There has been a great deal of debate over the origin of the word ‘σιλφιον’, and the only conclusion thus far agreed upon seems to be the fact that the word is not Indo-European. Authors of the eighteenth and nineteenth centuries debated whether the word is Chaldean, Berber language, or Semitic in origin. There have been other theories, including the possibility that the word is Tuareg or originates from language used in Morocco or various other areas in Africa.\textsuperscript{118} What seems clear from these

\textsuperscript{117} Andrew Dalby, *Dangerous Tastes*, Berkeley: University of California Press, 2000., 18

\textsuperscript{118} Gemmill, “Silphium,” 298
various theories, and the fact that no one seems to believe that the settlers from Thera originally named the plant, is that silphium was known and used before the Therans and other Greeks ever arrived on the shores of Cyrene.

Silphium is a unique plant, and one of the most significant plants of the Classical world, and for many reasons. It was vital to the economy of Cyrene, a very important Greek colony, and as such was depicted on coins, jewelry, and possibly even column capitals. It was used as both a medicine and a spice, and so is mentioned in a large range of works, from those of Theophrastus to Apicius, as well as Pliny and Pausanius.

The symbol ‘ψ’, later used as a letter in the Greek alphabet, appears on Minoan seals. Sir Arthur Evans believed that the symbol was a representation of the silphium plant. If this is indeed the case, it demonstrates that at the time when the Minoans were first developing a writing system, silphium was already known and used by the inhabitants of Crete. Because of this, scholars have posited that silphium began to be exploited as early as the Minoan period. Silphium continued to be present in Greek culture for centuries, and when the Romans came in contact with it, they adopted it and began to use it in multiple ways.

*Uses*

Silphium is most famous for its use as a method of birth control. It is believed that silphium was a member of the *ferula* family (Soranus, *Gynecology*, Book 1, Sect. 63). Ferujol, the active chemical substance in *ferula*, has been tested, and results have shown that when taken within three days after coitus the drug was entirely effective in

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preventing pregnancy. Ferujol is both a contraceptive and an emmenagogue, stimulating menstruation and thus, in the event of pregnancy, causing an abortion.\textsuperscript{120} It is possible that this method of birth control, as well as its use for other purposes and perhaps the rebellions of the local inhabitants of Cyrene, led to silphium being harvesting into extinction.\textsuperscript{121}

The Romans, according to Pliny, also used silphium to treat headaches, eye problems, fever, problems of the internal organs, and excess hair growth (Pliny, \textit{Natural Histories}, Book 20, Chp. 23, 33, 35). He also recommended it be used to stimulate the appetite ((Pliny, \textit{Natural Histories}, Book 20, Chp. 17) Like many medicinal plants of the period, silphium did not have one particular use. Any plant that was suspected of being helpful medicinally was used in every possible way, as in most cases there was no way to judge the efficacy of the plants used.

Silphium, while important as a medicine, was also used in many other aspects of Roman life. Pliny recommended sprinkling the branches of pomegranate trees with silphium mixed with wine to sweeten the taste of the pomegranate fruit (Pliny, \textit{Natural Histories}, Book 17, Chp. 47) Columella wrote that silphium should be used to keep weevils from destroying lentils (Columella, \textit{De Re Rustica}, Book 6, Chp. 117), and also that the \textit{σιλϕιον} should be used to pickle herbs (however, that may have been a reference to asafetida, as they were referred to by the same name in a number of situations) (Columella, \textit{De Re Rustica}, Book 12, Chp. 7). Apicius also used silphium in a number of recipes, including pumpkin and chicken, cucumber, and citron recipes (Apicius, \textit{De Re Coquinaria}, Book 3).

\textsuperscript{120} John Riddle, \textit{Eve's Herbs}, Cambridge: Harvard University Press, 1997. 44-46
\textsuperscript{121} Dalby, \textit{Dangerous Tastes}, 18
Art and Artifacts

The earliest representation of silphium may have been as early as the Minoan culture. Sir Arthur Evans believed that the symbol ‘ψ’ may have been meant as a representation of silphium. This symbol was found on Minoan seals and hieroglyphic tablets, and continued to be present in Greece’s written language. It survived the ‘Dark Ages’ and the collapse of the writing systems to reappear in the Greek alphabet four hundred years later. While the idea that the symbol on the seals and letter was a representation of silphium is purely speculative, it would provide evidence for the significance of silphium as early as the 1400s B.C.E. While it is believed that inhabitants of the island of Thera traveled to Cyrene quite early, this shows that the Minoan culture believed silphium to be significant enough to include in the development of a written language. This shape is not only found in the Minoan and later Greek scripts. The letters Shin and Sin in the Hebrew alphabet are also possibly the result of contact with Cyrene and the silphium plant.\(^\text{122}\)

There are a few vases that have been recovered on which images of silphium and the nymph Cyrene have been found. There are theories that the vases are not actually from Cyrene, and were in fact painted in Naukratis or Sparta. This would make sense were there only one or two such vases, but given the number of extant vases with silphium decoration, it seems clear that they are linked to the city. One such vase, a cylix, is decorated with a painted image of a woman with long hair,

\(^{122}\) Stawell, “Suggestions Towards an Interpretation of the Minoan Scripts,” 129
probably the nymph Cyrene, on the inside. In her one hand she is holding a branch, possibly from apple-tree of the Hesperides, and in the other a sprig of silphium\textsuperscript{123}

The Arkesilas Cup, a black-figure cup, is usually thought to be one of the most important examples of the depiction of silphium in art (Fig. 12). The nature of the cup has been the subject of serious debate for over a century, ever since it was first published by the Duc de Luynes in 1833.\textsuperscript{124} It was believed to have been painted in the 560s B.C.E. in Cyrene and to depict King Arkesilas, the fourth king of Cyrene, supervising the harvesting, weighing, and preparation of silphium. The men around him are engaged in various activities, and next to the king and the various workers their names are written. One of the names on the cup, sometimes read as ‘\textsuperscript{σλιφομαχος’}, was believed to be correctly spelled as ‘\textsuperscript{σιλφομαχος’}, indicating that the scene on the cup was that of a silphium harvest. The other names on the cup can be translated as relating to various tasks associated with the silphium harvest. There is a “basket carrier,” a “guard,” and a name that means “equal weight” for the man weighing the silphium.

The name Arkesilas, written on the cup, is that of the king of Cyrene at the time the cup was made. The name ‘\textsuperscript{Ορυξω’ is the only name on the cup, other than Arkesilas, that is not a pun on the name of the activity the figure is performing. It is possible that the name translates as “Digger,” possibly referring to the task of digging the silphium up. However, the man associated with the name is not digging, but

\textsuperscript{123} Ernest Arthur Gardner, "Early Greek Vases and African Colonies," \textit{The Journal of Hellenic Studies} 10, 1889. 133
\textsuperscript{124} Gerald Schaus, "Two Notes on Lakonian Vases," \textit{American Journal of Archaeology} 87.1, 1983. 1983, 88
carrying a bag. It has been proposed that it is actually a reference to Arkesilas’ queen ‘Ερυξω.’

Despite the names of the people on the vase, there is speculation that it was actually made in Sparta, and that the contents of the baskets depicted on the cup actually contain wool, not silphium. Although it is clear that the scene is set in Cyrene, it is possible that the word ‘σλιφομαχοσ’ has nothing to do with silphium. On the other hand, it does not make a great deal of sense for a cup that depicts a ruler of Cyrene, known throughout Greece for its production of silphium, to show the processing of a product other than silphium. The evidence that the scene on the cup represents a silphium harvest is strengthened by the name ‘σλιφομαχοσ’, because although it does not precisely correlate to the word ‘silphium,’ it is too close to be completely disassociated from the plant. The word ‘σλιφομαχοσ’ does not actually have a meaning, and this gives greater license to those who wish to associate it with the silphium plant. Thus it seems that while the debate on the precise interpretations and indications of the names and activities on the cup will continue, either way the cup is significant for the study of silphium.

The coins produced by the Cyrene government over the centuries give a better idea of the appearance and social and economic significance of the silphium plant. These coins are the most common archaeological evidence of silphium. Silphium was the main export of the Cyrene region in what today is known as Libya, and it was a valued commodity. As early as the sixth century, the people of Cyrene put images of silphium on their coins, demonstrating the economic significance of the plant (Fig.

\[125 \text{ Gemmill, “Silphium,” 301-302}\]
13-15). This occurred not long after the monarchy first arose, when Battus I and the other colonists left Thera and arrived in Cyrene in 630 B.C.E.\textsuperscript{126} The silphium design began to fade out of use in coin decoration by the end of the royal period, and in the Hellenistic age it was completely phased out of use. This is a reflection of the end of the monarchy and thus the royal monopoly on the profits gained through the harvest and trade of silphium.\textsuperscript{127}

The representation of silphium on the Cyrene coins changed a great deal over the centuries. The first silphium coins showed the fruit of the plant in up to four rosettes. This could either have been because the fruit was the part of the plant in use or because it was easier to depict,\textsuperscript{128} but by the beginning of the fifth century the coins began to depict the entire plant.\textsuperscript{129} At first the plants were very detailed and quite natural looking, but became progressively simpler and more stylized. The earliest silphium depictions had a long thick stem with circular shapes at the top, and side leaves ending in numerous flowers. This contrasts with Theophrastus’ description of the plant that mentioned only one flower.\textsuperscript{130} While the silphium plant is a common theme on Cyrene coins, the plant is not always shown alone. Occasionally the silphium plant is shown with a gazelle feeding on it, which may give some indication of the size of the plant. The coins also often depict a goddess, possibly the nymph Cyrene, holding a silphium plant, and sometimes a sickle in her other hand. There have been coins found that show the silphium plant with the head

\textsuperscript{126} Gemmill, “Silphium,” 296
\textsuperscript{127} Fabbricotti, “Silphium in Ancient Art,” 27-28
\textsuperscript{128} Fabbricotti, “Silphium in Ancient Art,” 27
\textsuperscript{129} Fabbricotti, “Silphium in Ancient Art,” 27
\textsuperscript{130} Fabbricotti, “Silphium in Ancient Art,” 27
of Ammon on the obverse of a coin, and a number of other images shown with the silphium image on various Cyrene coins. Some of these include stars, crabs, palm trees, tripods, and cornucopiae. While these images appear on the Cyrene coins with some regularity, silphium is the most constant and vital of those symbols.

Because of the social and economic significance of silphium, the people of Cyrene often used it as tribute in various situations. One of these situations was that of tribute. Some argue that the “Akanthos Column” (Fig. 16) from Delphi is actually supposed to be a silphium column sent from Cyrene as tribute, although there is no mention of silphium being used as a part of architecture, while there is for akanthos. Rome acquired Cyrene as a province in 96 B.C.E. Pliny reported that in 93 B.C.E., during the consulships of C. Valerius and M. Herennius, Cyrene shipped thirty pounds of silphium to Rome as part of the “public service” (Pliny, Natural Histories, Book 19, Chp. 15, Sect. 40). There is some debate over why there was a delay between the annexation of Cyrene and the recording of the shipment in 93 BCE, and there are multiple explanations for the situation. One explanation is that Rome took some time to organize the request for tribute and for Cyrene to put it together. Another possibility is that the 93 shipment was particularly large and worthy of recording. Whatever the situation may have been, at the beginning of the Civil War in 49 B.C.E. Caesar took 1500 pounds of silphium out of the aerarium in Rome, along with a great deal of silver and gold (Pliny, Natural Histories, Book 19, Chp. 15, Sect. 40). While Pliny says no more on the subject, the presence of so much stockpiled silphium could indicate its worth, or a fear of future scarcity. The fact that

131 G.W. Elderkin, "The Akanthos Column at Delphi," Hesperia 10.4, 1941. 374
Pliny mentions Caesar taking silphium out of the aerarium at the same time he mentions Caesar taking silver and gold gives some idea of the value of the plant.

Pliny also expounds upon the origin of the plant, recording that it first appeared after a great rainstorm seven years before the foundation of the city of Cyrene. He also states that silphium cannot be cultivated and describes the way in which it is harvested, saying that the silphium liquid was squeezed from the stalk, or that the harvesters would make an incision in the stalk and catch the liquid as it flowed out. He also says that cows were sent out to graze on it, and that the silphium made them fat and healthy (Pliny, *Natural Histories*, Book 19, Chp. 15, Sect. 40).

The practice of sending cows out to graze in the silphium fields may be one of the factors that contributed to the eventual extinction of the plant.

While there are no material remains, like the golden silphium tribute or botanical residue in the aerarium, still extant, the various authors, like Strabo, Pliny, Theophrastus, and Soranus, who mention these silphium tributes provide evidence of the vital nature of the plant.

*Conclusion*

From the various reports and the physical evidence that has survived through the ages, it seems clear that silphium was vital to the colony of Cyrene. From the time of the Minoans silphium was recognized as a useful plant. It was in fact so useful that it may have been included in the development of a writing system. As years went by it was included in more artistic representations, as the significance of the plant only grew greater, until finally its own significance destroyed it. It is unfortunate that there are no extant botanical remains that could be studied in order to
ascertain the species and make-up of the plant, but there are at least numerous representations of the plant in art over hundreds of years of Greek and Roman culture. It is particularly important in a situation like this, where the plant is no longer in existence and there are no botanical remains to examine, to study the artistic representations. Through those representations and the many mentions of silphium in writing it is possible to come to some fairly solid conclusions about the nature of the plant and its use in the ancient world.
Chapter Seven

Saffron Crocus

The Saffron Crocus is a beautiful plant with golden or purple flowers and long saffron-coloured stamens, believed to be native to the Mediterranean area (Fig. 17). It is a member of iris family (*Iridiceae*). The crocus used today for spices and dyes is a domesticated mutation, Latin name *Crocus sativus*.\(^{132}\) This particular species is a mutation of *Crocus cartwrightianus*, a wild, autumn-flowering subgenus of the crocus plant. The *crocus sativus* is a sterile, domesticated variety that saffron harvesters created through artificial selection in their search for long-stamened saffron crocuses.\(^{133}\) These sterile plants cannot reproduce independently, and so depend upon human assistance. Both the wild and domesticated varieties were used in the ancient Mediterranean for dozens of purposes.

Historians and botanists believe the saffron crocus is native to Asia Minor, and a wealth of evidence indicates that the inhabitants of the Aegean islands knew of it long before the eruption of the Santorini volcano in the 15th or 14th centuries B.C.E. (the date of the eruption is highly debated).\(^{134}\) Since that time people have used the saffron crocus as a spice, a dye, and a perfume. It has also served as medicine and as a religious symbol, among other things. It is the most expensive spice in the world, for a number of reasons. The first is that there are only three stamens per crocus flower, and each of those must be harvested by hand. A single pound of saffron

\(^{132}\) Dalby, *Dangerous Tastes*, 138


\(^{134}\) Dalby, *Dangerous Tastes*.138
represents the product of 75,000 flowers. \(^{135}\) The saffron crocus demands strong sunlight in a warm climate and a light, fertile, loamy soil that is often difficult to find and could be used to grow much higher-yield crops. The saffron flowers also only last three years, and the plant is sterile, so laborious replanting must be done regularly. \(^{136}\) To render the stamens useful for coloring and as a spice, they are dried over charcoal fires. Once prepared, saffron quickly loses its aroma and flavor. Therefore, not only is saffron a labor-intensive material, but also takes up a great deal of land and water for very little return. Despite this, the pungent flavor, beautiful color, and general usefulness of the plant keep it in high demand. Because of this, there have been times in history when saffron has been worth more than its weight in gold.

*Uses*

The saffron crocus has had dozens of uses, referenced by over half a dozen famous authors over the course of centuries. The most obvious use of the saffron plant is that of dying fabrics, still used on clothing today. That saffron color was originally produced through the use of coloring agents extracted from saffron stamens. This use is alluded to in Homer’s *Iliad*, one of the first pieces of writing created after the “Dark Ages.” According to the story, “Dawn in her saffron robes rose from the River of Ocean to bring daylight to the immortals and men.” (Homer, *Iliad*, 19.9) The cult of Artemis at Brauron, a cult primarily dedicated to maturation rituals for young girls, dressed those young girls in saffron-dyed robes as part of the


rituals. A saffron dye was used as a royal and religious color in many other cultures as well.

The crocus was also used for many medicinal purposes. According to Pliny, the correct application of saffron could ward off headaches, inebriation, cataracts, ulcers, and numerous other medical conditions (Pliny, *Natural Histories*, Books 23, Chp. 43). All of these remedies include the use of numerous other ingredients, as was common in the medical practices of the time. Pliny also states that when applied on wool as a pessary with leek juice and hare rennet saffron acts as an emmenagogue and can expel a dead foetus (Pliny, *Natural Histories*, Book 28 Chp. 77). While the function of hare rennet as an abortifacient has not been studied, various studies have shown that crocus is in fact a powerful emmenagogue, and thus promotes menstrual flow. Used in different situations, saffron could either be a contraceptive or an abortifacient, although Pliny never mentions the possibility of using saffron as a contraceptive. Pliny strongly disapproved of contraception and abortion, so the closest he comes to acknowledging that a plant might have such a function is to mention that it can be used to promote menstruation or abort a dead foetus. He does so with saffron.

The medical uses of saffron are also referenced in the works of Galen and Dioscorides. Both authors noted the use of the autumn crocus in some treatments for tumors. Today we know the plant in the form of colchicine, a medication

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137 Ellen Davis, "Youth and Age in the Thera Frescoes," *American Journal of Archaeology* 90.4 1986. 403
138 Teuscher, 321
139 John Riddle, *Dioscorides on Pharmacy and Medicine* Austin: University of Texas, 1985.55
commonly used for gout, but also used for some cancer treatment for its ability to stop cell division, thus fighting tumor growth.\textsuperscript{140} Today it is a common treatment for animals with cancer.\textsuperscript{141}

Saffron is the most expensive spice in the world, and has been so for millennia. Therefore the rich and powerful have used the spice to show their influence and wealth. For example, the Roman emperor Nero once had the streets of Rome strewn with saffron when he made his entrance into the city. Saffron also has many other uses, particularly as an ingredient in perfumes.\textsuperscript{142} The Greek \textit{hetaerae}, professional courtesans, used saffron as their signature scent,\textsuperscript{143} probably as a way to indicate that they, like saffron, were valuable, and to show that they too could represent the wealth and power of the men they accompanied. In fact, saffron is such a valuable commodity that ancient crocus farmers may have put about a rumor that consuming more than twelve grams could be fatal, in order to protect the supply.\textsuperscript{144}

\textit{Artistic Representations}

The literary references to saffron long outlived the creation of obvious artistic representations of the crocus. From the fall of the Minoan culture to the emergence of Greece from the “Dark Ages,” there is little or no evidence of the saffron crocus.

\textsuperscript{140} “Cancer and Chemotherapy,” http://www.chemheritage.org/EducationalServices/pharm/chemo/readings/ages.html, 4/21/07
\textsuperscript{141} Personal Communication from Dr. Jeffrey Wolf, Oncologist
\textsuperscript{142} Pat Willard, \textit{The Secrets of Saffron: The Vagabond Life of the World’s Most Seductive Spice}, Boston, Beacon Press, 2002. 63
\textsuperscript{143} Willard, \textit{The Secrets of Saffron: The Vagabond Life of the World’s Most Seductive Spice}. 59
\textsuperscript{144} Riddle, \textit{Dioscorides on Pharmacy and Medicine}, 66-67
(There have in fact been lethal cases of saffron overdose, and the lethal dose for humans can be anywhere from 5 to 20 grams.- Teuscher, pg. 321)
Unlike the pomegranate, crocus images vanish from extant material remains until the re-emergence of writing in the eighth century, and even then do not truly reenter the artistic works save as floral background decoration. However, the references to saffron in literature and the Minoan artistic representations are numerous enough for the crocus to warrant a significant place in a discussion of ancient plant remains.

Unlike the pomegranate and silphium, crocus does not appear significantly in much artwork after the thirteenth century B.C.E. It is occasionally shown in wall paintings as part of floral decoration, but does not seem to hold any special significance. However, before the fall of the Minoan culture, the crocus seems to have possessed a great deal of cultural and religious importance. Sir Arthur Evans, in addition to his studies of Minoan symbols and seals, also spent considerable time studying certain Linear B tablets found on Crete. He speculated that one of the tablets mentions saffron. There are also numerous depictions of what archaeologists believe to be the crocus in various wall paintings in Knossos, particularly in the House of the Frescoes. One of the Knossos paintings even includes images of monkeys gathering crocus (Fig. 18). In addition to this, two gold pins with a crocus on the ends were recovered from a grave in Mochlos, Crete, and a silver pin with a crocus shaped head was found in a grave in Mavro Spelio. All of these findings are significant and contribute to the study of the role of the saffron crocus in Minoan culture, but there is one instance of the depiction of the crocus that has played a larger role than all the others.

146 Shaw, "The Aegean Garden." 664
In 1967 an archaeologist by the name of Spyridon Marinatos began excavations at on the island of Santorini, also known as Thera. The excavations revealed an entire once-thriving city and within that city were found the famed wall paintings like those in the House of the Ladies, the painting known as the “Coming of Spring,” and most importantly for this analysis, the wall paintings of Xeste 3. Christos Doumas, the current head archaeologist for the Akrotiri site, has studied the Xeste 3 paintings in some detail, and has formed a number of conclusions about the significance of the presence of the saffron crocus in the artwork.

The Xeste 3 building possesses the most wall paintings found in any building at the Akrotiri site. The most detailed of these paintings, located in the northwest corner of the building, is that of the Saffron Gatherers (Fig. 19 and 20). This painting depicts several women engaged in an activity that appears to be gathering crocus stamens for saffron. Even in the 20th century, the act of gathering crocus stamens was still solely a woman’s job. In the painting, each woman holds a basket into which the stamens are placed. There is a larger basket, where Doumas believes the gathered stamens were consolidated as part of a tribute to the larger seated female figure. The figure is flanked by a blue monkey and a griffin, both of which are religiously significant figures in Theran culture on account of their foreign origins and mythical nature.

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148 Doumas, 77-81
149 Doumas, 106
The painting is on the walls just above a ‘lustral basin,’ suggesting that the painting possesses religious significance.\textsuperscript{150} This has not been confirmed, and in fact what has been dubbed the ‘lustral basin’ could actually just be a bath or water-collection space. It may have no religious or ritual significance at all. However, many of the Akrotiri archaeologists have come to the conclusion that it is indeed a basin used for ritual purposes. Given the inclusion of the griffin, a figure imported from the east and commonly understood to be mystical, and the blue monkey, again a foreign import and therefore connected to ritual practices, there seems to be reason to believe that the painting is of some sort of religious ritual.

The seated woman, thought to be a type of goddess figure, has been dubbed the “Crocus Goddess,” and many believe her role to be similar to that of Artemis at Brauron, in that she is a goddess of youth and maturation (Fig. 21). The connection Artemis at Brauron comes from both the presence of young women in the painting and the fact that the girls at Brauron were dressed in saffron-dyed robes.\textsuperscript{151} Doumas has postulated that the saffron gathering is part of a coming-of-age ceremony for young Theran girls.

Although the crocus ceased to be used in symbolically significant artwork around the time the Minoan culture fell, it continued to be significant in many other respects. The first extant works of literature written after the Dark Age, namely the Homeric epics, Homeric Hymns, and Hesiod’s writings, all mention saffron or the crocus. The author of the Homeric Hymns uses the crocus image in a manner quite reminiscent of the Xeste 3 paintings. When Persephone is gathering flowers,

\textsuperscript{150} Doumas, 106
\textsuperscript{151} Davis, "Youth and Age in the Thera Frescoes."403
immediately before Hades abducts her, she gathers crocuses, among others (Homeric Hymn to Demeter, Line 6). One of the things the archaeologists at Akrotiri believe, referencing the paintings in Xeste 3, is that the crocus was used as a symbol for coming-of-age rituals for young girls before marriage and loss of virginity. The reference to Persephone plucking a crocus before her forced marriage to Hades supports this idea, and in fact may be a reference to such a Minoan ritual.

The Homeric Hymns also reference crocus in other ways, using it to describe the yellow color of the earth (Homeric Hymn to Demeter 6.62) and the appearance of girls’ hair streaming over their shoulders (8.73).

Hesiod and Homer’s epics reference saffron as a dye. In the *Theogony* Hesiod refers to the goddess Enyo as “saffron-robed” (Hesiod, Theogony, 6.67) and the goddess Telesto is “saffron clad” (Hesiod, Theogony, 8.00). The Homeric epics, the *Iliad* and the *Odyssey*, also reference the use of saffron to dye clothing, particularly the clothing of the goddess Dawn. Her particular epithet, used in books four, six, and eight, is that of saffron-robed Dawn (Homer, Iliad)152 These references support the idea of saffron-dyed clothing being used for religious ritual purposes, as it is clearly deemed worthy for the clothing of goddesses. Pliny reports that saffron was held in high esteem already at the time of the Trojan War (Pliny, Natural Histories, Book 21 Chp. 17).

From this point onward, save for occasional depictions of the crocus in the background of paintings with floral themes, the evidence of the role the saffron crocus played in Classical culture is primarily literary in nature. Through the works

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152 See 4.95, 6.59, 8.33, 8.77
of Pliny, Dioscorides, Columella, Virgil, and through the Hippocratic writings, crocus is known as a very useful, expensive, and esteemed plant.\textsuperscript{153} The uses of the plant and the references to those uses are, clearly, numerous and widespread, stretching from the earliest extant written Greek to literature from the late Roman Empire.

Dioscorides, author of \textit{De Materia Medica} in the 4\textsuperscript{th} century B.C.E., wrote only about crocus’ medicinal capabilities. Indeed, Dioscorides wrote an entire chapter on the medicinal qualities of the autumn crocus, in which he extols it for its ability to counteract mushroom poisoning. He also referred to the saffron crocus as a treatment for cancer. Specifically, he recommended the administration of crocus remedies in the case of “\textit{phuma}” or growth, and for “\textit{oidema},” a word that in one Galenic texts translates as a painless, soft tumor.\textsuperscript{154} It was Dioscorides who reported that any dose of saffron over twelve grams would be lethal, although he does begin the clause “they say…” implying that he did not necessarily believe the claim.\textsuperscript{155}

Virgil, in his \textit{Georgics}, refers to saffron primarily as a scent. For example, he writes “See how from Tmolus comes the saffron’s fragrance…” (1.56) and a few books later he says “Let gardens with the breath of saffron flowers allure them…” (4.109)\textsuperscript{156} He also refers to the bed of Tithonus, Aurora’s consort, as “saffron” in both the \textit{Georgics} and the \textit{Aeneid} (Georgics 1.447, Aeneid 4. 585).

Pliny’s references to crocus are numerous. To be precise, he makes eighty-eight references to ‘saffron’ and ‘crocus’ throughout his \textit{Natural Histories}, be the

\textsuperscript{153} E.L. Sturtevant, "History of Garden Vegetables (Continued)," \textit{The American Naturalist}, 24.283, 1890. 633
\textsuperscript{154} Riddle, \textit{Dioscorides on Pharmacy and Medicine}, 55
\textsuperscript{155} Riddle, \textit{Dioscorides on Pharmacy and Medicine}, 64
\textsuperscript{156} Translation by J.B. Greenough
reference to the spice, the flower, or the color. Many of these reference to color have nothing to do with the spice itself, but his use of that word to describe the color of a stone or a flower bud or a bird egg or anything else shows how deeply rooted the idea of the saffron crocus was. In book fourteen he describes a wine in which saffron is an ingredient. (Pliny, *Natural Histories*, Book 14 Chp. 19) He also says that Cicero discussed the benefits of an unguent with an earthy smell over that with a saffron scent, as he disapproved of the corruption that the use of a great deal of saffron implied (Pliny, *Natural Histories*, Book 13 Chp. 4). He devotes a large portion of chapter 17 of book 21 of his *Natural Histories* entirely to the subject of where saffron crocuses grow best, and a considerable chunk of chapter 81 to the various medicinal remedies that one can derive from saffron. Although the *Natural Histories* are unconscionably long and cover virtually every possible subject, it is still significant that Pliny devotes two chapters, plus numerous other references, to saffron.

Like Virgil, Columella comments on the fact that Tmolus was a major location for the cultivation of saffron, as was Corycus (*De Re Rustica*, Book 3, Chp. 8), but he also notes with seeming pride that the fields of Italy are also capable of producing the crocus. He makes a single reference to the active uses of the plant when he describes the process of making a boiled-down “must” and includes saffron amongst the ingredients (Book 12, Chp. 20) In his poetry, Columella includes saffron as part of a Bacchic ritual, saying, “With spurge-laurel and clustering saffron-flowers. Sprinkle these blossoms with unmixed wine…” (Book 10) He also declares “Let scented crocus-plants, of foreign lands the gift, descend from the Sicilian hills…” (Book 10). In these four references, one can observe many of the different
characteristics of the saffron crocus, such as connection with cult ritual, the valued scent of the plant so important for foods and perfumes, and the pride inherent in possessing the plant.

Conclusions

While one might wish to possess more physical evidence about the role the saffron crocus played in Classical societies, it is clear from the few representations over the centuries and the multitude of literary references that the crocus was very much a part of society. In addition to the helpfulness of ancient artistic and literary sources, it is important to realize that current uses of saffron can also be helpful. The uses listed in the ancient literary works are quite similar to today’s uses of the saffron crocus, so by studying the ancient sources and the current uses today, one can begin to understand the role that the saffron crocus played in ancient society, whether it be in the realm of cuisine, medicine, or religion. Thus, even without the benefit of botanical remains of the saffron crocus, we are able to carry out something akin to a palaeoethnobotanical study of the saffron crocus.
Conclusion

It is clear that this thesis is in fact divided into two distinct halves. The first half of the thesis concentrates on three case studies in which archaeologists employ different methods of palaeoethnobotany according to the situations at the various sites. These sites employ the practices usually associated with palaeoethnobotany, as they involve analysis of actual organic remains. The Mediterranean is an area made up of various environmental situations, from volcanoes to stormy seas. The entire range of palaeoethnobotanical practices are employed there to enable the recovery of floral remains. However, as stated numerous times, the Mediterranean climate is temperate and shifts back and forth between hot and cold, wet and dry, wearing out the cells of the remains and leading to swift decomposition. While the analysts of botanical remains should still be attempted whenever possible, it is sometimes not a possibility. But to ignore an entire aspect of ancient culture by not studying floral remains leads to an incomplete picture of society.

Thus other methods of analysis, beyond study of organic remains, must be employed. This idea in turn leads to the second half of the thesis, in which I gathered evidence of three plants significant to Classical cultures. This evidence appears in literature and in artwork, and can be studied to reveal information regarding religious, culinary, medical, and luxury uses of the plant. It is true that this evidence is more likely to be biased than in the recovery of organic remains, since literature and artwork is a matter of interpretation. However, as long as proper care is taken to
study the issue from all angles, it is still possible to glean a great deal of information from these sources.

When possible, the artwork and literary mentions of these plants should be studied alongside any ancient remains of the plant that have been recovered. Failing that, scholars should use the living plant, as Wilhelmina Jashemski did in her analysis of root cavities at Pompeii. Unfortunately there are plants, like silphium, that have gone extinct since the Greek and Roman times. No one has ever recovered organic remains of silphium, and it is not likely, and there are no living samples of the plant. It is in cases such as these where the analysis of artwork and literary references becomes particularly significant.

This paper was an attempt to highlight the different ways in which scholars can study the plants of the ancient world and how people used them. Palaeoethnobotany has developed a great deal over the last few decades through improved recovery, testing, and preservation methods. It is becoming common practice to consult a palaeoethnobotanical specialist at most excavations. However, the study of ancient plants is still mostly a side note at many sites. This is particularly true in areas like the Mediterranean, but that should not be the case. There is a plethora of ways to study plant life in the ancient Mediterranean, and they should all be utilized.

Other than a desire to bring to light the wide range of possibilities available for the study of ancient plant life and the role it played in human society, I did not begin with any sort of goal in mind. I simply wished to explore palaeoethnobotanical methods and the ways in which those can be expanded upon. As I examined specific
excavations and the situations in which silphium, crocus, and pomegranate were found, I discovered a number of things.

For the first three case studies, which took place in very different locations and focused on different time periods, I found that the archaeologists all encountered problems with recovery and preservation. This seems natural, as organic remains tend to be small and delicate. However, these studies all took place at least thirty years ago, and great strides have been made in palaeoethnobotany since then. These advances, particularly in areas like phytolith analysis and palynology, represent both scientific advances in general, and advances in palaeoethnobotany specifically. Given these advances, it seems that much more information could be extracted from excavated material if work at the sites resumed. It also means that there has been an increased interest in the study of ancient plants, since it is possible to recover and analyze a wider range and larger amount of material.

The analysis of crocus, pomegranate, and silphium led to the discovery that the plants were all used as contraceptives, and actually do work as such on the chemical level. All of them can be found in wall paintings and literary references, but again, there are few similarities aside from that. The similarities between the plants are rather basic similarities, like being mentioned by the same author or appearing on wall paintings, and all of them were very important economically. The differences, like the fact that pomegranate and crocus were religious symbols while silphium was not, tend to be more noticeable.

Aside from these similarities, the three excavations and three plants had little in common, and this is in fact beneficial to the idea I am trying to get across. This is
that the more techniques used at a site, the more thorough the results will be, and then
if one method fails, one can simply move on to the next and do as much as possible
with the material that is available. Wilhelmina Jashemski’s work in Pompeii seems to
demonstrate this idea most vividly, since she utilized root cavity analysis, traditional
macroremain analysis, wall painting analysis, and studied the current plants to assist
in these analyses.

This argument is not new. Over the past thirty years or so great strides have
been made in palaeoethnobotany through the urging of many scholars and scientists.
They have encouraged the use of palaeoethnobotany at every site possible. Many
sites now employ a specialist to organize the study of plant material recovered from
the excavation. Yet palaeoethnobotany is still not an integral part of many
excavations in the Mediterranean. It is pursued half-heartedly. Clearly money and
time constraints explain this to some extent, but it is also because, despite recent
efforts, palaeoethnobotany and the study of plants in art and literature is still not seen
as entirely necessary at many sites.

In this paper, I wished to point out that the study of plant life is integral at
every site, from Mesolithic settlements to Bronze Age shipwrecks to Imperial Roman
cities, and vital to every part of culture, including medicine, food, religion, shelter,
and clothing. Despite the possibilities for various methods of study, there will still be
sites where no plant material can be recovered, and no imagery or literature will assist
in the interpretation of the role that plants played at the site, but this does not mean
that no attempt should be made. Perhaps someday palaeoethnobotanical research
methods will develop to a point where botanical remains can be recovered. Given the
advances over the last thirty years, this is certainly not improbable. Plants play a fundamental role in human existence, and to ignore them is to ignore a great part of human survival and development. Efforts should continue to be made in this field, as the results of such research add immeasurably to our knowledge of Classical culture and environment.
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i Jashemski, *The Natural History of Pompeii*, 153

ii Muthmann, *Der Granatapfel*, 100

iii Jashemski, *The Natural History of Pompeii*, 153

iv Haldane, “Shipwrecked Plant Remains,” 58

v Haldane, “Shipwrecked Plant Remains,” 58

vi Muthmann, *Der Granatapfel*, 61

vii Muthmann, *Der Granatapfel*, 61

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xxi Crete Classics, http://crete.classics.ox.ac.uk/U3S1/C224.jpg, 4/11/08
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<td>Pomegranate shaped vase</td>
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<td>Seeds and Skin Fragments</td>
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<td>Ivory Rod w/ Fruit Finial and Gold Necklace w/ Fruits</td>
<td>Pomegranate shaped gold jewellery and ivory rod with pomegranate finial used in a burial</td>
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<td>Two preserved pomegranate seeds</td>
<td>Tiryns, Greece, Elite Residence</td>
<td>c. 1200 B.C.E.</td>
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<td>c. 600 B.C.E.</td>
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<tr>
<td>Painting of Arkesilas Pot w/ Pomegranate Decoration</td>
<td>There are two sherds showing pomegranate figures. The first is that of a symposium, in which a flute-girl is playing. A figure leaning into the scene carries an item that looks like a pomegranate on top of a carrot, and there are pomegranate images all along the border of the scene. The second is a farm scene with a man tending to his fowl while standing beneath a tree upon which pomegranates are growing.</td>
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<td><strong>Archaeological Evidence of Pomegranate</strong></td>
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<td>Pomegranate Image in Mosaic</td>
<td>Ceramic bowl containing various ceramic fruits including one pomegranate.</td>
<td>Thuburbo Maius, Tunisia, House of Bacchus and Ariadne (upper class house) and East Temple</td>
<td>Early 5th Century C.E.</td>
<td>Jashemski, <em>“Roman Gardens in Tunisia,”</em> 569</td>
</tr>
<tr>
<td>Ceramic Bowl of Fruit</td>
<td>Lekythos vase depicting the bust of a goddess (presumably Athena) holding up a pomegranate in her hand.</td>
<td>Kamiros, Rhodes</td>
<td>5th C. B.C.E.</td>
<td>Muthmann, <em>Der Granatapfel</em>, 81</td>
</tr>
<tr>
<td>Statue of Enthroned Demeter Holding Pomegranate</td>
<td>Early Classical style seated female figure holding two round objects with crowns on them (pomegranates?).</td>
<td>Athens, Greece</td>
<td>c. 480 B.C.E.</td>
<td>Muthmann, <em>Der Granatapfel</em>, 68</td>
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<tr>
<td>Marble Relief Including Woman w/ Pomegranate</td>
<td>Marble relief with two archaic style enthroned female figures on either side facing each other. Three smaller human figures are lined up facing the enthroned figure on the right who holds a pomegranate in her left hand.</td>
<td>Xanthos</td>
<td>c. 480 B.C.E.</td>
<td>Muthmann, <em>Der Granatapfel</em>, 74</td>
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<tr>
<td>Vase Depicting Athena w/ Pomegranate</td>
<td>Lekythos vase depicting the bust of a goddess (presumably Athena) holding up a pomegranate in her hand.</td>
<td>Athens, Greece</td>
<td>c. 480 B.C.E.</td>
<td>Muthmann, <em>Der Granatapfel</em>, 64</td>
</tr>
<tr>
<td>Votive Statue of Maiden w/ Pomegranate</td>
<td>Bronze votive statue of a standing female figure holding a pomegranate in her outstretched left hand.</td>
<td>Monteguragazza</td>
<td>c. 470 B.C.E.</td>
<td>Muthmann, Der Granatapfel, 94</td>
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<tr>
<td>Statue of Enthroned Demeter Holding Pomegranate</td>
<td>Terracotta archaic style enthroned female figure with her right arm across her chest and a pomegranate form in her right hand.</td>
<td>Syracuse</td>
<td>c. 470 B.C.E.</td>
<td>Muthmann, Der Granatapfel, 69</td>
</tr>
<tr>
<td>Terracotta Image of Hera</td>
<td>Classical style figure of an enthroned female holding a pomegranate in her outstretched right hand.</td>
<td>Paestum</td>
<td>c. 470 B.C.E.</td>
<td>Muthmann, Der Granatapfel, 54</td>
</tr>
<tr>
<td>Mirror Stand</td>
<td>Executed in the Classical style, this marble bust depicts a woman holding her arms across her chest. In her left hand she holds something that appears to be a pomegranate.</td>
<td>Locri</td>
<td>c. 460 B.C.E.</td>
<td>Muthmann, Der Granatapfel, 44</td>
</tr>
<tr>
<td>Bust of Woman with Pomegranate</td>
<td>Terracotta archaic/ early Classical style enthroned female figure with her right arm across her abdomen and a pomegranate form in her right hand.</td>
<td>Selinunte</td>
<td>c. 460 B.C.E.</td>
<td>Muthmann, Der Granatapfel, 70</td>
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<tr>
<td>Statue of Enthroned Demeter Holding Pomegranate</td>
<td>Marble stela in the archaic style with a woman holding a round object (pomegranate?) in her left hand.</td>
<td>Bootien</td>
<td>c. 450 B.C.E.</td>
<td>Muthmann, Der Granatapfel, 84</td>
</tr>
<tr>
<td>&quot;Amphotto&quot; Stela</td>
<td>Terracotta horse-figure with splayed legs and trays (panniers?) along its sides with eight pomegranate shapes on each tray.</td>
<td>Bootien</td>
<td>Mid-5th C. B.C.E.</td>
<td>Muthmann, Der Granatapfel, 59</td>
</tr>
<tr>
<td>Wall Painting w/ Pomegranate (Geometric Design in Background)</td>
<td>A wall painting with two women depicted with their hands in the air near their hair (grieving?) and two pomegranates suspended from the upper border. There are vase-shaped figures in the background with geometric design.</td>
<td>Paestum</td>
<td>Mid-4th C. B.C.E.</td>
<td>Muthmann, Der Granatapfel, 88</td>
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<tr>
<td>Wall Painting w/ Pomegranate</td>
<td>Wall painting of a seated man facing the viewer and a female figure facing him holding a vase decorated with a geometric design. One pomegranate sits on the rim of the vase while two others fly through the air.</td>
<td>Cumae</td>
<td>Mid-4th C. B.C.E.</td>
<td>Muthmann, Der Granatapfel, 89</td>
</tr>
<tr>
<td>Artifact Type</td>
<td>Description</td>
<td>Location</td>
<td>Date Range</td>
<td>Source</td>
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<tr>
<td>Wall Painting w/ Pomegranate</td>
<td>Wall painting of a table upon which there are three vases (the central one with a bird-head top). Under the table is a pomegranate sitting on the border.</td>
<td>Paestum</td>
<td>Mid- 4th C. B.C.E.</td>
<td>Muthmann, Der Granatapfel, 87</td>
</tr>
<tr>
<td>Wall Painting w/ Pomegranate</td>
<td>The painting depicts a series of scenes in which couples appear to be engaged in sexual activities. In one scene there is a table placed next to the couch where the couple is reclining. Upon that table are two pomegranates.</td>
<td>Campania</td>
<td>4th C. B.C.E.</td>
<td>Muthmann, Der Granatapfel, 51</td>
</tr>
<tr>
<td>Plate w/ Image of Orestes and Elektra at Agamemnon's Grave</td>
<td>The figures of Orestes and Elektra are standing by the monument above Agamemnon's grave and a pomegranate has been placed at the base of the monument.</td>
<td>Paestum</td>
<td>320-310 B.C.E.</td>
<td>Muthmann, Der Granatapfel, 90</td>
</tr>
<tr>
<td>Hydria w/ Painting Including Pomegranate</td>
<td>Hydria with a scene in which four women surround a warrior figure with various offerings for him. The upper left female figure profers a tray upon which there are four objects the shape of a pomegranate.</td>
<td></td>
<td>4th C. B.C.E.</td>
<td>Muthmann, Der Granatapfel, 92</td>
</tr>
<tr>
<td>Lekythos w/ Image of Elektra at Agamemnon's Grave (Pomegranate at Grave)</td>
<td>Elektra is seated on the monument above Agamemnon's grave and a pomegranate has been placed upon the base of that monument.</td>
<td></td>
<td>4th C. B.C.E.</td>
<td>Muthmann, Der Granatapfel, 91</td>
</tr>
<tr>
<td>Wall Painting w/ Aphrodite, Eros, and Peitho</td>
<td>This painting shows Athrodie's servant placing a veil over the crown the goddess is wearing. The decorations on the top of the crown are pomegranates.</td>
<td>Rome, Villa Farnesina</td>
<td>c. 20 B.C.E.</td>
<td>Muthmann, Der Granatapfel, 46</td>
</tr>
<tr>
<td>Bronze mirror</td>
<td>The back of the mirror has extensive decoration, but the significant figure is a seated female on the far right of the top register (of two). The scepter she holds is topped by a pomegranate shape.</td>
<td>Vulci</td>
<td>c. 300 B.C.E.</td>
<td>Muthmann, Der Granatapfel, 45</td>
</tr>
<tr>
<td>Caffarelli Sarcophagus</td>
<td>Elaborate marble garland decorated with ribbons, grapes, and pomegranates, suspended from two bull heads.</td>
<td></td>
<td>1st C. C.E.</td>
<td>Muthmann, Der Granatapfel, 105</td>
</tr>
<tr>
<td>Altar of Julia Panthea</td>
<td>Altar with a semi-circular garland of fruits and leaves including pomegranates.</td>
<td>Rome</td>
<td>Mid- 1st C. C.E.</td>
<td>Muthmann, Der Granatapfel, 108</td>
</tr>
<tr>
<td>Round Marble Monument</td>
<td>Round monument decorated with a harp and a garland of fruits and leaves around the center, including pomegranate.</td>
<td>Veii</td>
<td>40-50 C.E.</td>
<td>Muthmann, Der Granatapfel, 108</td>
</tr>
<tr>
<td>Type of Representation</td>
<td>Description</td>
<td>Location</td>
<td>Date</td>
<td>Source</td>
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<tr>
<td>Wall Painting w/ Pomegranate</td>
<td>Pomegranate flower and fruit design on the wall</td>
<td>Pompeii, lararium of House 1.xiii.12</td>
<td>69-79 C.E.</td>
<td>Jashemski, <em>The Natural History of Pompeii</em>, 153</td>
</tr>
<tr>
<td>Wall Painting w/ Pomegranate</td>
<td>Fruit basket including pomegranate</td>
<td>Pompeii, House of the Vettii</td>
<td>69-79 C.E.</td>
<td>Jashemski, <em>The Natural History of Pompeii</em>, 153</td>
</tr>
<tr>
<td>Wall Painting w/ Pomegranate</td>
<td>Image of a gallinule (bird) eating pomegranate</td>
<td>Pompeii, House of the Little Fountain</td>
<td>69-79 C.E.</td>
<td>Jashemski, <em>The Natural History of Pompeii</em>, 153</td>
</tr>
<tr>
<td>Wall Paintings w/ Pomegranate</td>
<td>Numerous wall paintings with pomegranate in them throughout Pompeii</td>
<td>Pompeii</td>
<td>69-79 C.E.</td>
<td>Jashemski, <em>The Natural History of Pompeii</em>, 153</td>
</tr>
<tr>
<td>Carbonized pomegranates</td>
<td>Over a ton of pomegranate found carbonized and preserved between layers of hay in the Villa Rustica at Oplontis</td>
<td>Pompeii</td>
<td>69-79 C.E.</td>
<td>Jashemski, <em>The Natural History of Pompeii</em>, 153</td>
</tr>
<tr>
<td>Wall Painting Including Fruit Basket w/ Pomegranate</td>
<td>Image of a centaur kissing the hand of a maiden over a small basket of fruit among which are a number of pomegranates.</td>
<td>Pompeii</td>
<td>69-79 C.E.</td>
<td>Muthmann, <em>Der Granatapfel</em>, 63</td>
</tr>
<tr>
<td>Wall Painting of Fruit Basket w/ Pomegranate</td>
<td>Elaborate painting of a glass bowl in which there are many fruits including pomegranates. There is one open pomegranate on the table showing seeds.</td>
<td>Pompeii, House of Julia Felix</td>
<td>69-79 C.E.</td>
<td>Muthmann, <em>Der Granatapfel</em>, 100</td>
</tr>
<tr>
<td>Wall Painting w/ Aphrodite and Adonis</td>
<td>A scene in which Aphrodite reclines upon Adonis surrounded by smaller figures (Cupids?). One of the figures is leaning over a wall upon which there are a number of pomegranates.</td>
<td>Pompeii, House of Julia Felix</td>
<td>69-79 C.E.</td>
<td>Muthmann, <em>Der Granatapfel</em>, 103</td>
</tr>
<tr>
<td>Marble Frieze w/ Pomegranate Garland</td>
<td>The marble garland suspended between two marble bull heads is composed entirely of pomegranate shapes.</td>
<td>Rome, Hadrian's Mausoleum</td>
<td>135-139 C.E.</td>
<td>Muthmann, <em>Der Granatapfel</em>, 110</td>
</tr>
<tr>
<td><strong>Item</strong></td>
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<tr>
<td>16 Gate and Leg Combination Seals</td>
<td>Unknown</td>
<td>Minoan Period (Specific Time Unknown)</td>
<td>Reich, &quot;Twelve New Bronze and Iron Age Seals,&quot; 167</td>
<td></td>
</tr>
<tr>
<td>Inscribed Tablets w/ Silphium Signs</td>
<td>Knossos, Crete in Hieroglyphic Deposits</td>
<td>Minoan Period (Specific Time Unknown)</td>
<td>Fabbricotti, &quot;Silphium in Ancient Art,&quot; 27</td>
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<tr>
<td>Arkesilas Cup</td>
<td>Cyrene</td>
<td>c. 560 B.C.E.</td>
<td>Schaus, &quot;Two notes on Lakonian Vases,&quot; 88</td>
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<tr>
<td>Statuette of goddess-figure with silphium and sickle</td>
<td>Athens, the Northern Slopes of the Acropolis</td>
<td>5th Century B.C.E.</td>
<td>Fabbricotti, &quot;Silphium in Ancient Art,&quot; 27</td>
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<tr>
<td>Tetradrachm Coin w/ Silphium Design</td>
<td>Cyrene</td>
<td>C. 480 B.C.E.</td>
<td>Price, &quot;Recent Acquisitions of Coins by the British Museum,&quot; 1</td>
<td></td>
</tr>
<tr>
<td>Tetradrachm Coin w/ Silphium Design</td>
<td>Cyrene</td>
<td>Late 4th Century B.C.E.</td>
<td>Kroll, &quot;Greek Coins,&quot; 311</td>
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</tr>
<tr>
<td>Column (Silphium Leaves Engraved?)</td>
<td>Delphi</td>
<td>C. 400-373 B.C.E.</td>
<td>Elderkin, &quot;The Akanthos Column at Delphi,&quot; 374</td>
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## Archaeological Evidence of Silphium

<table>
<thead>
<tr>
<th>Coin Description</th>
<th>Location</th>
<th>Date Range</th>
<th>Source</th>
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<tr>
<td>Wall painting images</td>
<td>Sir Arthur Evans discovered an image in which a blue monkey is gathering saffron.</td>
<td>Knossos, Crete</td>
<td>2000-1550 B.C.E.</td>
</tr>
<tr>
<td>Two Gold Pins</td>
<td>Gold pins with crocus - shaped images on the heads.</td>
<td>Mochlos, Crete, Grave</td>
<td>2000-1550 B.C.E.</td>
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<tr>
<td>Silver Pin</td>
<td>Silver pin with crocus - shaped images on the head.</td>
<td>Mavro Spelio, Grave</td>
<td>2000-1550 B.C.E.</td>
</tr>
<tr>
<td>Wall painting images</td>
<td>Uncovered by Marinatos, these paintings show scenes in which women gather saffron or offer saffron to a seated female.</td>
<td>Akrotiri, Thera/Santorini, Xeste 3 (ritual building?)</td>
<td>c. 1650 B.C.E.</td>
</tr>
<tr>
<td>Linear B Tablet (mentions saffron?)</td>
<td>Tablet uncovered by Sir Arthur Evans with a word inscribed upon it that possibly means 'saffron.'</td>
<td>Crete</td>
<td>Between 1500 and 1100 B.C.E.</td>
</tr>
</tbody>
</table>
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