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# An Abridged History of The Orange

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AN ABRIDGED HISTORY OF THE ORANGE

A Thesis

Presented to

The Department of Interdisciplinary Studies

San José State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

Robert Aho

December 2010

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The Designated Thesis Committee Approves the Thesis Titled

AN ABRIDGED HISTORY OF THE ORANGE

by

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APPROVED FOR THE DEPARTMENT OF INTERDISCIPLINARY STUDIES

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December 2010

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## ABSTRACT

### AN ABRIDGED HISTORY OF THE ORANGE

by Robert Aho

The orange is more than a fruit that one can purchase at a supermarket or pick from the tree in the yard. The fruit started as an object of exoticism. It was later transformed into a symbol of purity. Eventually the orange became a vehicle for humanity to demonstrate its mastery over nature. In modern society, oranges are the foundation of enterprises, ones that sustain entire regions of the world. This thesis presents a series of essays, each using aspects of art history and geography, to describe the history of the orange. The digital portion of this essay uses Google Maps™ to present the diffusion of the orange in an interactive environment. The intention of this thesis is to introduce the discipline of art history to geographers, to do the same with geography to art historians, and to introduce both disciplines to the lay audience. It is hoped that the combination of the two disciplines provides a more complete picture of the remarkable history of the orange.

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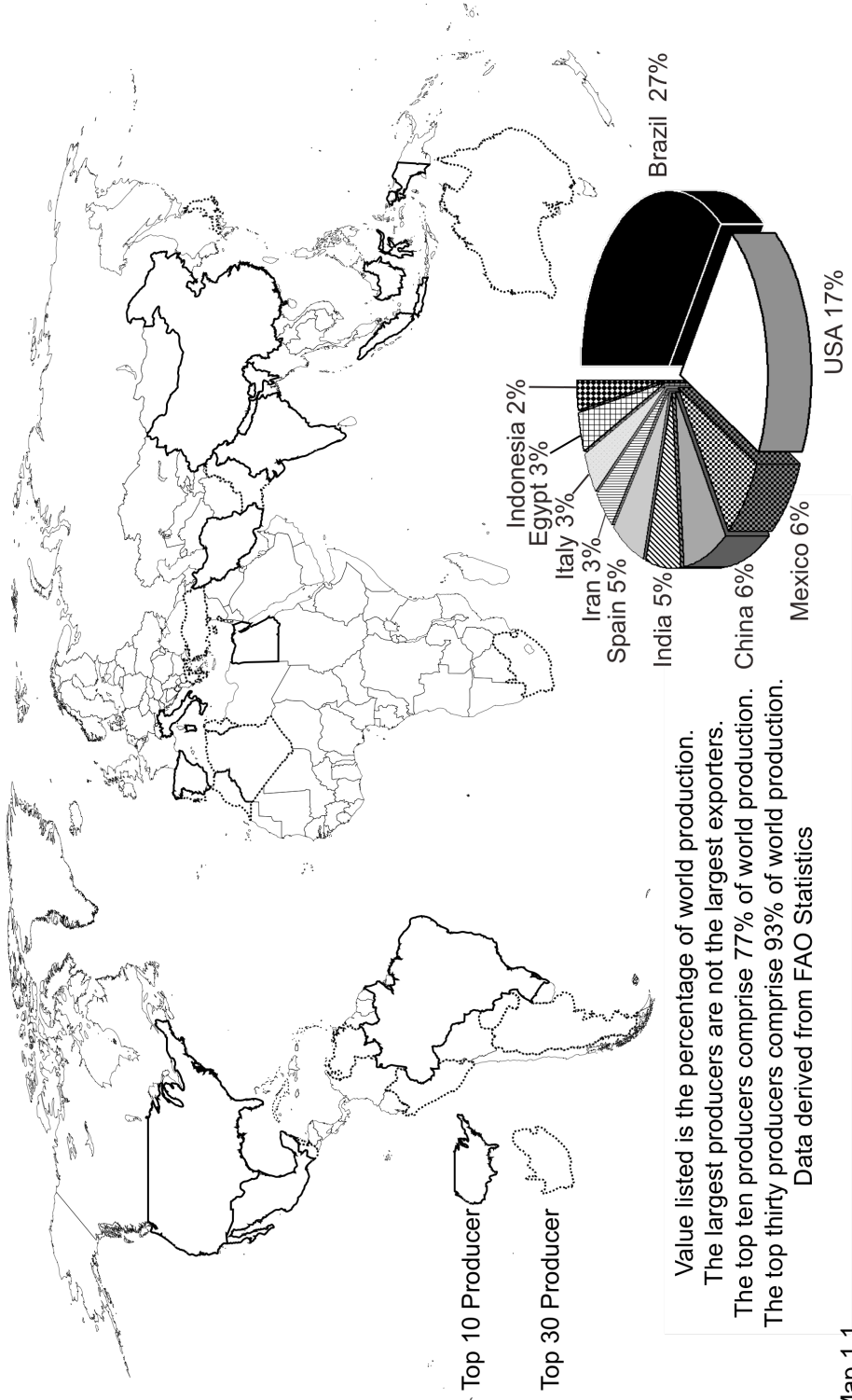
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## CHAPTER ONE: INTRODUCTION

The orange is more than a fruit that one can purchase at a supermarket or pick from the tree in the yard. The fruit started as an object of exoticism.<sup>1</sup> It was later transformed into a symbol of purity.<sup>2</sup> Eventually, the orange became a vehicle for humanity to demonstrate its mastery over nature.<sup>3</sup> As oranges became widely available, they became signifiers of both low class<sup>4</sup> and of elite status.<sup>5</sup> When the orange reached the New World, it evolved from a rare addition in the diet,<sup>6</sup> to the fruit of the gentleman farmer,<sup>7</sup> and finally to being the foundation of enterprises that sustain entire regions<sup>8</sup> (Map 1.1). What aspects in the fruit contributed to its diffusion? How did its eventual dominance in the market come to be? To address these questions, a series of essays is presented that describes the diffusion of the orange. Two disciplines, geography and art history, are brought together to examine the topic from different angles to produce a document that is broad while including essential details. Both paper and digital media are employed with the intent of comparing the traditional methodology to the new techniques that modern technology allows.

The discussion starts with the topics of botany and climate, as these subjects inherently build the foundation for the other subjects. Both factors are elemental to the topic and, for that reason, are given this prominent place. The intent is to describe how a subtropical plant, restricted in its range, came to the places where it thrives today. The third chapter shifts the discussion to the orange as a symbol. This was chosen because of the overlap of the subject

The Top Orange Producers 2000 to 2005



Top 10 Producer

Top 30 Producer

Value listed is the percentage of world production.  
 The largest producers are not the largest exporters.  
 The top ten producers comprise 77% of world production.  
 The top thirty producers comprise 93% of world production.  
 Data derived from FAO Statistics

Map 1.1

between the two disciplines. The early groves did more than provide food; they were sacred sites and manifestations of prestige.<sup>9</sup> Those aspects were fundamental in the diffusion of orange cultivation.

Chapters four and five discuss the orange tree within the subjects of agriculture and gardens. It will be argued that gardens are more than places of leisure or aesthetic repose; the essay will show that gardens are hallmarks of civilization. The orange tree is indicative of that position because commercial citriculture demands the budding and grafting of trees. These agricultural practices require deft manipulation combined with an intimate knowledge of botany; these are talents that were developed in antiquity and refined over the centuries.<sup>10</sup> It was the application of those skills that allowed the orange tree to migrate from the pleasure gardens and sacred groves into the commercial enterprises of today. However, it must be recognized that the progression was not a planned route; it appeared organically. Furthermore, the participants spanned the entire social spectrum. That broad involvement within society makes the subject appealing.

Chapters six and seven turn to the subject of food, in which it will be shown that there is more to an orange than meets the eye. Although the fruit is not overly perishable, it is not particularly durable. Another characteristic is that it is relatively heavy. Due to these limitations, the commercial distribution of oranges in the United States, and elsewhere, was limited to sea-lanes, and restricted to the ports where the cargo had landed. This practice continued until

the late nineteenth century when trains connected the coasts.<sup>11</sup> Although the taste appeal of oranges figured significantly in the marketplace, the biggest change came about with the introduction of the technology for frozen concentrated orange juice.<sup>12</sup> The digital portion of these essays has a section that uses the service, *Google Maps*, to discuss the modern marketplace.

Nothing in the past predicted today's situation. Oranges currently command the highest dollar value in international trade.<sup>13</sup> Nevertheless, just fifty years ago in the United States, the orange was restricted to seasonal availability, was relatively expensive, and was rarely served as a breakfast drink.<sup>14</sup> In the past the more common role for the orange was as a dessert,<sup>15</sup> or as a special holiday treat given to children.<sup>16</sup> While the orange as a breakfast staple, a lunch box adjunct, and a nutritious snack may seem natural, the reader should appreciate that this situation is an exceptionally modern one.

## LITERATURE REVIEW

When considering the literature on the orange tree, an appropriate place to start is in the subject of agricultural history. Despite its 1938 publication date, *Hesperides*,<sup>17</sup> by Samuel Tolpowsky, remains a pre-eminent resource on the history of citrus cultivation. In an exhaustive examination, he traces citriculture from its first mention in the *Book of Odes* sixth century BCE China,<sup>18</sup> to his contemporary twentieth century. Especially valuable is the discussion of Mediterranean cultivation under Islamic purview. Although it is a secondary source, Tolpowsky drew from an extensive array of material and his scope is

unparalleled in the modern literature. His work remains widely cited and many scholars recognize him as authoritative.

Andrew Watson's *Agricultural Innovation in the Early Islamic World* is another useful reference in agricultural history.<sup>19</sup> In it, he provides insight to the context in which the earliest citrus production occurred in the Mediterranean Basin. He credits the broader dispersal of citrus as being facilitated by the production of agricultural manuscripts and standardization of techniques. His argument that the urban environments created the demand and that the wider variety of products prompted the markets to grow is forceful and well supported.<sup>20</sup> One drawback of the text is that Watson does not examine why sweet oranges were not imported; he focuses solely on the citrus that appeared. Nonetheless, his explanation that the value of sour oranges lay in their use as a drink with subsequent reuse of the discarded rind provides justification why that citrus fruit was a cash crop and not just as a component in an ornamental garden.<sup>21</sup> Another source, Karl Butzer, disagrees with Watson that a revolution occurred.<sup>22</sup> Butzer argues that the change was evolutionary, contending that the changes in agriculture were simply a continuation of the previous technology and methodology.<sup>23</sup> Nevertheless, Butzer agrees with Watson that Islamic arborists were responsible for introducing citrus to the Mediterranean, and that those trees were often central to their irrigation projects.<sup>24</sup>

Two editions of *The Citrus Industry* were consulted.<sup>25</sup> The book is an all-encompassing tome that discusses everything from the historical roots of the

citrus industry<sup>26</sup> to the differences in the genomic sequences.<sup>27</sup> As a publication by the University of California, it devotes a chapter to the history of citrus and citrus research in the state.<sup>28</sup> Since the California experience is a relatively modern phenomenon, the amount and the accuracy of the data are exceptional. The authors are universally respected for their thoroughness and veracity. Walter Ebeling's *The Fruited Plain*,<sup>29</sup> also published by UC Press, covers the broader topic of agriculture in the United States, but also devotes a chapter to California.<sup>30</sup> The coverage of the immigrant populations and their role in citrus cultivation is especially interesting. *Orange Empire: California and the Fruits of Eden*<sup>31</sup> by Douglas Sackman is an authoritative history of the Southern California Fruit Exchange, the agricultural cooperative known as Sunkist, and demonstrates the usefulness of including business history to geographic studies.<sup>32</sup> An exceptional text is *Odyssey of the Orange in China*<sup>33</sup> by William Cooper, a biologist who can discern and describe the abundant *kan* varieties.<sup>34</sup> The intention of the book is to make the argument that the hearth of the orange lies in China.<sup>35</sup> One particularly interesting fact the book reveals is the role of politics in modern orange cultivation. Mao Zedong had numerous groves eradicated during the Cultural Revolution, which explains the unusually low production of the sixties and seventies.<sup>36</sup> The subsequent revival of those trees by Deng Xiaoping accounts for the recent dramatic increase in Chinese production.<sup>37</sup>

Those texts are cited to lay the foundation in agricultural history. Adding to that collection are numerous journal articles. The article by Ranier Scora, "On



the History and Origin of Citrus,"<sup>38</sup> is a readily accessible reference in the current literature on that subject. His conjecture that the citron, the mandarin, and the pomelo are the base from which all other citrus springs has held true so far.<sup>39</sup> Another article, "Influences of Climate on the Cultivation of Citrus Fruits"<sup>40</sup> was published in *Geographic Review* about the same time as *Hesperides*. This fact is mentioned because the author, Edward Ackerman, provided a comprehensive review of the role of climate in citriculture. That is a subject that Tolkowsky neglected to address. Two authors, Alfred Andrews and Erich Isaac, address the role of religion, specifically Judaism, in the diffusion of citrus. Andrews sets out to correct an error he perceives in Tolkowsky's conclusions on the introduction of citron,<sup>41</sup> while Isaac's goal was to amplify the connection between religion and the diffusion of citrus fruits.<sup>42</sup> Isaac concluded that the citron's ancient presence in Southwest Asia provided an example that aided the subsequent diffusion of citrus.<sup>43</sup> Both serve to cement the status of Tolkowsky's scholarship. Sibhi Labib's "Capitalism in Medieval Islam"<sup>44</sup> in *Economic History* remains a well-respected reference on the subject and contributes valuable details to the market structure during the introduction of oranges. Starting in the 1930s, geographic journals such as *Economic Geography* and *Geographic Review* published numerous articles on the topic of oranges and citrus.<sup>45</sup>

Two texts that do not solely discuss agriculture deserve special mention. Fernand Braudel's three-volume opus magnum, *Civilization & Capitalism, 15<sup>th</sup>-18<sup>th</sup> Century*,<sup>46</sup> was consulted extensively during the production of this thesis.

The other one, *History of Private Life*,<sup>47</sup> which is another a multi-volume set, also proved to be a useful reference. Although neither text is extensively cited, both provide the context to the historical scene and the framework for the other cited texts.

A working knowledge in botany and industry is beneficial to comprehend fully the subject. *Citrus: The Genus Citrus* is an extensive modern reference.<sup>48</sup> Although the bulk of this text deals with biochemistry, its introductory chapters on history, botany, and cultivation practices are informative and easily understood by a lay audience. Valuable insights can be gleaned from the discussions on juice extraction, essential oils, and citrus byproducts. Julie Morton's *Fruits of Warm Climates* is an impressive reference for subtropical and tropical fruits.<sup>49</sup> Morton covers all aspects of cultivation and use, from detailing the water and temperature requirements of the tree to revealing the interesting flavor combination of sour oranges and chili-paste enjoyed in Mexico.<sup>50</sup> The orange is included, and discussed in detail, in Daniel Browne's 1846 text *The Trees of America: Native and Foreign*.<sup>51</sup> Despite the title, the book does not restrict itself to the United States and North America. The author also discusses European geography and the available varieties from the continent. Noteworthy in this text is the remark that to bring *Bahia*, a.k.a., *umbigio* or navel, oranges from Brazil, they must be picked while green and gathered into a suspended net for transportation.<sup>52</sup> Obviously the author did not know that the oranges were indeed ripe. As will be discussed later, the color of the rind, whether orange or

green, is not a good indicator of the ripeness of the fruit pulp. Browne's coverage of cultivation and agricultural practices highlight the longevity of advanced budding and grafting techniques. The tools and techniques he illustrated are both still in use and are described by Pliny in *Natural Histories*.<sup>53</sup> This technology and methodology is pertinent because oranges arrived in an environment where the population had perfected these practices and techniques and their use was prevalent. Where seed culture is the norm for field crops, we should be aware that orchards and groves demand a different set of skills.

The garden spans geography and art history, so it is natural for this subject to be included. Christopher Thacker's *The History of Gardens*<sup>54</sup> is a foundational work in this subject. He takes a chronological and cultural approach in his survey of the subject. His opening argument, that the first garden was not made but that it was found, blurs the line between art and nature and exemplifies the bond between art and science in this topic.<sup>55</sup> The text concentrates on the plans of the gardens and compositional elements. Thacker is especially good at describing how the garden evolved from a personal refuge to a political stage. A much earlier work by Ellen Churchill Semple in *Geographic Review* "Ancient Mediterranean Pleasure Gardens"<sup>56</sup> is similar in that it connects the kitchen garden and orchard to their later role as the sanctuary for the royal and the elite.<sup>57</sup> The discussion is comprehensive and thorough. Another survey text, *The Quest for Paradise*<sup>58</sup> by Ronald King covers much of the same material as Thacker. King echoes Tolkowsky that the planting of the Patio de las Naranjas

was part of the expansion of the great mosque, and that the courtyard grove was a mimesis of the interior.<sup>59</sup> On that topic, D. Fairchild Ruggles is a notable authority for the Islamic garden and her *Gardens, Landscape, and Vision in the Palaces of Islamic Spain*,<sup>60</sup> was invaluable in explaining the nexus of science and culture that were these sites. Surprisingly, the topic of orangeries is neglected; the best work is *Orangeries: Palaces of Glass: Their History and Development*, which was written by Sylvia and Michel Saudan.<sup>61</sup> Richly illustrated, it provides a directed study of the major monuments on both the European continent and in Britain. An especially useful feature of this work is the inclusion of the dates for construction of numerous sites. These sites are featured in the on-line map in the digital portion of this work. Billie Britz concisely outlines the architectural features used for climate adaptation in Europe,<sup>62</sup> and in another work describes the construction of orangeries in colonial America.<sup>63</sup> In his article, "Renaissance Gardens and the Discovery of Paradise,"<sup>64</sup> Terry Comito devotes ample discussion to the symbolic nature of the orange. He focuses on the diffusion of the idea of the paradise garden, and describes how the occupation of the Italian peninsula by various military forces had an unintended consequence. The kings and dukes who led the armies made the palace grounds their headquarters, and their appreciation of that particular luxury led to the establishment of many gardens in Europe.<sup>65</sup> Finally, the orangery of Versailles is prominently featured in three guides, the most notable one being the guide that was written by Louis XIV of France.<sup>66</sup>

Any discussion of oranges must address its role as a food item. However, food in itself is a broad subject, and a foundation in the topic must be laid before focusing on a particular item. *Food: A Culinary History from Antiquity to the Present*<sup>67</sup> is a first-rate compendium in the finest European tradition. Although *Food in History* by Reay Tannahill is published by the popular press,<sup>68</sup> it is extensively referenced and footnoted, and has proven to be a reliable reference. Its broadly descriptive nature complements the earlier focused agricultural history. Linda Civitello's *Cuisine and Culture: A History of Food & People*<sup>69</sup> follows the same path of popular press and broad perspective. Interestingly, she identifies economic influences that were overlooked in other references.<sup>70</sup> *Food & Nutrition: Customs and Culture*<sup>71</sup> by Paul Fieldhouse is a useful text for understanding the anthropological perspective of food. It is particularly helpful in analyzing the niches occupied by the orange in various diets. The text by Fredrick Simoons, *Food in China*,<sup>72</sup> is authoritative and expansive. The feature that makes it stand out from other material is that it also contains descriptions of the storage techniques.<sup>73</sup> The practices that Simoons describe date to the inception of citriculture in China; so this book provides a thread that reaches back the origin of citrus cultivation. Phyllis Pray Bober, in *Art Culture and Cuisine*,<sup>74</sup> discusses the gastronomy of Europe from antiquity to the medieval era. Although oranges and citrus rarely appear, the text provides a framework for understanding the evolution of the culinary arts. Om Prakash, in *Food and Drinks in Ancient India*,<sup>75</sup> serves a similar purpose of building a framework for

the understanding the development of cuisine. The author does not differentiate between sweet and sour oranges when assigning their introduction to the advent of the Common Era.<sup>76</sup> The survey text, *You Eat What You Are*,<sup>77</sup> by Thelma Barer-Stein supplies precise contemporary food information on local fare in numerous countries. *Food in Global History* is part of a global history series and contains essays the span these broad topics.<sup>78</sup> The editor's four-fold approach<sup>79</sup> was unwittingly followed when the outline for these essays was conceived. An unconventional source is the collection of articles in the journal *Good Housekeeping*. Compiled in 1894, it is notable for the quote: "[o]ranges...once considered a luxury, ought to henceforth be regarded as a standard article of diet."<sup>80</sup> This statement, made on the eve of two major freeze events in Florida in December 1894 and February 1895, did not foresee the removal of 6 million boxes of oranges from the marketplace.<sup>81</sup> Nevertheless, the statement reveals the rapidity in the growth of citrus as an industry, and its influence on the American diet.<sup>82</sup> In a similar manner, world production of citrus has nearly doubled over past 30 years as statistics from the UN Food and Agricultural Organization and other government sources reveal.<sup>83</sup>

The United States, and particularly California, has a notable place in the history of the orange. To that, citriculture, specifically the cultivation of oranges, was featured prominently in travel memoirs of those who visited California between 1849 and 1900. The Library of Congress maintains a web site devoted to the first person narratives published during this time.<sup>84</sup> In that substantial

collection, one can find Charles Nordhoff's *California: For Health, Pleasure, and Residence*.<sup>85</sup> This book is exemplary of the carnival barker's art that was so commonly employed in that genre.<sup>86</sup> Cited as the impetus for bringing in many of the new citrus farmers,<sup>87</sup> it is, as its title implies, a book that outlines the advantages of life in California. The chapter on citriculture describes it as the profession of the gentleman farmer, and implies that it leads to a life of ease and of wealth. Ludwig Salvator's text, *Blume aus dem goldenen Lande*, is especially fascinating because of its 1878 publication in Prague.<sup>88</sup> The son of the Duke of Tuscany, the author arrived in Los Angeles shortly after direct rail service was established. The first portions of his book read like a geography text, he provides numerous statistics that are surprisingly focused. As it continues, he provides pertinent for the day travel information and directions. The depth and breadth in the presentation of material indicates the author intended it for an especially astute audience. These two works describe California as a land of limitless opportunity, with citriculture at the center of wealth. Such enticements were not limited to private sector; the Los Angeles Chamber of Commerce published a text that extolled the opportunity in citriculture.<sup>89</sup> The Library of Congress also hosts the papers of George Washington,<sup>90</sup> in which are his requests for oranges, orange trees, and the plans for an orangery.<sup>91</sup> Washington later built an orangery on Mount Vernon.<sup>92</sup>

Two popular books have covered this topic, *Oranges* by John McPhee,<sup>93</sup> and *Citrus, A History* by Pierre Laszlo.<sup>94</sup> The former touches on the broader

history but concentrates much of the text on the experience in Florida.<sup>95</sup> On the other hand, Laszlo has a broader perspective. His work expands the topic beyond oranges to include all citrus, and discusses it from a global viewpoint. The chapters on symbolism<sup>96</sup> and image<sup>97</sup> provided inspiration for the direction of this work. The art made for orange crates is covered in two books. The first one is by John Salkin and Laurie Gordon and is titled, *California Orange Box Labels*.<sup>98</sup> The second book *California Orange Box Labels: An Illustrated History* was written by Gordon McClelland and Jay Last.<sup>99</sup> While these books are not academic treatises, they are useful for the determining dates of the specimens of that art form. The images of numerous labels themselves are available on-line from two prominent California repositories, the Pomona Public Library<sup>100</sup> and the Riverside Public Library.<sup>101</sup>

## CONCLUSION

The diffusion of oranges was a deliberate act by humankind. While the appeal of this fruit seems universal;<sup>102</sup> we shall see that the initial diffusion relied upon visual aesthetics as much as it depended upon culinary ones. Oranges were brought from the rainforest to be grown in the desert. They were carried over the highlands and through the valleys. Previously reserved for kings,<sup>103</sup> oranges are now commonly served to children. Oranges provide to us an exceptional example of a food item transforming the human and physical geography.



## CHAPTER TWO: DIFFUSION OF THE ORANGE

The diffusion of the orange was dependent upon a number of factors, with climate having primacy. As a subtropical tree, it is restricted to a band around the earth<sup>1</sup> (Map 1.1). This essay introduces the botany of oranges and traces the chronology of the diffusion of oranges. It looks at each place and examines how climate influenced the spread of oranges and the hurdles the planters overcame.

### THE BOTANY AND BIOGEOGRAPHY OF THE ORANGE

The orange, both the tree and the fruit, has fascinating qualities. The tree has particular characteristics that classify it as subtropical vegetation.<sup>2</sup> It requires a long period of warm temperatures to bear a substantial crop and it is moderately frost tender; the trees can incur substantial damage if temperatures fall below 1 °C (34 °F) for extended periods. Interestingly, for the fruit to develop its identifying color, the temperatures must drop near that frost point.<sup>3</sup> Moreover, the rind color is not constant. In subtropical regions, the late ripening varieties, e.g., Valencia oranges, will become green again as they mature on the tree.<sup>4</sup> It grows in variable soil conditions, only demanding that soil be well drained.<sup>5</sup> Its water requirements are modest; oranges flourish in climates with as little as 125mm per year.<sup>6</sup> Given that the tree originated in an area where temperature and precipitation can vary tremendously by season, its affinity for acclimatization is not surprising.<sup>7</sup> These qualities make the tree relatively easy to propagate in various terrestrial locations that meet its temperature demands.

The defining aspect of citrus in general, and oranges in particular, is their means of self-propagation; this occurs in unexpected and unpredictable manners. The conventional wisdom dictates that we expect fruit only to develop after pollination, i.e., through zygotic propagation. That is not necessary in oranges; indeed the more common means of reproduction is nucellar propagation.<sup>8</sup> In nucellar propagation, the development of the new plant does not come from the fertilized ovum, a zygote, but rather directly from the ovum itself. This happens because an orange routinely undergoes apomixis, the production of seeds without fertilization.<sup>9</sup> This is especially important in both wild and cultivated populations because these seeds are effective clones of the original tree. Furthermore, within the genus, the trees can be pollinated by other kinds of citrus; and unlike many hybrids, these progeny trees are fecund. Even if the orange undergoes zygotic fertilization, the seeds themselves are often polyembryonic, which means that zygotic and nucellar propagation occurs simultaneously.<sup>10</sup> These seeds containing multiple embryos can produce different varieties, a quality that can lead to extreme results. McPhee recounts the efforts of the United States Horticultural Service to isolate a disease-free strain of the Persian Lime. After dissecting nearly two thousand limes and finding no seeds, the scientists went to a processing plant to obtain them. From tens of thousands of limes the plant handled, the scientists only obtained two hundred and fifty seeds. Furthermore from those seeds, only two Persian Limes were propagated. The remainder of the

seeds produced a variety of citrus tree seedlings: sweet and sour oranges, lemons, grapefruit, tangerines, limequats, and citrons.<sup>11</sup>

It is this quality that leads to the hypothesis that the hybridization of the monoembryonic pomelo and polyembryonic mandarin produced the orange.<sup>12</sup> If true, it is an exceptional example of a plant expanding its range and dispersal through natural means. It is certain that the botanical qualities of the orange explain at least a portion of its popularity. The flexibility in acclimation and the reliability in cultivation could have easily been exploited by the earliest arborists. When grown in an isolated environment, the nucellar seeds are reliable germinators. In a heterogeneous setting, the zygotic seeds would yield an assortment of the local pollinators while the subsequent nucellar seedlings would support the propagation of useful hybrids.

Orange cultivation as we know it today is the result of centuries of innovation by humanity, yet the orange itself has not changed considerably.<sup>13</sup> The ancestors of the orange, the pomelo and mandarin, are still in cultivation today, and the wild strains of those ancestors still populate the original range in the Assam Valley, India.<sup>14</sup> The original hybrids were likely acts of nature; the affinity for the genus to cross-pollinate would quickly yield that result.<sup>15</sup> The genius lay in the transformation of the orange grove into a crop; that demanded the application of a range of agricultural techniques and practices. The extensive dispersal of citrus is an artifact from trade and exploration, but the successful cultivation in lands with a climate substantially different than its hearth needed

skilled arborists. Its current range is an attribute of extensive irrigation projects designed to support it.

## THE PRIMACY OF CLIMATE

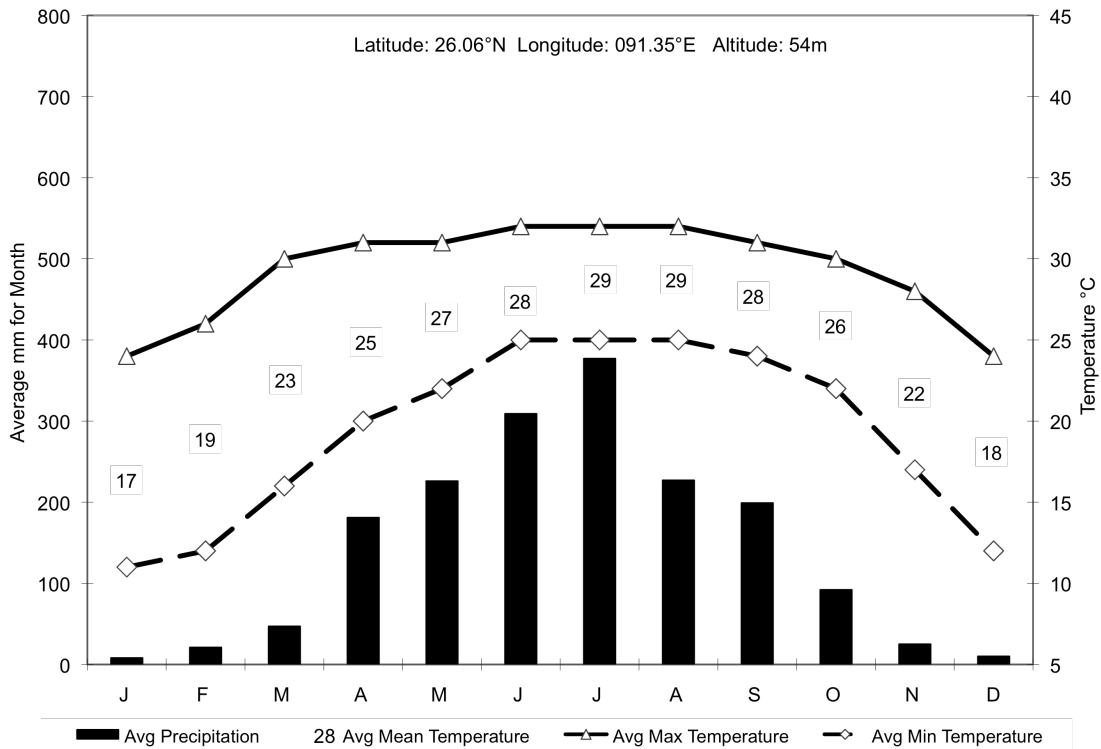


Figure 2.1. Climograph of Guahati, India.

The hearth of the orange is believed to be the Assam valley, which is represented here by the climograph of Guahati, India<sup>16</sup> (figure 2.1). The defining characteristic of this area is the punctuated rainfall brought by the summer monsoon, which is followed by a winter drought. Located in a broad valley, with the immense Himalaya mountain chain to the north, this area is well watered by numerous rivers and streams flowing down the hillsides. These watercourses bring sediment and particulate matter through the area, creating a soil with a strong capillary action. When the deluge during the summer months arrives, it

quickly dissipates through the soil and down the various watercourses, providing the necessary drainage required by the tree. The combination of warm temperatures coinciding with precipitation and cooler ones with drought has the effect of yielding a flavorful fruit with a fine coloration.<sup>17</sup>

The climograph reveals that the average high temperature stays within a restricted range, while the average low temperature varies on a much greater scale. Note that the average high temperatures are of such duration that it allows the fruit to ripen and reach maturity.<sup>18</sup> The minimum lowest average occurs in January and is approximately 11 °C. This temperature change combined with the restricted water induces the tree into dormancy and causes the fruit to develop its characteristic color. The other factor of importance is the wide temperature range during those winter months. The ten-degree difference between the maximum average and the minimum average affects the sugar production in the orange.<sup>19</sup>

The history of cultivation of oranges in the Assam Valley is scanty. However, a strong historical record exists towards the cultivation occurring in Southeast and Southwest China. There, the Chwang people either cultivated citrus fruits, or collected them from wild stands. These fruits were then offered as tribute to the emperor Yü and recorded in the *Shih Ching*.<sup>20</sup> This activity occurred during the Chou dynasty reign, roughly 1027 – 256 BCE. Later writers, most notably Confucius, described it as an ongoing practice. The importance of this activity is highlighted by the appointment of a minister who was tasked to

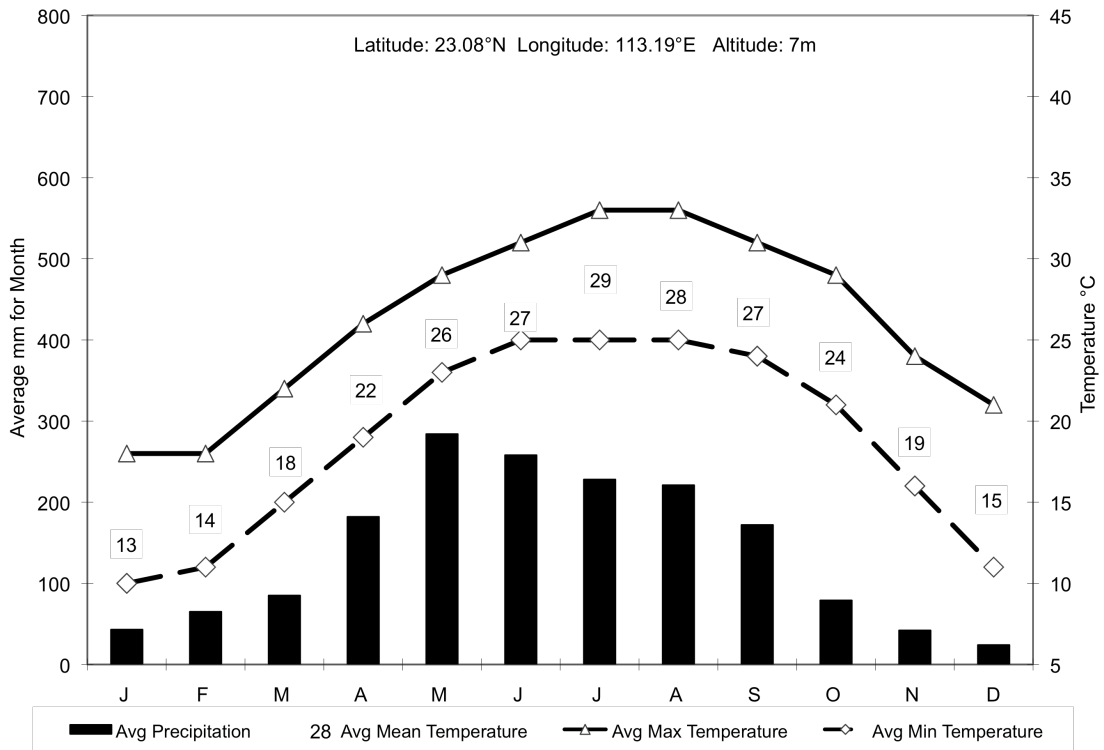


Figure 2.2. Climograph of Guangzhou, China.

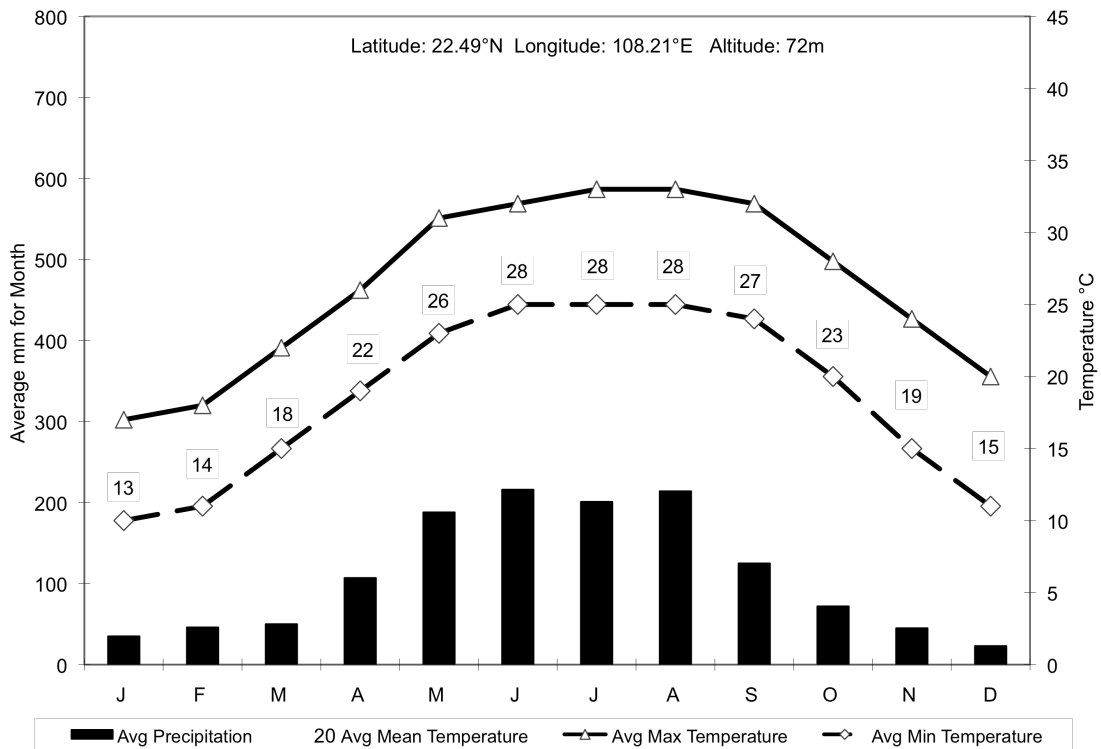


Figure 2.3. Climograph of Nanning, China.

collect the tribute of oranges.<sup>21</sup> From this activity, we can infer that enough citrus was gathered or produced to attract the attention of the ruling class. It also stands to reason that the Chwang produced enough citrus to export to the north. Even if oranges did not attain the status of the essential four in Chinese gardening tradition, the bamboo, plum, pine, and chrysanthemum,<sup>22</sup> it is apparent that the ruling class valued them.

The climates of these regions are similar to the Assam Valley. The climographs for Guangzhou and Nanning (figures 2.2 & 2.3) describe the areas of historical and current cultivation. In these regions, the temperature and the rainfall patterns are similar to that of India. However, it needs to be recognized that the overall volume of precipitation is substantially less. This does not necessarily prevent the dry land farming of citrus, for the rainfall needs are not exceptionally great. However, in order to obtain sufficient crops and for the fruits to develop sufficient juice, then more water is required.<sup>23</sup> Nevertheless, the values in these areas appear to be sufficient to produce a sufficient and palatable crop. These rainfall patterns are important because the diminished amount during the cooler months allows the tree to enter dormancy. Conversely, the increased amount during the growing and fruit set season means the fruit will grow to proper proportion.

The climograph for Kunming (figure 2.4) presents a different picture. Although this area lies within the expected latitude range, the influence of the altitude is dramatic.<sup>24</sup> This region likely represents the upper limit for

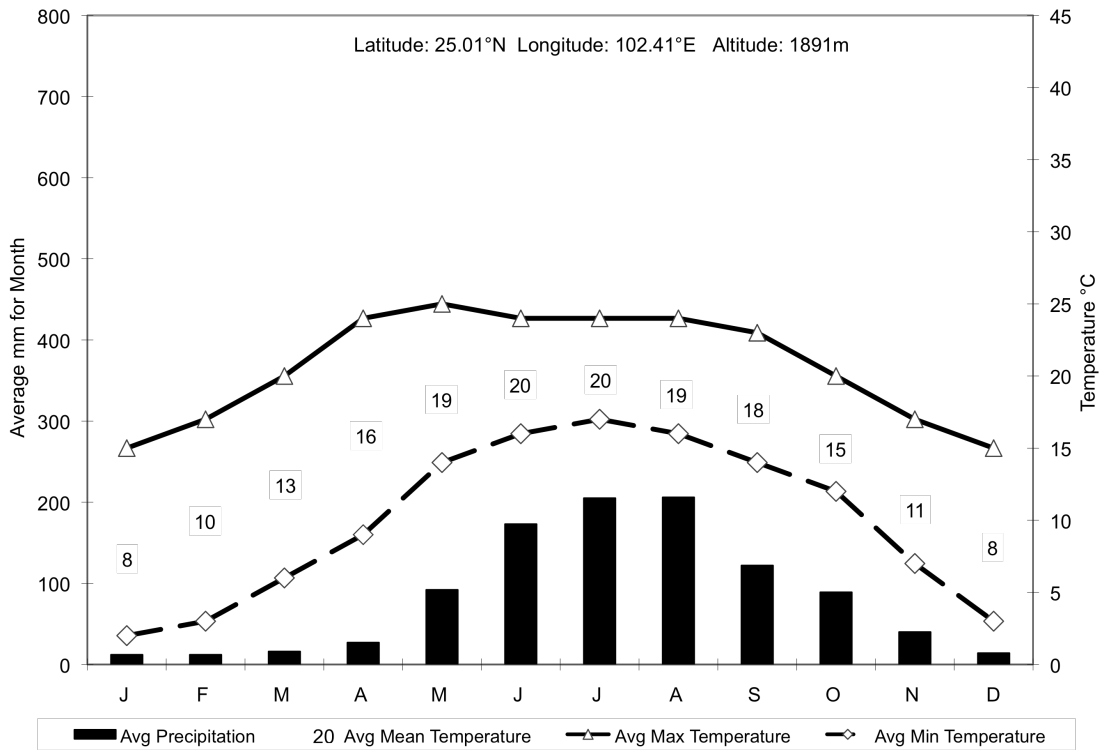


Figure 2.4. Climograph of Kunming, China.

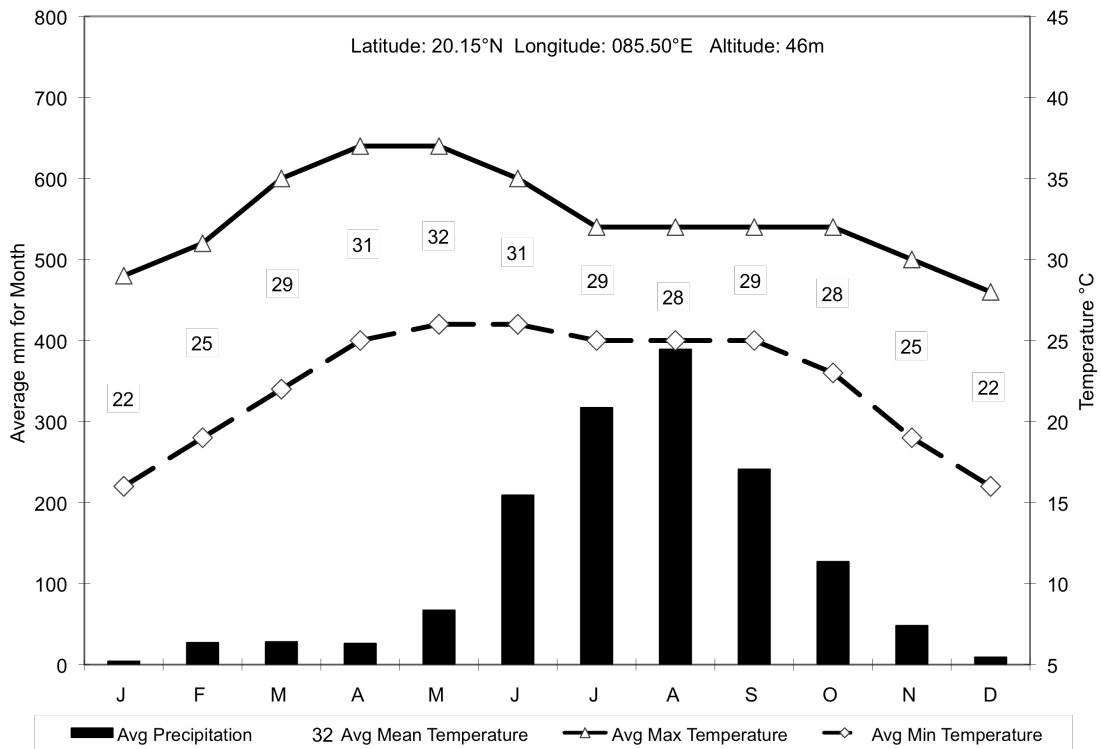


Figure 2.5. Climograph of Bhubaneswar, India.



orange cultivation, and it is likely that only the hardiest of varieties survive here. The lowest temperatures, 3 °C for the month of December and 2 °C for the month of January, are dangerously close to the level where trees would be damaged. It is likely that cultivation in this area is accomplished by placing the trees on hillsides and slopes. This technique is practiced in the Central Valley of California with the intention of allowing the cool air to flow downward, and not remain stagnant around the trees themselves.<sup>25</sup> Employing these placement techniques allows the growers to cultivate these high value crops in areas that would otherwise be suitable for other products. The oranges and mandarins are easily cultivated in the areas discussed so far, as normal rainfall can sustain the groves.<sup>26</sup> The fruit of such trees would be similar in quality and have the same characteristics as those found in the modern marketplace.

Although the hearth of oranges lies in India, they were first cultivated in China. Om Prakash lists the orange arriving in India at the cusp of the Common Era. Unfortunately he does not distinguish between sweet or sour varieties, nor does he describe in which region they were found.<sup>27</sup> He describes their availability as being “common” by 300-400 CE.<sup>28</sup> This raises a question, what level of geographic diffusion yields common status? It is clear that for oranges to diffuse from northeast India and travel along the coast and to western littoral, significant hurdles needed to be overcome.

The climograph of Bhubaneswar, India (figure 2.5) reveals one such barrier. While the rainfall patterns indicate sufficient precipitation, the

temperature range is dramatically different. Despite the nearly 10°C degree downward shift during the winter months, the average low remains above 15°C. This rather warm temperature inhibits sour oranges from developing its distinguishing color.<sup>29</sup> The fruit will ripen normally but the rind will change slowly and revert to a green hue when temperature rises.<sup>30</sup> The shift in precipitation has negligible influence on the fruit quality. The delay in rainfall is only a month and a sufficient amount falls to avoid an extensive "June drop."

Inland from Bhubaneswar is Hyderabad (figure 2.6). The continental position of this region has a pronounced influence on the climate. The region has a warmer high average temperature, a warmer average mean temperature, and a slightly cooler average low temperature. The difference also extends to precipitation patterns, which are, on a whole, much lower as demonstrated by a leveling shift during the months of precipitation. This climatic pattern creates a different obstacle, one that conventional wisdom does not anticipate. Oranges had evolved in a subtropical environment and so adapted to that climatic pattern. When the temperatures exceed 35°C, the sweet orange effectively stops growing.<sup>31</sup> In this region, a tree may stop growing leading to the growth of small fruit that is either overly acid or watery. In this situation, the climate presents a formidable barrier to the diffusion of the orange.

Another problem that may occur is that the relatively warm average high temperatures may yield an orange with an insipid flavor.<sup>32</sup> In regions with a high humidity, oranges grow to a substantial size; however, it also means the trees do

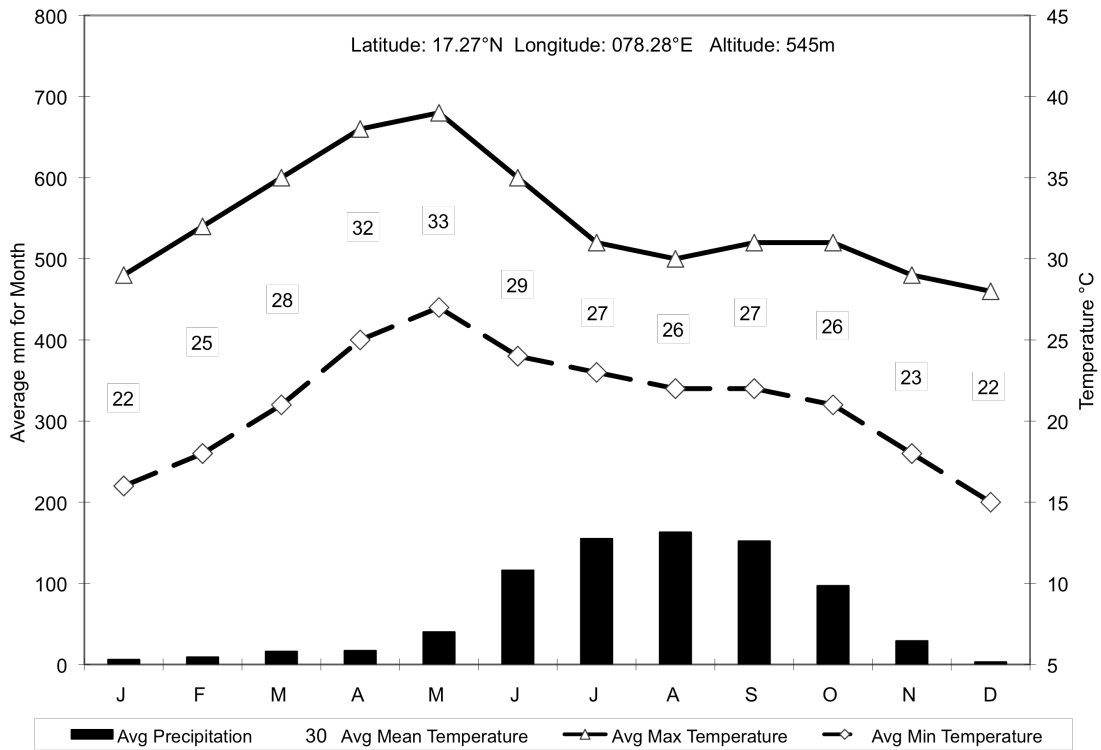


Figure 2.6. Climograph of Hyderabad, India.

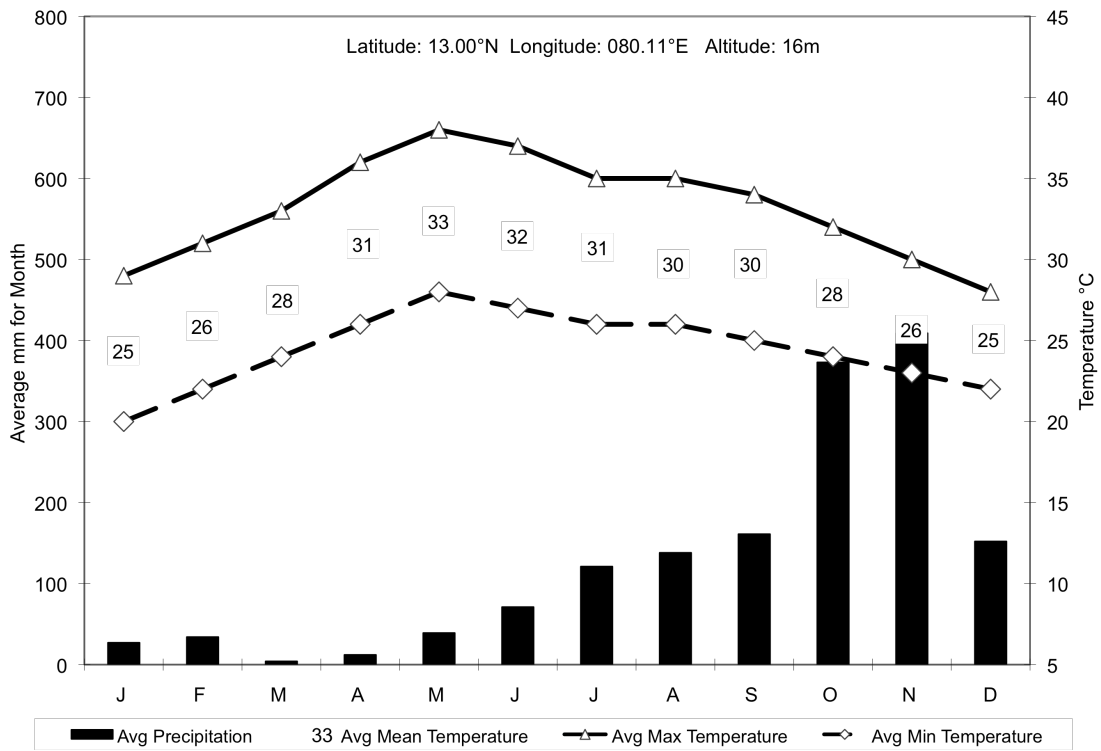


Figure 2.7. Climograph of Madras (Chennai), India.

not transpire. As the trees take up water from the soil, the excess water that would normally transpire through the leaves is instead shunted to the fruit. In this case, a sweet orange would be both green and have an unappealing flavor, hardly a strong incentive for cultivation. Despite these climatic features, we know oranges reached the west. The next climographs from Madras and Mumbai (figures 2.7 & 2.8) are locales currently cultivating oranges.<sup>33</sup> These regions are also included because of their status as trading centers. When Roman and Arab traders arrived in India, these were the favored ports of call (Map 2.1). These climographs suggest that citrus fruits available from local groves would be of the tropical variety, specifically citrons, lemons, mandarins, and limes. If oranges currently cultivated are any indication, they did not have the brightly colored

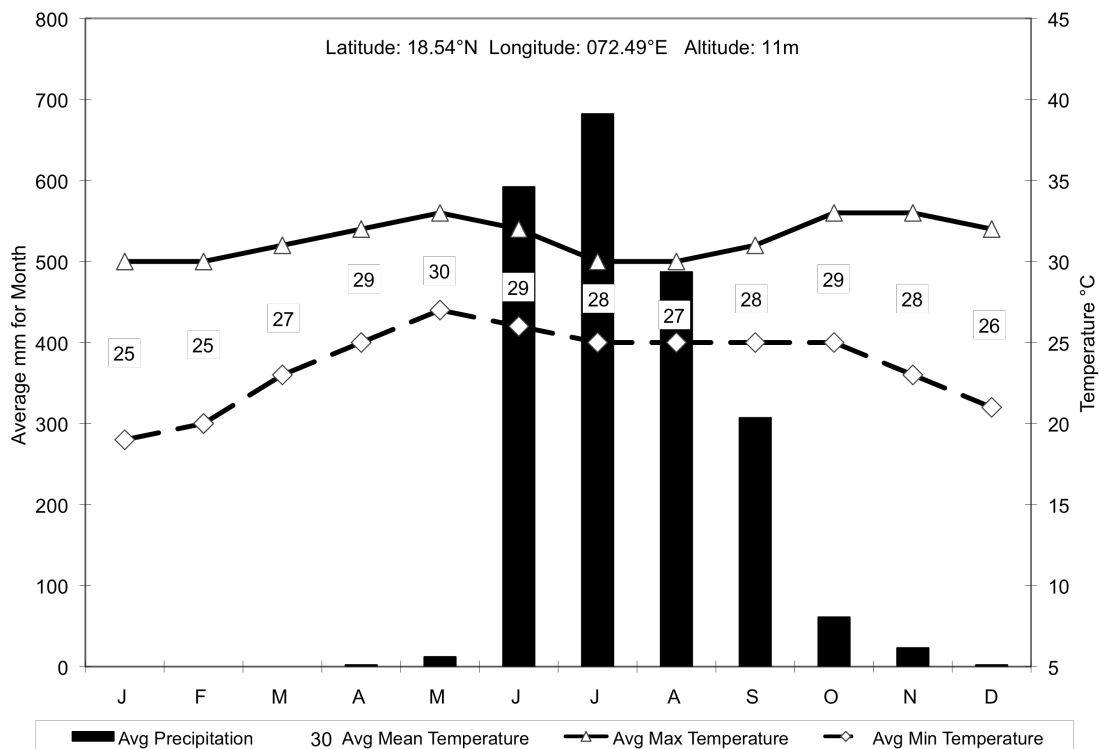
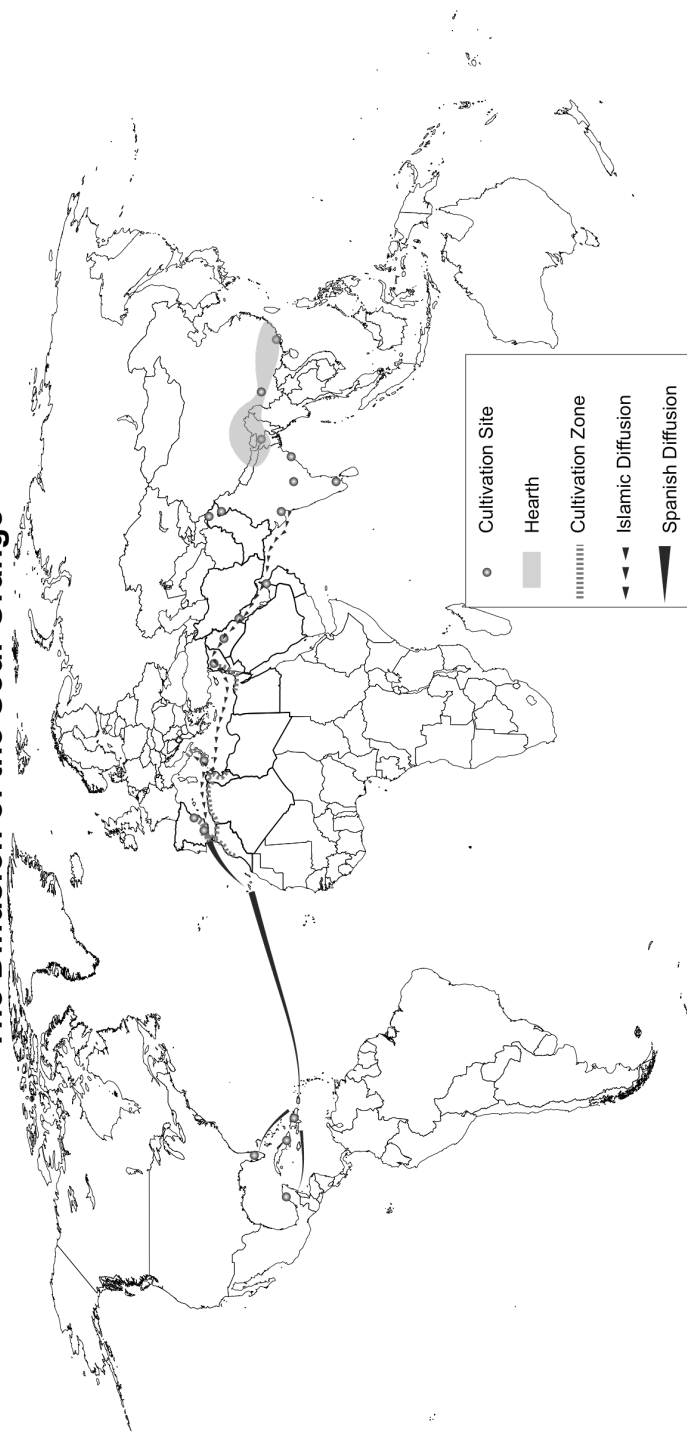


Figure 2.8. Climograph of Mumbai, India.

## The Diffusion of the Sour Orange



The hearth of the orange is in northeast India. They were cultivated in China and the first mention of them appears in 500 BCE in the Book of Odes. According to Mas'udi, sour oranges were introduced to Oman in 912 CE; they were cultivated throughout the Mediterranean by 1200. Columbus brought oranges, seeds, and pips from Spain and the Canaries to the New World on his second voyage in 1493.

Map 2.1

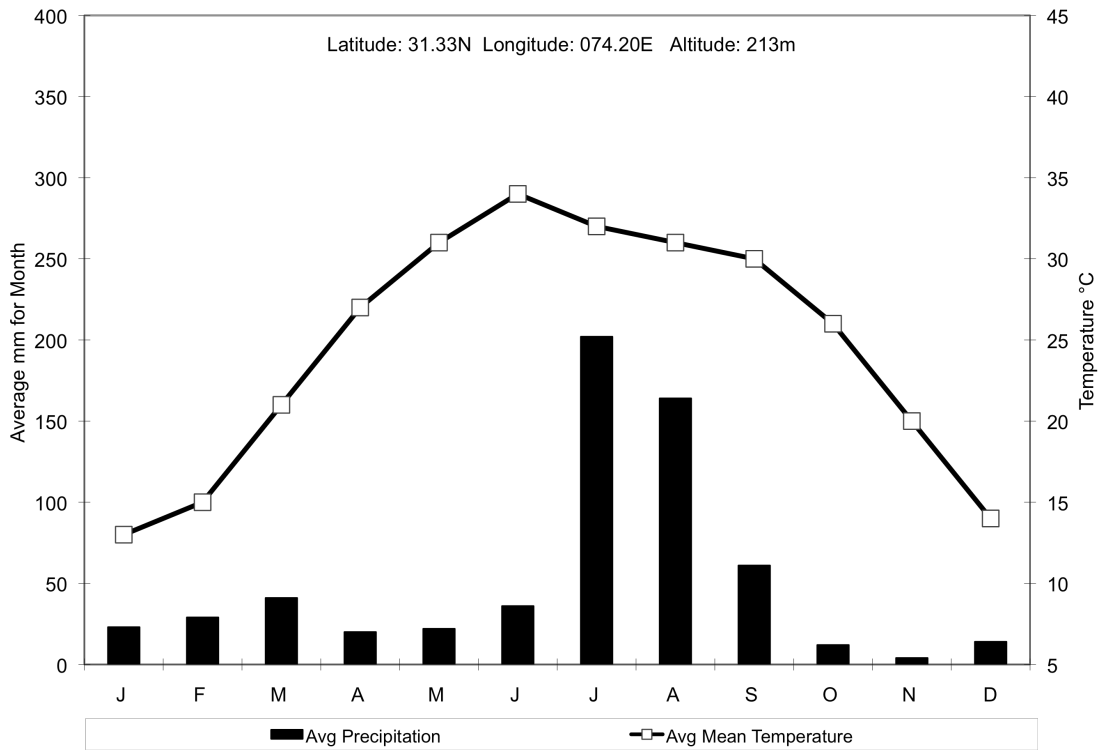


Figure 2.9. Climograph of Lahore, Pakistan.

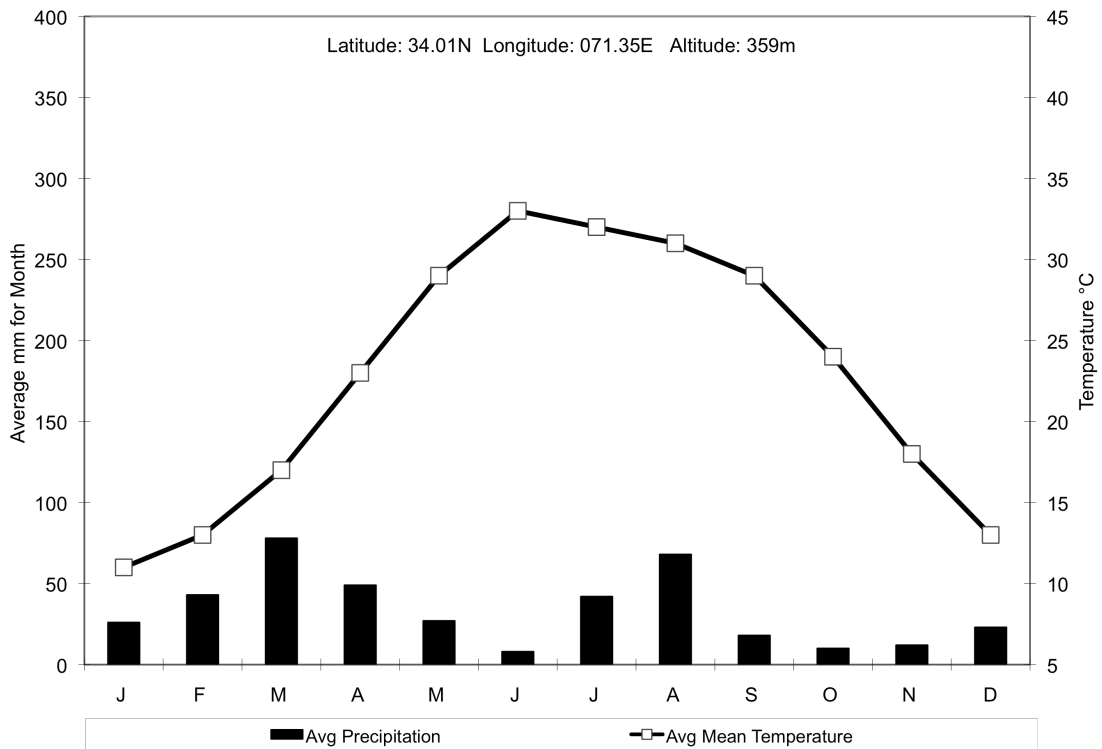


Figure 2.10. Climograph of Peshawar, Pakistan.

orange rind that we normally assign to them. The oldest cultivar, the sour orange *Kitchli*, is a yellowish orange. The sweet variety, *Sathgudi*, is greenish yellow to pale orange. The dominant cultivar, an acid-less variety, *Mosambi*, is pale yellow.<sup>34</sup> Where the first variety appears to be native to the subcontinent, Portuguese sailors introduced the latter varieties during the sixteenth century from Indonesia and Mozambique respectively.<sup>35</sup> If the sour orange followed this path, it was replaced by those varieties. Another route for the orange should be considered. The overland path across the Indian subcontinent is less of an obstacle. Although Lahore and Peshawar, Pakistan, (figures 2.9 & 2.10) are less than four hundred miles apart, there is a significant difference in precipitation. That is not important because both cities have long histories of irrigation and water diversion. If this was the path of diffusion, the obstacle would be the terrain itself, and that barrier is minor for seeds, which are much easier to carry and distribute than fruit or trees. Each city is at a crossroads for traffic coming from all directions and currently supports citrus cultivation. It is not recorded which Islamic merchants brought oranges west, only that the fruit came from India.<sup>36</sup> Oranges are currently cultivated in Punjab, but the planted acreage is one tenth of the lower states.<sup>37</sup>

The abundant trade connections terminating in Mumbai and Madras make these ports the likely transit node for oranges. The lack of sour oranges is explained by their replacement with an introduced varieties and the abundance of other citrus. Here climate had another influence on the diffusion. These ports

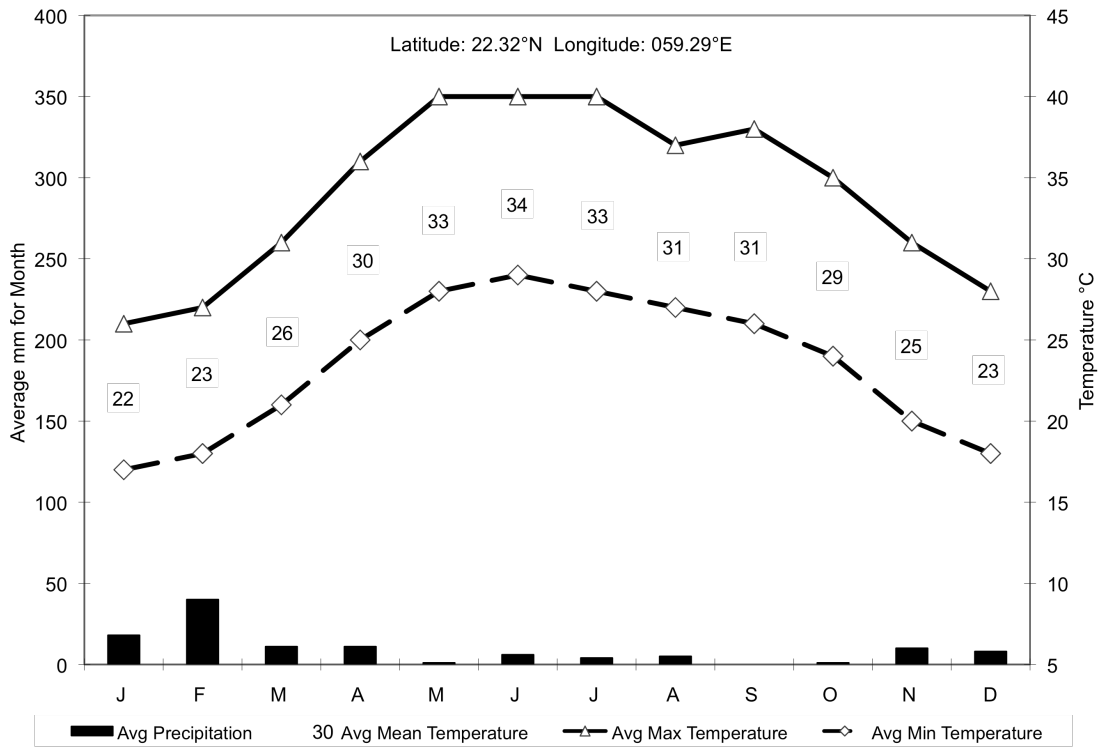


Figure 2.11. Climograph of Sur, Oman.

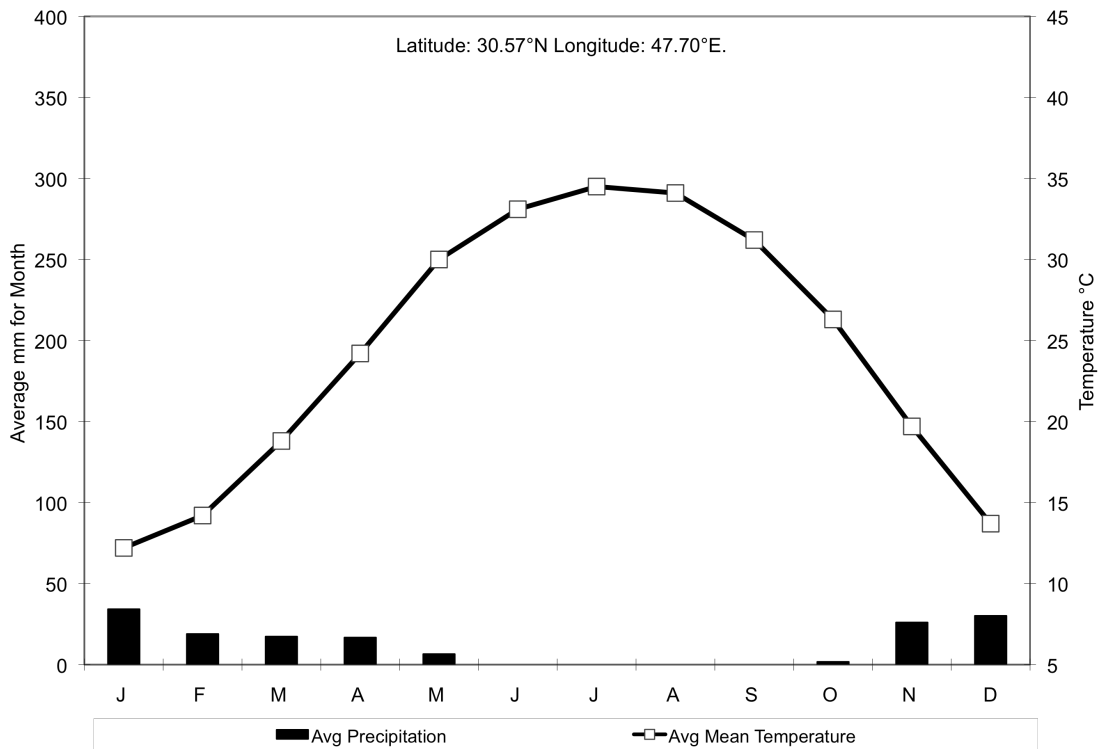


Figure 2.12. Climograph of Basra, Iraq.



are seasonal and the winter westerly winds are less powerful than the summer monsoons. Seeds would have been the easier mode of diffusion. While fruits could be carried across on the journey, the comparison of their weight and perishable nature of them against that of spices or silks, it is hard to believe that oranges or other citrus were the primary cargo. Citrus and oranges were among the last fruits brought the west but the slow diffusion of fruit appears to be the norm rather than the exception.<sup>38</sup>

The sour orange arrived in Oman sometime during the first decade of the tenth century, and it was introduced through trade relations.<sup>39</sup> It is not clear whether they were brought as an item of food or whether they were brought as an ornamental plant. The climograph (figure 2.11) hints that the reason for importing it was to acquire a luxury food. The sour orange has a long history of being used as a condiment and dressing for meat and fish, as well being used for making drinks.<sup>40</sup> This does not preclude it from being added to the garden for ornamental purposes, as the flowers of this tree are exceptionally fragrant and the rinds rich in essential oils.<sup>41</sup> However, the dearth of rainfall demanded the groves be provided with irrigation. Unlike previous regions, this one lacks the large rivers and bountiful groundwater. Water was, and remains, an exceptionally valuable resource on the southern end of the Arabian Peninsula. It is doubtful that the cultivation was widespread and so it is unclear if the subsequent diffusion west came from or went through Oman, or if oranges were once more imported directly from India.

The sour orange was soon introduced to Basra, in modern day Iraq, (figure 2-12) perhaps as soon as 920.<sup>42</sup> Once more, the reasoning for the introduction is ambiguous. As the major trade center with a diverse population of wealthy merchants, its appeal may have been based on its suitability for their personal garden or as a dietary supplement. Regardless of the reason, it is obvious that accommodations were necessary for orange cultivation. The precipitation pattern of this region and that of Oman are markedly different from the previous locales. In this place, very little precipitation falls and none during the growing season. Clearly, in both places, irrigation was vital to growing a specimen tree, let alone producing a commercially viable crop. Basra was successful because it has a large river system that provides water. In a place where irrigation water was not as dear, the urban infrastructure could support numerous gardens.

The next two regions of interest are the historical capitals of the Islamic dynasties. The orange was introduced during the reign of the Abbasid dynasty whose seat was in Baghdad (figure 2.13). Around 940 CE, the Abbasid Caliph al-Qahir is reported to have specifically brought trees from Basra to plant in his garden.<sup>43</sup> The climate of this location is continental, which is a sharp contrast from the maritime influenced locales of the previous regions. The warmer high temperature and colder low temperature are characteristic of this location. Moreover, orange trees themselves were transported, not the seeds, and it is unquestioned that the intention was a pleasure garden.

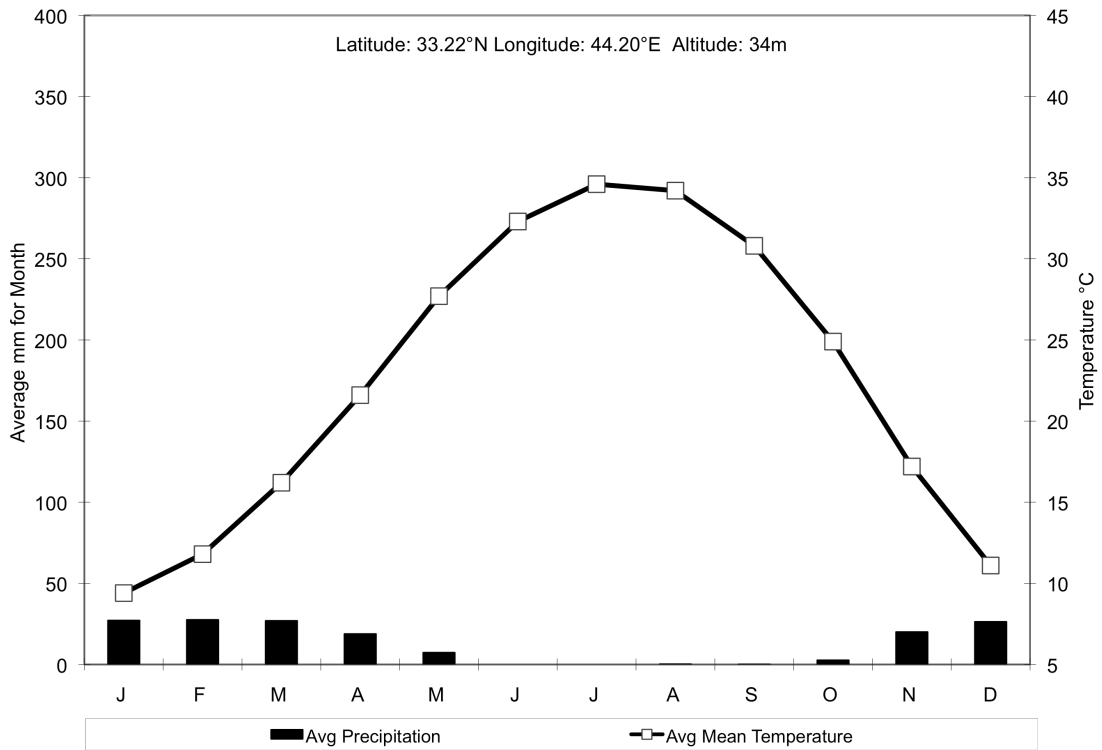


Figure 2.13. Climograph of Baghdad, Iraq.

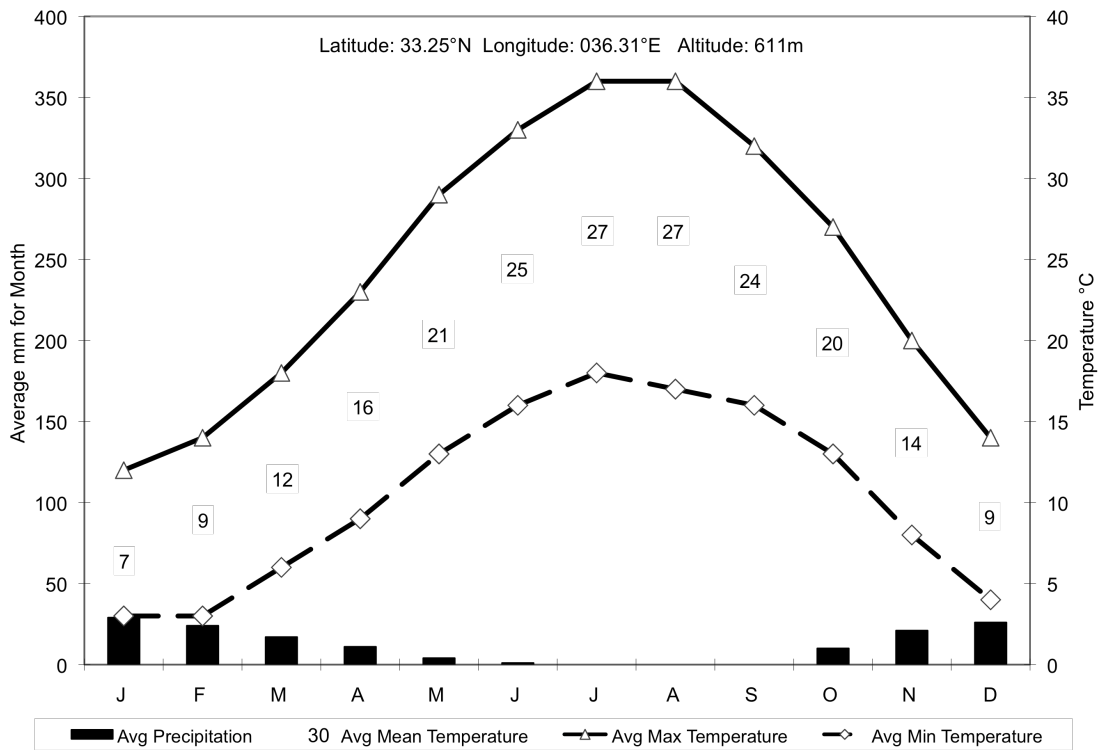


Figure 2.14. Climograph of Damascus, Syria.

It is telling that orange trees were considered to be of such value that these accommodations required to support its cultivation were deemed reasonable. If at first novelty alone justified the expense, later commercial success proved it. The long history of Damascus (figure 2.14) in trade, agriculture, and as the seat of the Umayyad dynasty demands its inclusion in the discussion. Although the Umayyad dynasty was long since gone by the time of the introduction of the orange, their descendants in Andalusia Spain were one of the first adopters of the orange outside of Asia. Damascus represents another fringe area for orange cultivation with its average low temperature in winter months approaching 3 °C. Interestingly, modern day Syria is a minor citrus and orange producer and exporter.<sup>44</sup> Once introduced, oranges are incorporated into the diet of the society. It is intriguing that the orange was originally imported as ornamental and later adopted as a food item. When the Crusaders arrived in 1191, they mistook the cultivated orange groves to be forests.<sup>45</sup>

The noteworthy change that has occurred over this dispersal of the orange is the difference in temperatures. Where the average high and low temperatures are unavailable, the reader can infer a pattern from the average mean values. Climate affects more than the taste, it also determines color intensity. The nighttime thermal radiation of these regions is substantial; the continental climate results in daily fluctuations that approach 40 °C. This difference will intensify taste and color, yielding an exceptionally flavorful taste and deep hue in

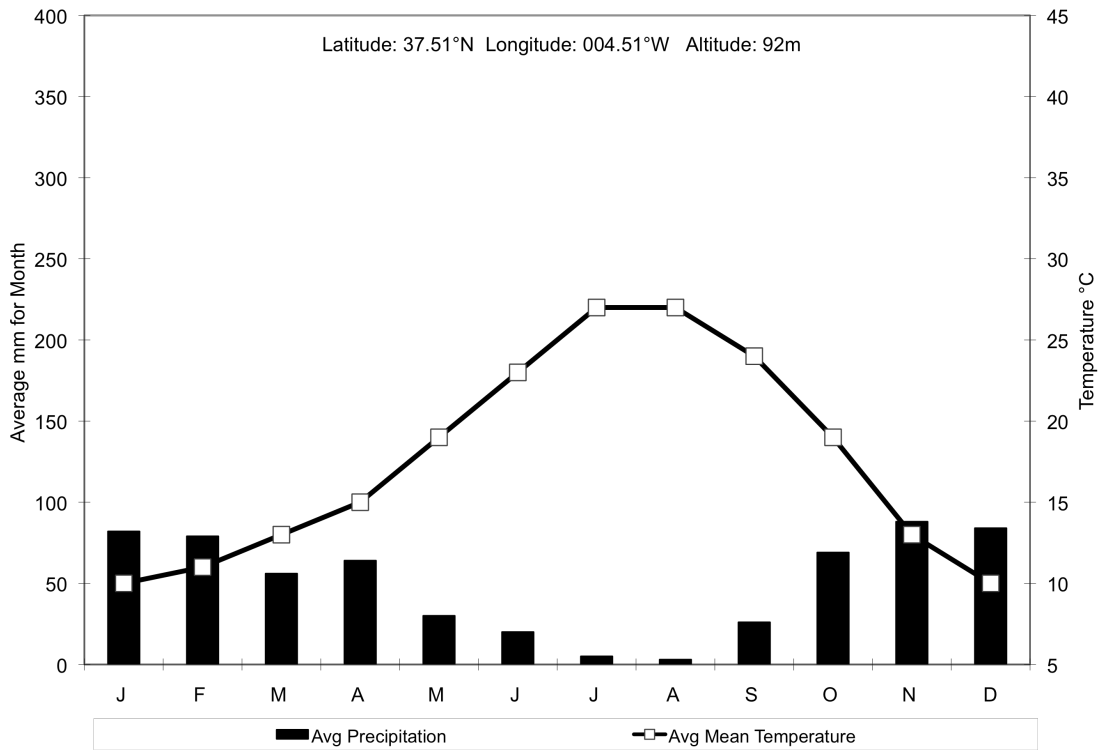


Figure 2.15. Climograph of Cordoba, Spain.

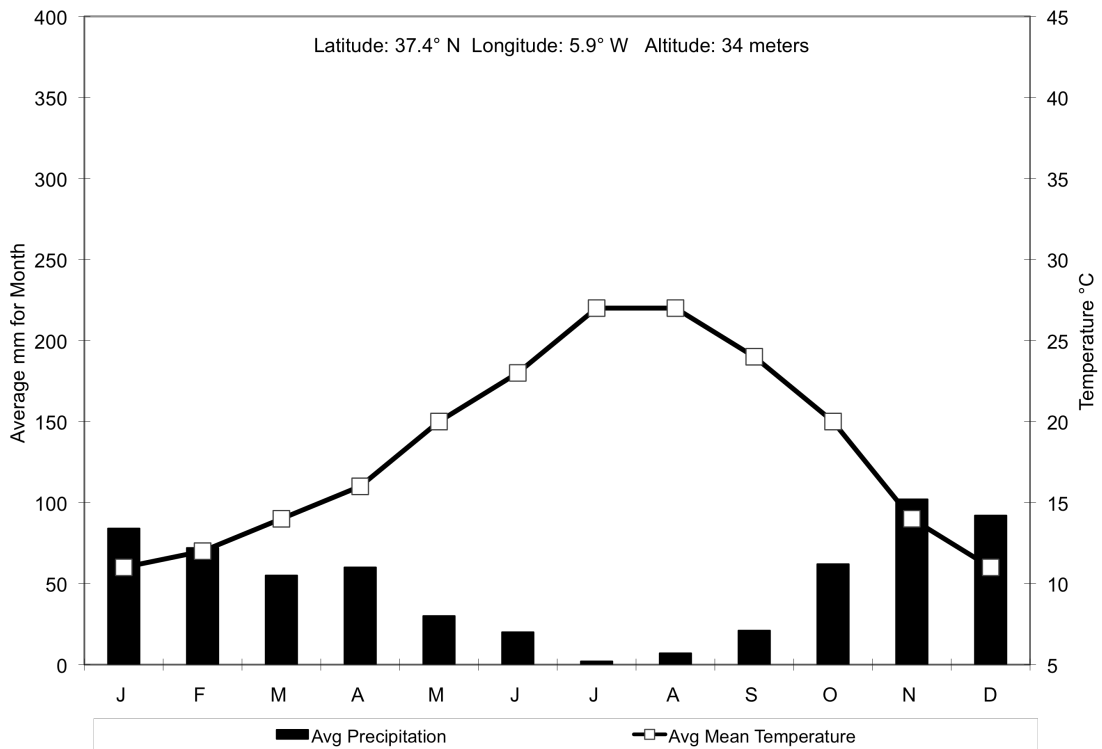


Fig 2.16. Climograph of Seville, Spain.

the fruit.<sup>46</sup> These qualities were likely not found in the oranges from their Indian source.<sup>47</sup>

About 976, the Cordovan Caliph al-Mansûr had the Patio de las Naranjas established in the courtyard of the Great Mosque of Cordoba.<sup>48</sup> The trees provided shade from the heat, fragrance with their blossoms, and beauty with their contrasting fruit. The climate here resembles the typical Mediterranean climate, with a slightly diminished rainfall and slightly warmer temperatures; the result of the continental influences from the central plateau. It is remarkable that this climatic pattern is nearly the opposite of the one where oranges originated. The temperatures peak during the summer months where the greatest rainfall occurs during the winter months.<sup>49</sup> The lack of water during the summer periods would prevent appreciable vegetative and fruit growth and cause extensive fruit drop.<sup>50</sup> Certainly, arborists learned how to adapt to the natural conditions in order to cultivate the trees successfully. In the case of the Great Mosque, irrigation systems that were already in place were used to support the cultivation.<sup>51</sup> The plan was repeated in Seville, (figure 2.16) which has a similar climate to Cordoba. The sour orange once imported to the new world became known as the Seville orange.

It is crucial that these projects were accomplished under a royal direction. The placement of oranges in sacred spaces may have influenced or enhanced their status and encouraged their cultivation elsewhere. For a peasant farmer to cultivate oranges, they would have likely needed to use their ration of irrigated

water or draw from cisterns to support the grove. Regardless of whether a farmer was a tenant or a free-holder, the expenditure of this relatively valuable resource indicates the importance of citriculture. The taste appeal of drinks using sour oranges and lemons combined with sugar cane is easily understood when its solitary status is considered.

The Islamic agriculturists quickly spread orange cultivation throughout the Mediterranean basin. After initial plantings in ornamental gardens, oranges were quickly and enthusiastically adopted as a cash crop, and by 1200, citriculture was firmly established in Sicily and on the Italian Peninsula.<sup>52</sup> The climograph of Palermo (figure 2.17) describes a zone with the typical Mediterranean climate pattern. Once more, the arborists developed a system to accommodate the lack of water during the summer months. Similar to the Cordovan climate where rainfall is scant during the summer months, supplemental watering during the summer could easily have been derived from cisterns or other temporary water storage containers. The important factor in this scenario is that this system does not require the investment and maintenance of an irrigation project. This allowed the pioneer farmer to plant seedlings without the need to build a complicated infrastructure to support it. The yield may be reduced, but the compact groves can be an efficient use of the land.<sup>53</sup> The Valencia region (figure 2.18) is currently the major orange cultivation zone of modern day Spain. This climate supports citriculture with limited intervention.

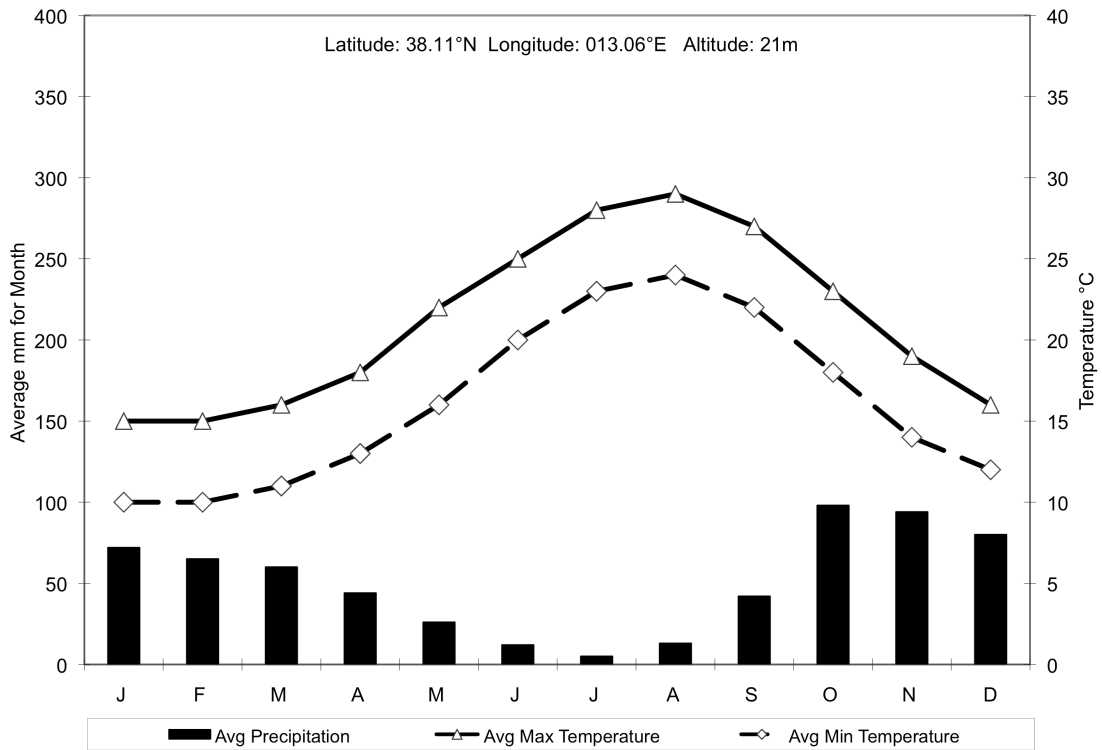


Figure 2.17. Climograph of Palermo, Italy.

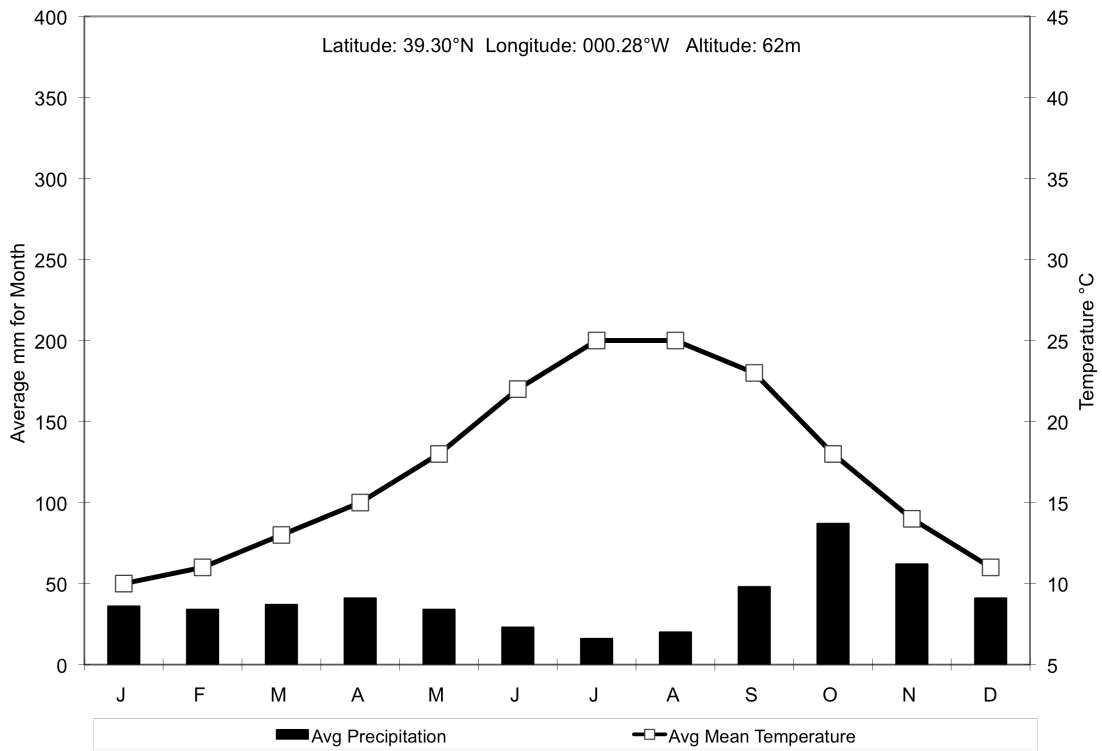


Figure 2.18. Climograph of Valencia, Spain.



Table 2.1

Top Orange Exporters by Percentage of World Exports							
1970 – 1979		1980 – 1989		1990 – 1991		2000 – 2004	
Spain	25%	Spain	24%	Spain	31%	Spain	29%
Israel	15%	Morocco	11%	USA	12%	S. Africa	16%
Morocco	11%	Israel	10%	Morocco	9%	USA	12%
USA	8%	USA	10%	S. Africa	9%	Morocco	6%
S. Africa	6%	S. Africa	8%	Greece	8%	Greece	6%
Egypt	4%	Cuba	6%	Israel	4%	Egypt	4%
Italy	4%	Greece	4%	Netherlands	3%	Netherlands	4%
Greece	4%	Italy	4%	Italy	3%	Turkey	3%
Palestine	3%	Egypt	3%	Brazil	2%	Australia	3%
Lebanon	3%	Palestine	2%	Australia	2%	Italy	2%

Source: United Nations Food and Agricultural Organization.<sup>54</sup>

The citrus crop is the economic engine of this region; Spain leads the world in citrus and orange exports<sup>55</sup> (Table 2.1). This is remarkable when one considers how much more harvested acreage is in the US and Brazil.<sup>56</sup> However, Spain's membership in the European Union and its adjacency to that large market is a stronger influence than climate in this situation. That economic landscape is indeed powerful when a non-producing EU member, Netherlands, can re-export their imports and be among the top ten.<sup>57</sup>

The outliers in Old World citriculture are the celebrated gardens in Northern Europe, with the most famous one being the orangery attached to the palace at Versailles, represented here by Paris, France (figure 2.19). It should be recognized that this climograph does not fully describe the environment where the trees grow. The trees grown in that garden were kept in pots and moved indoors to spare them the coldest weather. Wealthy patrons built orangeries across France, Germany, and England and each of these are substantial structures intended to protect these cold sensitive trees.<sup>58</sup> The trees were placed outdoors in spring after the danger of frost had passed, and the gardeners

provided the water, so their exposure to an uncontrolled climate was minimal. During that diffusion to the region, the seedling trees were imported from Spain and Italy.<sup>59</sup> Those imported trees, by nature of their size, grew better than trees propagated from seed or cutting. Although the trees spent the winter indoors, they were still subject to cool temperatures for long durations. Furthermore, the decreased winter photoperiod of the latitude was exacerbated by the limitations of the windows.

Cultivation of oranges in these locales was a case of desire overriding economics. The return on investment was not paid in the food market; the profit was recouped in the market of public approbation. These exhibitions of

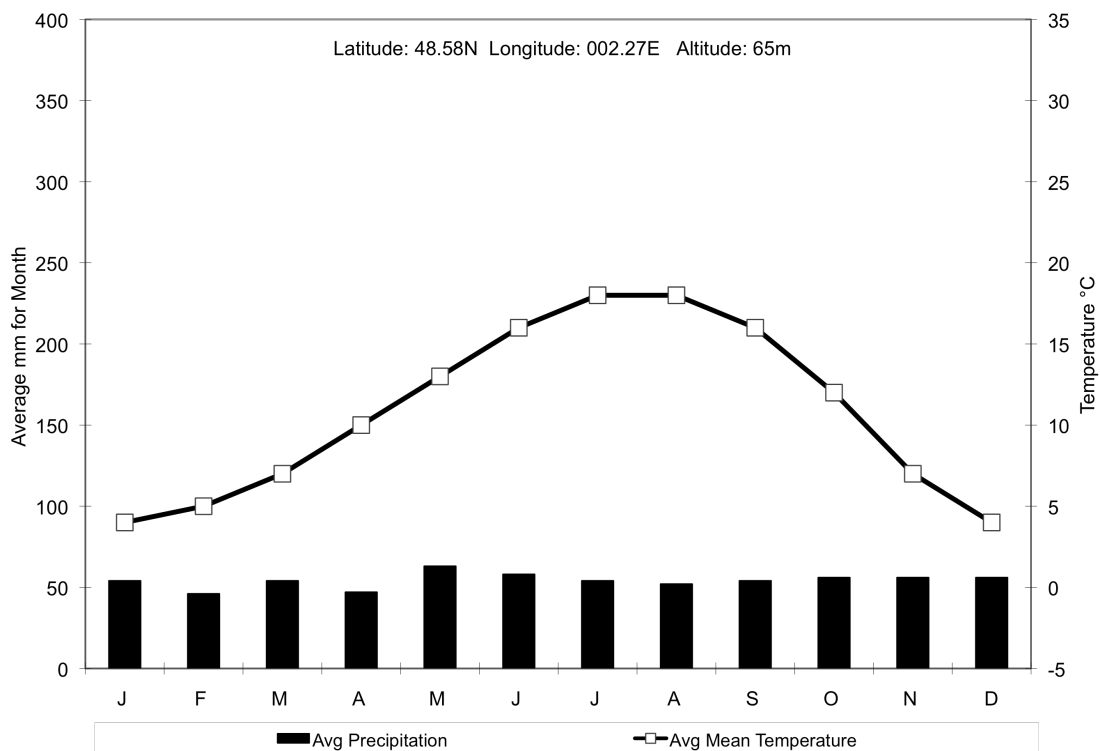


Figure 2.19. Climograph of Paris, France.

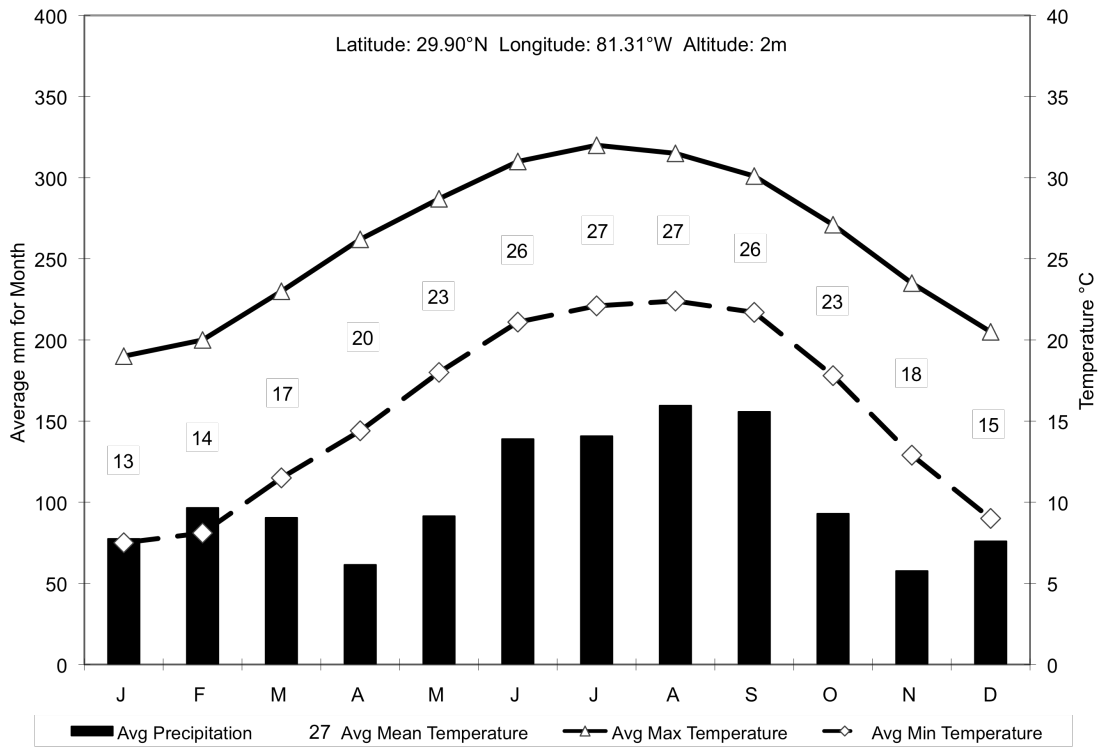


Figure 2.20. Climograph of St. Augustine, Florida.

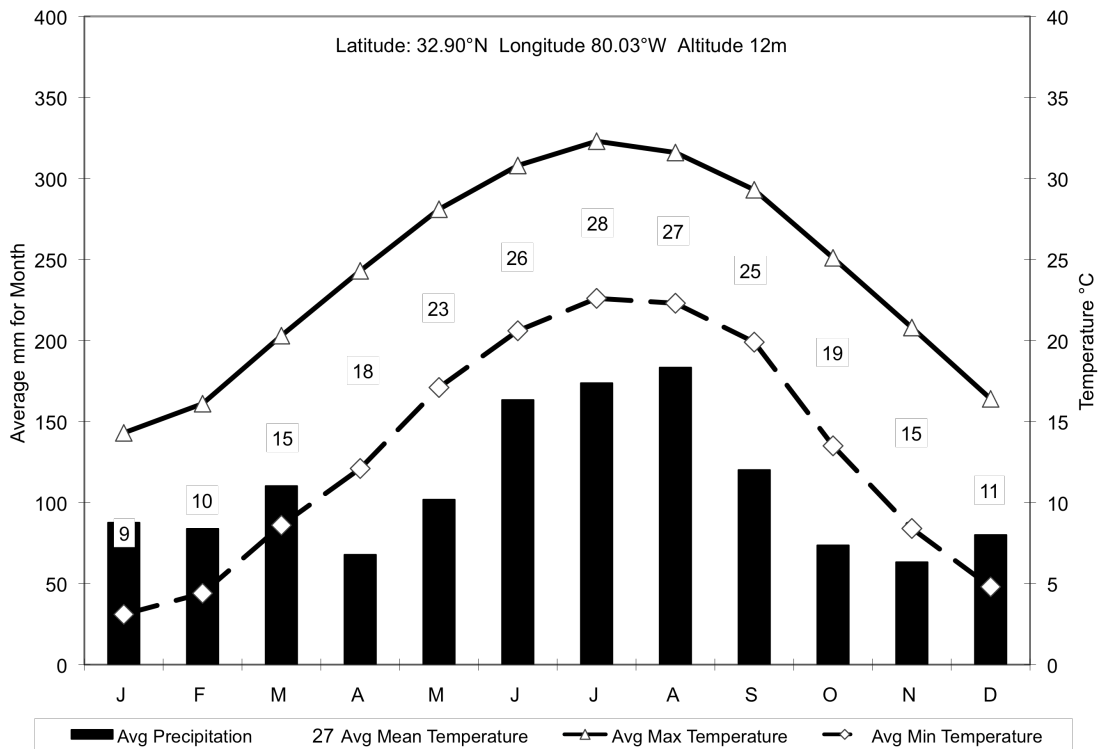


Figure 2.21. Climograph of Charleston, South Carolina.

horticultural prowess set the foundation for the later tradition of botanical gardens. McPhee writes that the tree in the New York Botanical Garden is an especially popular attraction.<sup>60</sup>

The sour orange was brought across the Atlantic Ocean in 1493 on the second voyage of Columbus.<sup>61</sup> Brought to the Caribbean islands and Florida peninsula, (figure 2.20) this climate closely resembles its original range. The difference between Florida and the Assam Valley is the presence of moderate winter rains. However, the soil conditions of Florida are such that this precipitation will quickly percolate into the groundwater.<sup>62</sup> This climatic similarity between origin and destination allowed the trees to self propagate. The combination of human intervention and natural acclimation allowed the trees to go feral and thrive without further involvement.<sup>63</sup> A factor that is important to remember is that climate is not weather. Florida regularly experiences freezing weather of significant magnitude where more than fifty percent of harvest is lost and some episodes where trees themselves are killed.<sup>64</sup> Nevertheless, it appears that the strongest limiter on citriculture is the construction of residential housing. Contemporary Florida has the lowest recorded harvested acreage for oranges; a housing boom in the state has converted many groves into residences.<sup>65</sup>

Charleston, South Carolina, (figure 2.21) was an early source of citrus for the American colonies. George Washington recorded in his diaries that oranges and orange trees arrived from Charleston.<sup>66</sup> The low altitude and average low

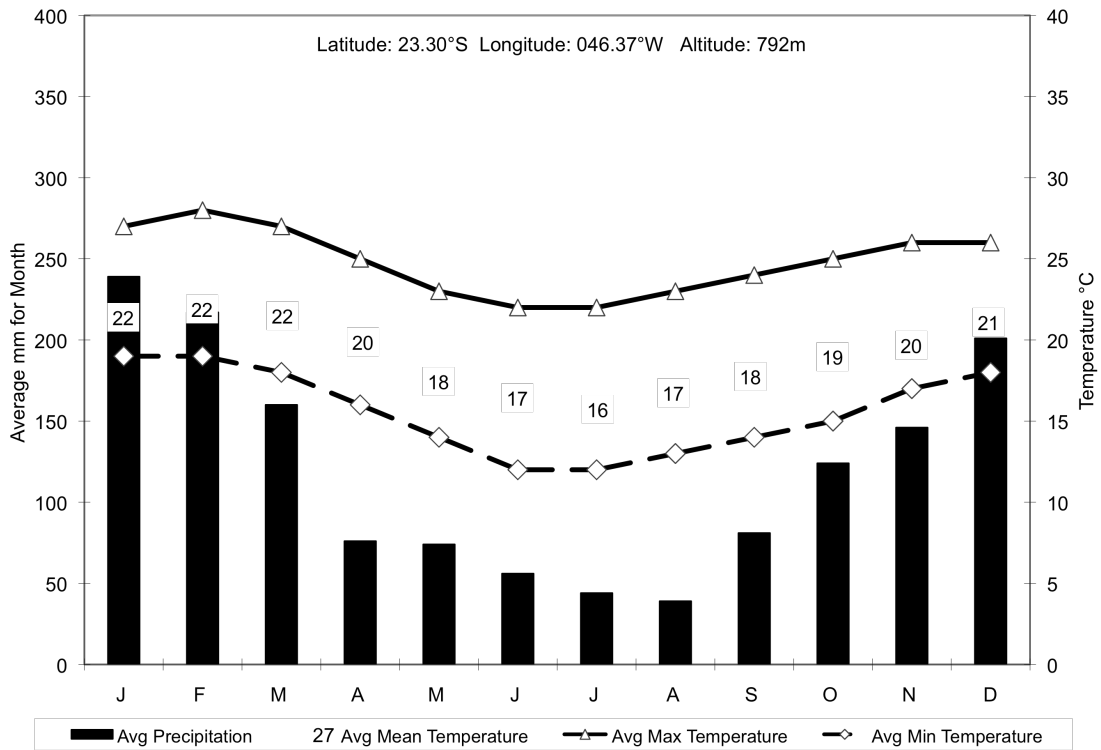


Figure 2.22. Climograph of Sao Paulo, Brazil.

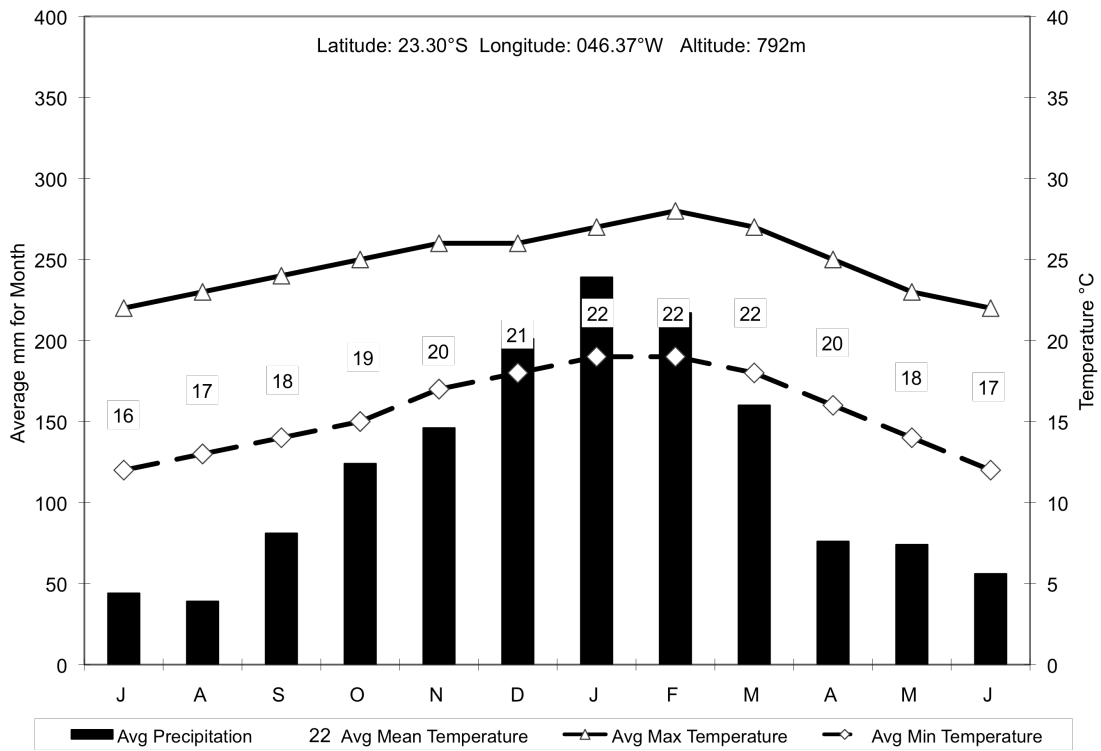


Figure 2.23. Seasonally adjusted climograph of Sao Paulo, Brazil.

temperature of January combine to present the same if not greater danger of frost damage.<sup>67</sup> The average mean temperature and average high temperature indicate that successive days of sub-freezing temperatures are not common. Nevertheless, this region is not currently a significant producer as other fruits have taken hold.<sup>68</sup>

The original plantings in Brazil (figures 2.22 & 2.23) were intended to be a food source for transatlantic traffic. By deliberately allowing groves to go feral, these sailors set up de facto food drops in remote ports.<sup>69</sup> The groves located on St Helena Island played a similar role.<sup>70</sup> The results were spectacular because the climate unquestionably favors citriculture; Brazil is currently the world's largest producer of oranges<sup>71</sup> (Table 2.2). The advantage Brazil holds is that its climate is consistent; it does not experience freezing weather nor are there other weather related dangers such as hurricanes and tropical storms. The lone disadvantage is that the temperatures do not drop low enough to induce a complete color change so the rinds of the fruit are mottled or green. Although the local population is familiar and comfortable with that appearance, relatively few whole oranges are

Table 2.2.

Top Orange Producers as Percentage of World Production							
1970 – 1979		1980 – 1989		1990 – 1991		2000 – 2005	
USA	26.4%	Brazil	20.2%	Brazil	20.8%	Brazil	20.0%
Brazil	15.7	USA	19.3	USA	16.6	USA	14.4
Japan	7.9	Spain	6.0	China	9.0	China	13.1
Italy	5.7	Japan	5.6	Spain	6.2	Mexico	6.7
Spain	5.7	Italy	5.4	Mexico	5.4	Spain	6.2
Mexico	4.0	Mexico	4.3	Italy	3.9	India	4.8
India	3.7	India	3.3	Iran	2.9	Iran	3.1
Israel	3.3	China	3.0	Egypt	2.7	Italy	3.1
Argentina	3.1	Argentina	2.5	Argentina	2.5	Argentina	2.7
Egypt	1.9	Egypt	2.4	Japan	2.3	Egypt	2.7

Source: United Nations, Food and Agricultural Organization<sup>72</sup>

exported to the world marketplace. (Table 2.1) Instead, the vast majority of the fruit, over 90% from both Florida and Brazil, goes to the juice market. The leftover rinds are passed to a less discriminating consumer; they are an important byproduct that is used as cattle feed.<sup>73</sup>

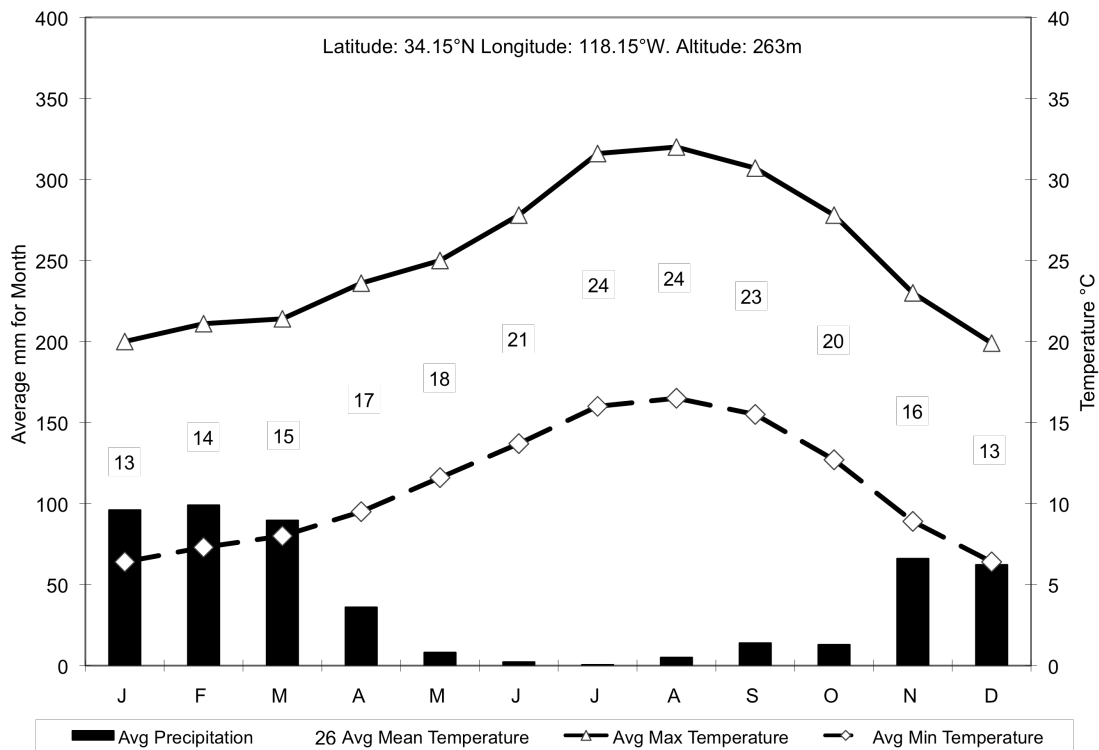


Figure 2.24. Climograph of Pasadena, California.

The first orange groves in California were attached to the missions. A relative latecomer, these were groves were not established until the latter years of the 1770s.<sup>74</sup> Their owners prized these plantings if their refusal to share them was any indication.<sup>75</sup> Lacking the resources and labor to build substantial irrigation, these mission citrus groves relied on combinations of cisterns, wells, and the limited diversion of seasonal watercourses.<sup>76</sup> Pasadena (figure 2.24) is

near the location of the San Gabriel mission that supplied the first seedlings to Joseph Wolfskill. He relied on water from the Los Angeles River for the irrigation of his property holdings.<sup>77</sup> That was a harbinger of the later citrus boom. When the colony of Ontario was founded, its irrigation system was the attraction.<sup>78</sup> Water rights trumped land ownership in this location, and water above all was needed for citriculture.

The diffusion of oranges demonstrates the ability of humanity to transform the land and its predilection for that practice. The orange tree was once restricted to Southeast Asia and now it is one of the most widely cultivated fruits on the globe.<sup>79</sup> Oranges originated in the foothills of the Himalaya and were first cultivated in China. Before oranges reached the Mediterranean, the Chinese had cultivated them for over one thousand years. When Islamic farmers extended citriculture across Southwest Asia, North Africa and the Mediterranean Basin, they built a water infrastructure to acclimate the trees to the new environments. With so many sites having orange trees, the quantity in market must have been substantial. What is more remarkable is that until the Portuguese introduced the sweet orange in the sixteenth century, only sour oranges were cultivated. Compare that solitary example against the twenty-seven varieties of citrus recorded in China in 1178 CE<sup>80</sup> and their appeal is better appreciated. The Spanish did not wait for the Portuguese sweet orange to spread citrus to the New World; they included the sour orange on their forays into



colonization. When the sweet orange was finally introduced to the west, it was immediately adopted and as a result, quickly diffused.

It has been demonstrated that the climate confines oranges. The next chapter examines the same terrain, but instead of focusing on a physical attribute, the essay discusses the perception of the fruit and tree. Oranges acquired varied meanings across the lands they grew and those associations affected the diffusion and adoption of the fruit. In this case, it shall be argued that the symbolism defines oranges.

The HTML page attached to this thesis, "Origin and Diffusion of the Orange" covers this subject using Google Maps™ as a cartographic platform. An Internet connection is necessary for that portion. The page provides the reader an image of terrain and traces the diffusion in a visual manner.

### CHAPTER THREE: THE ORANGE AS A SYMBOL

The orange as a symbol is an appropriate place to begin when approaching it through art history. The modern day orange is cheap and plentiful; this situation belies its past. In the previous chapter, it is noted that the first record of the orange was its role as tribute to the Chinese emperor. This inclusion in that payment demonstrates its importance. The Chwang, subjugated by an undoubtedly superior military and political force, believed the fruit to be to be an appropriate item to present to the victor. The Han, in turn, acknowledged its value by accepting it. This became the role for the orange for the following millennia. To those who encountered them, oranges represented a rare and exotic object that was often reserved for the powerful and wealthy.

Chinese tradition assigns a number of symbolic attributes to the orange. The most prominent one is that as a solar symbol.<sup>1</sup> This belief likely originates in its physical appearance. The orange has a brightly hued rind and comes in a rounded form; the association is reasonable. Its physical appearance is augmented by its winter ripening characteristic, which also coincides with the New Year celebrations. Another symbolic relationship that developed was as manifestation of money.<sup>2</sup> This led to a dual role in decorations for New Year celebrations, for the orange is considered a charm that brings longevity and prosperity.<sup>3</sup> Oranges and mandarins, as well as representations of them, are also placed on the graves of ancestors. In this case, the food offering brings eternal

connotations.<sup>4</sup> In all these situations, the multiplicity and plasticity of the orange led to its popularity and reverence.

From its hearth in south Asia, the orange slowly spread westward. Before Arab traders brought the sour orange to the Mediterranean, some examples reached the Roman Empire. It is unclear to what extent the orange was known to Roman society, for it is absent from the extant recipes and literature.<sup>5</sup> Citrons were well known but other citrus was rare.<sup>6</sup> Tolkowsky cites examples from Pompeii mosaics as the first antique example of sweet and sour oranges as well as lemons, but Pliny never mentions them.<sup>7</sup> However, other physical evidence informs us that someone was aware of oranges. The mosaics in the Mausoleum of Santa Costanza (figure 3.1) provide the evidence of that fact. Built during the reign of Constantine,<sup>8</sup> which occurred from 304 to 337 CE, we see oranges are included in the decoration in the dome. Nonetheless, when we consider the utter lack of literary evidence, it is apparent the fruit must have been exceedingly rare.<sup>9</sup> The vegetative decoration contains the elements commonly found in Roman and Christian imagery, the grapes and birds being the most prominent. However, what prompted the inclusion of oranges cannot be definitively answered. It may be that oranges are evergreen and bear fruit when all others are barren and so symbolize an eternal paradise. It is also plausible that oranges are there to provide nothing more than decoration; that they are filler material that was added on an artist's whim. The inscrutability does not cease there; the entire structure is shrouded in mystery. Its purpose is clear, but under what religious

purview is unknown.<sup>10</sup> It is fascinating that this lone instance of oranges in ancient art appears in the tomb of a member of the ruling family.<sup>11</sup>



Figure 3.1. Mosaics on mausoleum ceiling, Santa Costanza, Rome. The oranges are between the palm and the pitcher. (Source: <http://commons.wikimedia.org/>)

If oranges were present in the Mediterranean after the collapse of Roman Empire, there is no evidence of it.<sup>12</sup> It is clear that Islamic merchants planted the sour orange in Southwest Asia and later spread the cultivation west (see Chapter Two). As discussed earlier, the original purpose for the trees is unclear. It may have been imported as a foodstuff, as a garden ornament, or more likely, to serve both needs. The dual role is preferred because the flower was prized for its fragrance and used in perfumes.<sup>13</sup> If it was imported for its flower, its fruit would not be ignored and vice versa. The intent here is to point out that these first gardens were in climates that required extensive irrigation projects and meticulous care. This implies that the cultivation was under the purview of a

wealthy person. Even today, substantial resources are needed to bring fruit trees to bearing age and beyond. In that climate, the investment in water, land, and labor were undoubtedly expensive and far too much for a farmer whose specialty was field crops. Moreover, its usage in medieval Islamic cuisine, as an adjunct to roasted meats, implies a wealthy consumer.<sup>14</sup> In these circumstances, the association between prosperity and the sour orange is robust. The orange tree held a central role in the garden, one that required a complex skill set. The orange fruit held a status on the table, one where wealth and status was on display.<sup>15</sup> The orange and other citrus came to symbolize the ability of the patron to marshal substantial resources and wealth for decidedly ephemeral purposes.

Islamic civilizations cannot be considered a monolithic bloc, for each society arose from a distinct population with each one bringing its own heritage. Nevertheless, a common symbolic meaning arose placing the orange in paradise.<sup>16</sup> This elevated status is exemplified best by its placement in the mosque courtyards of Cordoba and Seville. This is not surprising given that one motive to obey religious edicts is the promise of the future admittance to paradise. Given the restricted habitat and relative scarcity of oranges, it is not difficult to make the connection; especially when one considers the fragrance and visual attractiveness of the tree. Another quality that was assigned to oranges and citrus in general was one of purity. This feature is illustrated by the twelfth century exhortation by Ibn al-Awwân that only women who are of absolute purity and unimpaired health be allowed near citrus trees lest they damage them.

Interestingly, the fruit itself has the power to cleanse that woman.<sup>17</sup> This principle leads one to the conclusion that these gardeners believed that the orange and other citrus served as a touchstone; that by its presence, it conveyed the merits of the patron. It is notable that the gender was specified in the counsel; perhaps this was a tacit acknowledgement that men could not hope to attain that level of wholesomeness or that the quality was not desirable. Whatever the reason, the concept was shared and conveyed to the rest of Europe; Volckhamer repeated the same myth in his text six hundred years later.<sup>18</sup>



Figure 3.2. Sandro Botticelli, *Primavera*. Tempera on panel, 203 x 314 cm. Galleria degli Uffizi, Florence. (Reprinted with permission from World Images Database.)

When oranges appeared in European art, the symbolism appears to have been drawn from those same themes. Botticelli's *Primavera*, (figure 3.2) painted in 1482, portrays the arrival of spring as approaching from the orange grove of

the goddess Venus.<sup>19</sup> The picture portrays the deity as the mistress of the garden as she presides over the celebration.<sup>20</sup> Above her, the trees are filled with leaves, flowers and fruit. Highlighting this feature where all three are present concomitantly must have influenced the selection; it depicts an especially fecund state. Moreover, that citrus is the only tree that is bearing fruit at the start of spring must have had an impact. The paradise theme is pervasive, as is the worthiness of the inhabitants. The rich textiles augment the garden, which is more than a grove; it is a veritable forest.<sup>21</sup> This display of wealth is pure and is out of the reach of the tax collector; the sumptuary laws did not apply in this virtual rendition. The patrons flaunted their wealth without hindrance; the outdoor garden was brought inside and the expensive textiles were placed on constant display. An array of meanings, from divinity, paradise, and wealth, could be placed upon oranges and the viewers were left to select the ones that appealed to them.

In sacred themed art, the other qualities appear to have been emphasized. From the workshop of Joos van Cleve, oranges appear in certain paintings; for example, in this one of the *Holy Family*, which was painted in 1515 (figures 3.3 & 3.4). The purpose of these images appears to be to fulfill a particular niche for private devotionals.<sup>22</sup> In this painting, the orange may be a signifier that the Christ child is the new Adam.<sup>23</sup> To indicate this new beginning, the fruit responsible for expulsion, the apple, is replaced with one that represents a return to paradise. In a setting of domestic bliss, the orange joins the traditional



Figure 3.3. Joos Van Cleve, *Holy Family*. Oil on wood, 53 x 40 cm. Gemäldegalerie der Akademie der Bildenden Künste, Vienna. (Reprinted with permission from WorldImages Database.)

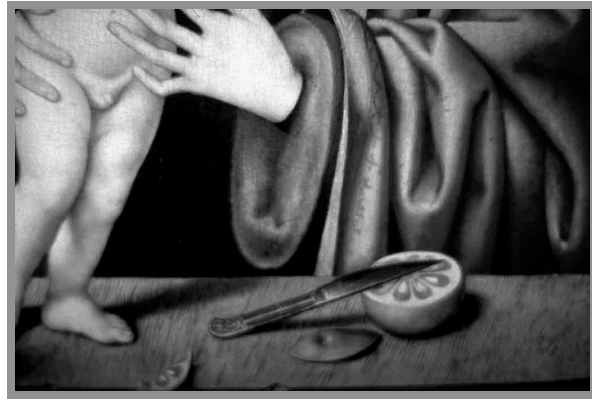


Figure 3.4. Detail of *Holy Family*.

symbols used to amplify the purity of Mary.<sup>24</sup> The orange is sectioned, implying she has served it to the child; this echoes the Adam and Eve refrain.<sup>25</sup> In this case, oranges acquired an aura of holiness to augment its reputation for fecundity. Certainly, oranges were rare commodities in northern Europe, but their presence was known well enough to develop a following.

The sour orange did not make significant inroads into the European diet and so it was not widely cultivated. The sweet orange is what is familiar to the modern audience. Introduced to the Italian littoral between 1450 and 1500, it quickly supplanted the sour one in commercial marketplace.<sup>26</sup> The Portuguese introduced a superior variety in the subsequent decades and the availability of oranges suddenly expanded so much that they were no longer restricted to the





Figure 3.5. Chateau of Versailles. Gardens, Lake and Orangery. (Reprinted with permission from WorldImages Database.)

wealthy. By the latter decades of the 1500s, oranges were available for purchase on London streets, most notably to Elizabethan theater patrons.<sup>27</sup> Apparently, this sudden increase deflated the reputation of the orange.<sup>28</sup> Nevertheless, oranges were essential elements in the gardens of European elites who continued to lend it the prestige it previously held.

To northern European rulers, the orange was not the symbol of paradise, as much as it was a symbol of the patron's presence in paradise.<sup>29</sup> The gardens of the sixteenth century may have imitated the splendor of the gardens in twelfth century Sicily and Spain but they did not have the same purpose.<sup>30</sup> The gardens repeated the setting of conspicuous consumption, but the purpose was to demonstrate their mastery over nature and their possession an unlimited budget.<sup>31</sup> By growing a sub-tropical tree in a temperate environment (figure 3.5)

the wealthy proved their contention that humanity was the center of creation by complex structures. Here nature itself was bent to their collective will. The elite and wealthy seemingly competed against each other to prove their skills, or rather that of their gardening ateliers, to raise and bring to fruition this particularly delicate tree.<sup>32</sup> Not all the wealthy participated in the campaign of gardening; however, many supported citrus trade through the purchase of



perfumes.<sup>33</sup> Here money was spent on an extravagant item that is ephemeral, status enhancing, and appealing to the senses. Although these gardens were in the tradition of providing pleasure to the royal figures, the grounds emphasized the wealth of the patron and provided a medium to exalt that status. The orange was chosen to be the symbol of affluence.

Figure 3.6. Willem Kalf, *Still Life with an Oriental Rug*. Oil on canvas, 65 x 54 cm. Ashmolean Museum, Oxford. (Reprinted with permission from WorldImages Database.)

Contemporary to these seventeenth century gardens were the Dutch and Spanish genre paintings. Willem Kalf's *Still Life with an Oriental Rug* (figure 3.6) from 1660 is representative of the style. When these still life paintings included citrus, either an orange or a lemon, the fruit was often depicted as half

peeled. These are likely to be accurate renditions that reveal the popular use for the fruits. In compositions they depict the common practice of the time of rubbing the peel of the orange on the rim of the glass. This culinary practice releases the essential oils onto the beverage, and it is considered as an enhancement to its flavor. The practice is the result of the interactions between Dutch sailors and the Chinese elite.<sup>34</sup> Here the orange embodies the qualities of Dutch and Spanish commerce, displaying access to a widespread network that provides valuable products.<sup>35</sup> If the orange symbolizes wealth, it could also represent worldly knowledge and refined taste.

The geographic distance between Europe and the New World appears to have changed the symbolism for the orange. Where the practice of dedicated orangeries continued among the wealthy of colonial Virginia and Maryland in the eighteenth century,<sup>36</sup> most orange cultivation was restricted to plantations with commercial intent.<sup>37</sup> Sour oranges were cultivated in Florida during the Spanish colonization of the sixteenth and seventeenth centuries. The English colonists inherited the Spanish introductions in South Carolina.<sup>38</sup> However, the obstacles for widespread cultivation were steep. The abundance of other fruits such as apples and peaches, as well as the geographic restrictions in cultivation, prevented the orange from reaching the common status it obtained in Europe.<sup>39</sup>

The emergence of rail transportation networks in the 1870's has brought oranges to its popular and privileged status in the diet of the population.<sup>40</sup> That railroad connection from western groves to eastern market was the advent of the

modern era. The railroads sponsored events and fairs for tourists, with the intent of bringing new emigrants to California.<sup>41</sup> This revolution in transportation changed the symbolism surrounding the orange. It was no longer something for the rich, instead it was something that made one rich.<sup>42</sup> Much of the travel literature extolled the wealth one could obtain growing oranges.



Figure 3.7. Mutual Label & Lithograph, *Orange Blossom*. Lithograph, 25 x 27 cm. (Source: Pomona Public Library)

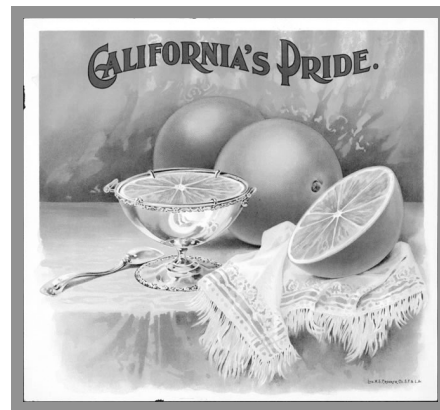


Figure 3.8. Mutual Label & Lithograph, *California's Pride*. Lithograph, 25 x 27 cm. (Source: Riverside Public Library.)

Labels were not exclusive to packinghouses or to growers. These two examples from the 1890s, demonstrate different brands using the same motif.

Oranges are remarkably plastic when considering the symbolic roles assigned to them. On the cusp of the modern era in the United States, oranges were shipped from California and Florida to markets in the heartland and along the eastern seaboard. This activity began just as commercial art was beginning to expand.<sup>43</sup> Representative of that art is the orange crate label (figures 3.7 & 3.8). These labels were more than attempts at persuasion and enticement, they were symbols intended to justify a premium to be paid for the fruit and to establish reputation.<sup>44</sup> Although growers initially resisted the exhortations of the Sunkist cooperative board to increase advertising, numerous billboards, print

advertisements, and store signage were developed and placed in public view.<sup>45</sup>

These images had the direct purpose of convincing the American public to view "eating an orange a secular sacrament."<sup>46</sup> The scale of this advertising, with over one thousand billboards in eleven urban markets, at the height of the Great Depression, illustrates the depth and conviction of their attempts.<sup>47</sup>

The diffusion of oranges across the globe depended on this symbolism. In the following chapter, it will be shown that the cultivation of oranges was not a trivial effort, the planting of groves required significant outlays. For a population to adopt these trees, their perception of oranges needed to justify their expenses. Given the imagery surrounding oranges, the status they achieved both on the personal level and in the commercial market should not be surprising.

## CHAPTER FOUR: THE ORANGE, GARDEN TO GROVE.

The modern opinion of the garden is that it is a place for recreation; it is a setting where one practices a hobby.<sup>1</sup> If it is a flower garden, a viewer assumes that the purpose is to provide a landscape for the gardener to enjoy; it is an indulgence in the aesthetics of nature. When the garden is used for entertaining guests, it is done so to extend a friendly gesture. That same audience looks at the vegetable garden, or perhaps better identified as the kitchen garden, and develops the impression that it provides a fresher or preferred variety of a food.<sup>2</sup> These perceptions overlook the prestigious origins of the garden. As humble as they may have been, gardens were among the first biotechnology research centers; and they continue to play that role in the modern botanical garden and the agricultural university. This essay focuses on the scientific and commercial roots of the garden, examining the subject with an emphasis on issues pertaining to orange trees. The subsequent essay focuses on the political roots of the garden.

It is improbable that the garden originated to serve frivolous purposes or that aesthetics were the prime motive for establishing the earliest examples. On the other hand, it is most certainly an overstatement to assume gardens, or agriculture in general, arose as the solution to insure immediate survival. The eminent geographer Carl O. Sauer explains his reasoning on that premise with his observation: "People living in the shadow of famine do not have the means or time to undertake the slow and leisurely experimental steps out of which a better

and different food supply is to develop in a somewhat distant future."<sup>3</sup> Accepting this observation as true, it then stands to reason that smaller scale gardens preceded field crop agriculture. The large-scale agricultural fields of Mesopotamia and Ancient Egypt could not have sprung up overnight; the genesis must have been a series of horticultural plots involving trial and error.<sup>4</sup> Then the lessons learned in those smaller plots were applied in the communal space for staples. Furthermore, this growth from horticulture to agriculture did not force the abandonment of the kitchen garden. Since these were under the purview of the women of the house, proximity to the domicile was inherent.

The kitchen garden had the dual purpose of supplying the house with secondary foods and small trade for the market.<sup>5</sup> In those ancient kitchen gardens, scientific discoveries were made and agricultural techniques were perfected; discoveries and techniques that are still in use in modern times.<sup>6</sup> These small-scale plots also established the foundation of the variety of secondary foods available. This too has continued through all of human history.<sup>7</sup> This perspective describes the garden solely as a place of investigation and production, wholly lacking any component of leisure. Although its role of scientific discovery has waned at the personal level, in educational and government settings that role continues.

It was against this background that the practice of citriculture, and specifically orange cultivation, began in southern China.<sup>8</sup> That the first recorded instances of oranges describes them as an object of tribute to the Han Emperor

by the Chwang people before 1000 BCE<sup>9</sup> infers that the Chwang had a citriculture industry producing a sufficient quantity to offer the fruits as tribute. That industry, alongside the rice cropping and fish farming, provided a strong agricultural base.<sup>10</sup> It is noteworthy that they considered these fruits to be precious and appropriate for presentation to royalty. It implies that the trees were not planted to feed the peasantry; instead, they were grown as a prestige crop.<sup>11</sup> Farmers probably recognized the value of oranges as secondary or peripheral food, and grew them to supplement diet and income.<sup>12</sup> It is odd that fruit in general is not particularly featured in the traditional Chinese diet.<sup>13</sup>

One characteristic of citriculture that undoubtedly enhanced its value is its fecund nature. The propagation of cuttings is at the base of agriculture and citrus is particularly well suited for that practice.<sup>14</sup> Grafting and budding have similar primeval origins (see above). Since citrus trees are so amenable to all these practices that it is reasonable to conclude that these practices were applied to citrus.<sup>15</sup> This is a crucial economic aspect because field crops bring a near immediate return on investment; the plants are harvested within a season. That feature appeals to small-scale farmers who need an immediate return on investment. Conversely, to establish a grove, orchard, or vineyards, one must make a substantial capital investment, and that outlay will not be repaid until the land yields a significant crop. In the modern orange grove, the first marketable yield arrives five to eight years after planting seedlings, and it takes at least ten years for the trees to mature and come to full production.<sup>16</sup> Note that the time lag



can be significantly shortened, to five years or less, if the tree is budded.<sup>17</sup> The other advantage of grafting, the ability to interchange the root and scion portions, is vital when the grower needs to match the rootstock to soil condition.<sup>18</sup> This is pointed out because these techniques were part of the common knowledge in the Mediterranean region when oranges were introduced into the Islamic world.<sup>19</sup> Undoubtedly, small-scale farmers used these techniques; they would have been foolish to ignore them. Nevertheless, the commercial grower was more likely to exploit and gain the most benefit from them.<sup>20</sup> If establishing and maintaining a grove needs substantial investment in labor, money and time, then it suggests, if not demands, involvement by an elite class. Small farmers could afford to attempt trivial efforts, but how many would risk their prestige crop in experimentation? A commercial grower would have the sufficient capital to withstand failures of the experiments, and would possess a ready market for the results, both for the fruit and for the methodology.

Watson used the term, revolution, to describe the expansion of agriculture in Islam between 700 & 1100 CE.<sup>21</sup> This dramatic term is appropriate because it accurately describes the substantial increases in variety, quantity and quality of agricultural products that were cultivated and available.<sup>22</sup> The expansion of Islam was a complex event because it involved the migration of people as well as the transmittal of an idea.<sup>23</sup> The first wave is, by definition, the *avant-garde*, and it is safe to assume that these people were adventurous. It is an established pattern that when people migrate, they bring their agricultural practices and

customs. However, those migrants will also be amenable to incorporating new ideas and crops. Therefore, an increase in the diversity of crops and the exchange of techniques is an expected outcome. The migration also opened the trade routes to the flow of products from India and Asia; and it was somewhere among those trade routes where oranges and lemons were discovered and brought to Oman.

The geographer Masûdi wrote his narrative *The Golden Meadows* in 943, in which he records that citriculture was introduced to Oman from India in 912.<sup>24</sup> Oranges quickly spread north to Basra and Baghdad, and were added to the gardens of wealthy merchants. Basra, the premier trading center of the time,<sup>25</sup> could draw from the long tradition of gardens and private horticulture.<sup>26</sup> In those places, citriculture would have been a natural addition; citrus trees provide flowers, fragrance, fruit and year round shade. Considering the climate and sun exposure, citrus is an ideal tree for gardens these locations. Moreover, since the introduction of oranges lagged earlier advancements and plantings, the growers were able to apply the recent advancements in irrigation and agronomy to its cultivation. Once in place, orange cultivation experienced a meteoric rise.<sup>27</sup> Cultivation spread across the Islamic lands of Southwest Asia and North Africa eventually reaching Spain between 940 and 950 CE.<sup>28</sup>

Merchants follow the flag because the relationship is symbiotic.<sup>29</sup> Those who emigrated across the Mediterranean needed to be relatively adventurous, and whether they were compelled or enticed by the lure of new riches success,

those merchants chose to establish themselves in a new and untested market.<sup>30</sup> An important group occupying this economic terrain were the traders attached to the ruling household. A *tadjir* was a merchant who worked under the aegis of the local political authority.<sup>31</sup> He reported, inspected, negotiated, and bought goods for himself, the local marketplace, and for the ruling class. He was a commercial agent with a royal customer. This was not unprecedented; merchants had often worked in close cooperation with state apparatus and acted as de-facto ambassadors.<sup>32</sup> This affected citriculture because these merchants were the agents who carried the fruits, seeds, trees and information. The initial migrants likely brought their crops and techniques and then incorporated foods they found in the new lands. No doubt, core foods and staples were first and foremost among the foods that were introduced and cultivated. Nevertheless, once the population is comfortable with food security, increasing the cultivation and production of secondary foods is an expected response. Watson lists fourteen separate crops including citrus that were introduced to Islamic lands prior to the thirteenth century.<sup>33</sup> *Tadjirs* and other merchants facilitated that dispersal.<sup>34</sup> Still the appeal of orange cultivation must have been strong for the supporting industry to be so quick to grow. The placement of oranges in the courtyard of the Great Mosque in Cordoba is unlikely to have been a pioneer project; it is difficult to conceive that such a prestigious location received saplings.<sup>35</sup>

The complexes built by the caliphs of Cordoba were often described as pleasure palaces, but that portrayal is too simplistic.<sup>36</sup> The palace of any ruler

needed to serve multiple purposes. The basic role of a personal residence was overridden by its position in the military and political realm.<sup>37</sup> The other responsibilities of a ruler, as an educator, a philosopher, and the leading religious figure bring varied requirements. The grounds needed to symbolize the physical strength of the society, to provide the political means to culturally bind the people, to exhibit the educational capability of the people, and to stand as a sacred edifice. A single structure could not fulfill that role; a complex was needed.<sup>38</sup> To raise oranges and other citrus required wealthy participants, and Watson points out that the original plantings were elite driven.<sup>39</sup> A nursery could support both private and public needs; the output could fill an intimate garden or be given as *waqf*, (a donation) e.g., to the mosques of Cordoba and Seville.<sup>40</sup>

Why sour oranges lagged behind the citron by over one thousand years in reaching the Mediterranean is curious.<sup>41</sup> Many fruits, such as the peach, apricot, and citron were imported to the Mediterranean basin from China; and those fruits had crossed the Indian peninsula by Roman times.<sup>42</sup> So either that subcontinent was bereft of oranges or their cultivation was so minor that traders overlooked it.<sup>43</sup> What is known is that when the sour orange was introduced, the trade routes and plant sciences of the Islamic lands were well developed. This is notable because the diffusion and dispersal of agriculture is more than an exchange of seeds. The von Thünen model proposes that vegetables and fruit are produced in the area closest to market.<sup>44</sup> However, value could override that distance restriction, provided the available transportation could deliver the

shipment intact. The value was apparently great enough for trees in pots were transported; a practice that was intended to insure successful propagation at the destination.<sup>45</sup> Value aside, if the fruits and vegetables were too bulky or perishable for transport then seeds and cuttings or grafts could be distributed. However it may have occurred, the transfer of plants, seeds, and fruits were not enough to insure success, an information flow was also necessary.

Merchants with tales from distant lands describing foods and their preparation as well as architectural and garden designs were instrumental in whetting the appetites of the elites.<sup>46</sup> Promoting those discoveries were the hundreds of manuscripts written in the ninth through twelfth centuries.<sup>47</sup> These manuscripts were not monographs of contemporary ideas, but rather represented the culmination of science to that point.<sup>48</sup> The authors often collected knowledge from multiple sources and produced a compendium for particular audiences. Thus, these manuscripts were not intended for the local farmer; the cost and literacy requirement placed them out of the reach of the poor or tenant farmer. It is a safe assumption that the intended readers were the wealthy property owners and the elite class. However, it does not preclude the practices from being widely dispersed; a landlord who could read probably issued oral directions to his tenant farmers based on his scholarship. Moreover, the manuscripts were necessary to accommodate the rate of advances in the agricultural sciences; the capabilities of an oral tradition are limited and the concepts too complex to effectively transmit.<sup>49</sup> Another factor was that a manuscript overcomes the drawbacks of

plant dispersal by seed or cutting; the manuscript could be lent, copied, or presented depending on the circumstance. The last and most important feature was that manuscripts were considered authoritative; the written word was judged to be an immutable aggregation of knowledge.<sup>50</sup> This would be important to elites who constantly sought to acquire new and better products, as well as to develop new ways of conducting business.

Combining the evidence of the grounds, the plants, and the manuscripts creates a different view. It is unquestioned that palatial gardens contained a pleasure aspect; the landlords and the rulers would not abandon a practice with such deep roots. However, it is certain every political leader recognized the need to insure food availability in the urban centers. Given the frequency of revolt among the societies, food security must have ranked as highly or higher than securing the borders with military means.<sup>51</sup> The gardens employed every irrigation method known at that time, from wells to aqueducts, and they used the *noria* and the *shadduf* to deliver water to the fields.<sup>52</sup> Combined with sheer number of agricultural manuscripts produced during this time, it stands to reason that research and education played a substantial role in these endeavors.

The scientific and commercial nature of the garden did not begin or conclude with the Islamic agricultural revolution.<sup>53</sup> As the United States came together, seminal figures such as Benjamin Franklin, Thomas Jefferson, and George Washington planted gardens and obtained seeds and plants with the intention of expanding the agricultural base of the fledgling country.<sup>54</sup> During

that era, the pioneer farmers in Florida and South Carolina shipped their produce to vibrant markets in New York and Philadelphia. Indeed, Washington's diaries record his procurement of oranges and trees from South Carolina.<sup>55</sup> Still, it was not until 1870 before a truly national focus was placed on citriculture. The newly formed Department of Agriculture had *Bahia* or navel orange seedlings imported from Brazil to Washington DC.<sup>56</sup> The dispersal of those twelve trees had an unforeseen and dramatic impact on the nation, for two of them were sent to Mrs. Tibbets in 1873 and from those trees, an entire industry was born.<sup>57</sup> It should be noted that citrus trees were not the only import to the west coast. Eucalyptus trees were also brought to California from Australia and were planted to create windbreaks to protect those fledging groves from the Santa Ana winds. This action had an unintended and dangerous consequence.<sup>58</sup> Scale insects were resident on the trees, and the pest quickly multiplied; and quickly spread to the citrus groves.<sup>59</sup> Such was the magnitude of the infestation that it spawned the development of new branch of science, integrated pest management. When the first attempts at control, fumigating the groves with cyanide, proved impractical,<sup>60</sup> the USDA sent an agent to Australia. Albert Koebele was dispatched with the directive to find a predator for the scale insect and his response was to send back ladybird beetles.<sup>61</sup> The success of this biological control encouraged further advances in the methodology.<sup>62</sup>

Citrus in general and oranges in particular, have instigated significant efforts by their growers. Although many of these efforts were intended to

increase the wealth of the patron, the benefits extended into the scientific realm. The efforts do not qualify as an organized promotion, for little of it was centrally directed. However, there is no denying that many participated with the purpose to reach a destination or complete a task. Whether the situation was more evolutionary than revolutionary matters little, the important aspect is that the importation and dispersal of crops and foods flourished throughout the eighth to twelfth centuries, and did so under numerous ruling parties. The arrival of those new crops also opened communications channels and expanded the flow of information. Agricultural expansion itself demanded that flow of information in order to be successful. These secondary actions were unlike the other commercial exchange of the time. The acquisition of other prestige items such as textiles, precious metals and stones, did not provide impetus for passing on methods of production or information on use, it only created more demand for similar items. Where it is true that the gardens of the rulers and wealthy elite excluded the greater population, it is also true that such gardens provided opportunity for that broader public. The publishing industry benefited from the demand for books and dissemination of this specialized knowledge and certainly the gardeners and landscape architects came from both the ranks of the formally and informally educated. It is noteworthy that the agricultural manual has roots in those ancient times and that citrus had a prominent role in those texts.<sup>63</sup> Although the orange or citrus cannot be attributed to be the sole impetus for



these innovations, it must be recognized that the peculiar characteristics of citrus were likely strong influences.

## CHAPTER FIVE: THE EARTH TRANSFORMED

The enduring reputation of the garden in history is epitomized by its inclusion in the book of Genesis.<sup>1</sup> That garden did not feature field crops; those were reserved for the later punishment.<sup>2</sup> The Garden of Eden was a place of leisure; the field was where work was performed. That in mind, it should not be surprising to learn that it was the early walled orchards and vineyards that evolved into royal patios and pavilions.<sup>3</sup> Although food rarely appears in tribute lists of Southwest Asia, the elite classes did not ignore it. The extensive trade network of the Phoenicians moved staple grains and similar foods, as well as transporting ornamental plants and nursery stock.<sup>4</sup> Nonetheless, it is not unreasonable to assume that the market for exotic plants was probably restricted to the royal and the elite classes.<sup>5</sup> As a symbol of wealth, a garden on par with the palace dwelling was a good indicator of the exalted standing.

### AN EARTHLY PARADISE

The appeal of the garden lies in its versatility and plasticity. In that respect, a garden can be approached in a similar manner as one does a museum.<sup>6</sup> Visitors can be enticed to stop briefly to glance at objects, perhaps long enough to observe details and admire them, but never to impede their progress. However, similar to the museum, the views are manufactured and controlled by the arborist. Similar to the museum curator, the gardener places the objects in a fixed arrangement; the difference being the gardener uses plants instead of exhibits. This person selects flowers, fruit, and foliage to attract the attention of the visitor

and to weave them into a cohesive pattern. As in all art, a garden's allure lies in the manipulation of the formal elements.<sup>7</sup> The garden has one advantage over other art forms; it can appeal to the sense of smell, as well as to hearing, and to some extent, to the sensation of touch.<sup>8</sup>

That versatility and wide spectrum of appeal lends itself to its amorphous role. The garden is naturally a liminal zone.<sup>9</sup> It can equally represent the transition from the wild to the civilized or from the profane to the sacred. In the urban environment, it can be the buffer that lies between the public space and the private one. For the ruler, a garden can be an extension of the throne or used as a private refuge. For the less powerful, a garden provides a place where the natural inclination is towards relaxation, placing its visitors in a relaxed atmosphere thereby gaining their trust. It also can be a showcase for wealth and prestige. This latter design principle is repeated today; the reception area of any given company is usually a highly decorated zone, often populated with plants and artwork; the purpose being to place visitors at ease and create an impression of wealth.

The finest instances of using oranges in a garden setting are the mosques of Spain. The Patio de las Naranjas, in the courtyard of the Great Mosque of Cordoba, is a prime example of the garden as a liminal zone (figure 5.1 & 5.2). Created during an expansion of the structure during the reign of Al-Mansur, these trees echo the interior of mosque.<sup>10</sup> The trees provide a gentle progression from the profane through an earthly paradise phase into the sacred realm.

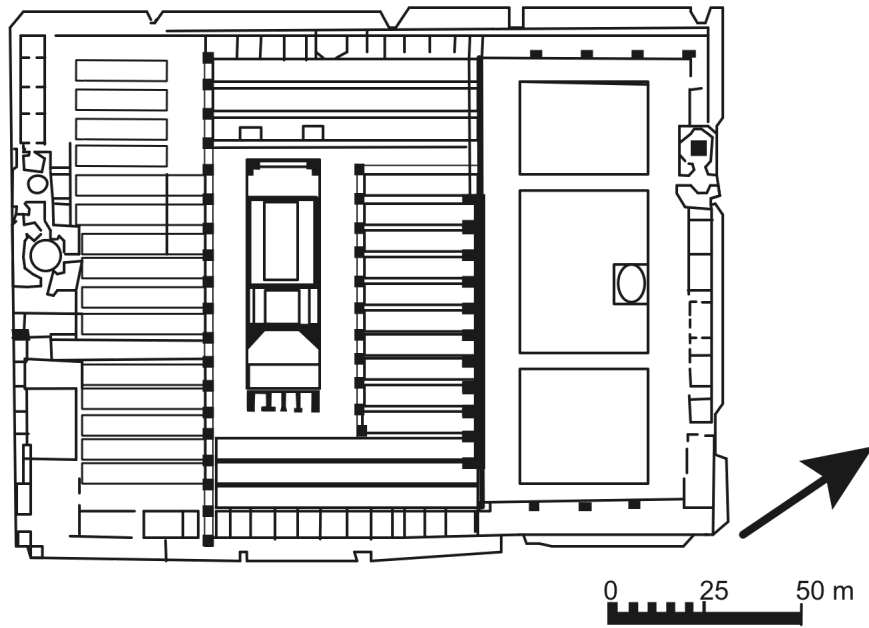


Figure 5.1. Plan of the Great Mosque of Cordoba. Author drawing after Mitchell.<sup>11</sup>

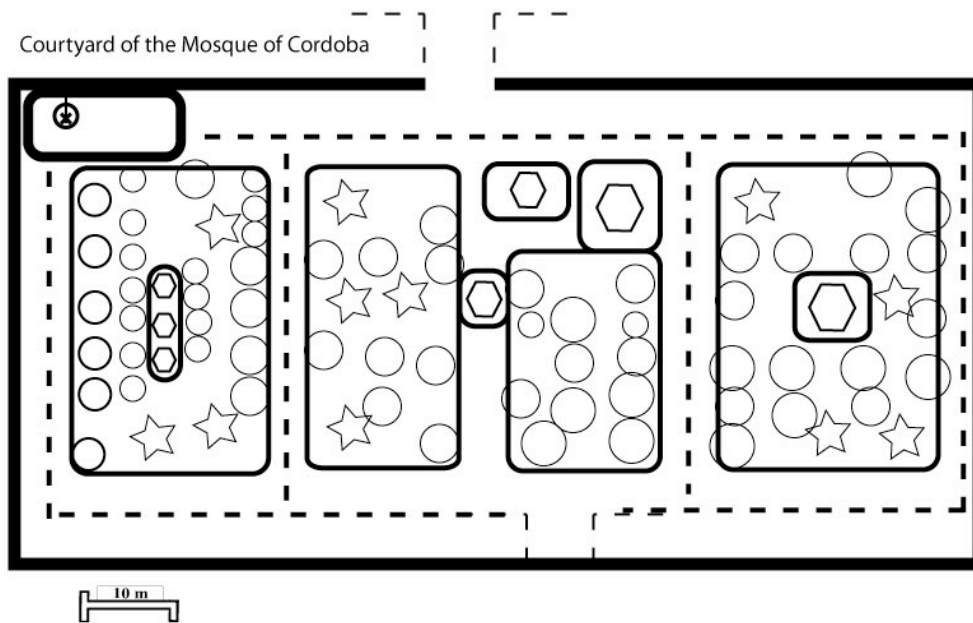


Figure 5.2. Detail Courtyard Mosque of Cordoba. Author drawing after Google Maps.

Bounded by the exterior walls, this garden directly echoes the original form of the ancient Middle East.<sup>12</sup> The walls precisely delimit the boundary between the purely secular street from the courtyard garden, and allow the zone where the sacred and secular overlap to develop. Included in the mosque garden is the ablution fountain, which when combined with other fountains, brings the cleansing water that prepare the adherents in their approach towards the holy. It may be from this setting that the trees acquired their reputation of purifying the spirit.<sup>13</sup> A crucial aspect of this garden is that it successfully weaves plants, stone, water, and air into a complex level of meaning that is found in the worship and communion of the faithful.<sup>14</sup>

The other place where oranges are centrally located is Seville. Also known as the Patio de las Naranjas, it repeated the concept of transitioning the space between the public street to a private *madrassa* and sacred mosque.<sup>15</sup> Unfortunately less is written about this space; Tolkowsky failed to cite dates for the founding, providing us with only the name of the patron.<sup>16</sup> However, the resemblance to the layout in Cordoba is undeniable. In both spaces, the trees provide shelter and shade, a sensory respite from the summer heat and brightness. The irrigation canals supplying water to the trees and fountains further stimulate the senses. Tolkowsky points out that this infrastructure was not restricted to this space; canals and irrigation were extended to the greater city.<sup>17</sup> Furthermore, manuscript production in Seville was significant: two notable authors, Ibn al-Awwan and Abu'l Khayir, hail from this region.<sup>18</sup> Perhaps

the most noteworthy aspect of this planting is that sour oranges are, by and large, commonly referred to as Seville oranges. This power of naming may be the result of Seville's role in the voyages of Columbus, but it also informs the modern audience of the importance of this fruit to this place. The placement of oranges within these sacred locations highlights the value that was placed upon them. It is reasonable to assume that these initial plantings were ornamental, and not primarily for food production, which implies that their appeal was aesthetic.<sup>19</sup> In fact, it was the physical characteristics of the tree that develops this charm. The tree itself is sturdy and tall, mature specimens can reach heights of 10 meters. The evergreen foliage represents continuity with an enduring status matched by the life span of the tree. Prolific and pungent, its white flowers are sweet that have a fullness in aroma. The symmetric globular orange fruit strongly contrasts against the leaves. This culminates with the ultimate sign of fertility; the tree has leaves, flowers, and fruit occurring concomitantly.<sup>20</sup> Assuredly paradise incorporates all those qualities and so the tree was worthy of this central role. Although these gardens benefited from the scientific and commercial advances surrounding citrus, their placement was to fulfill a political and sacred purpose.

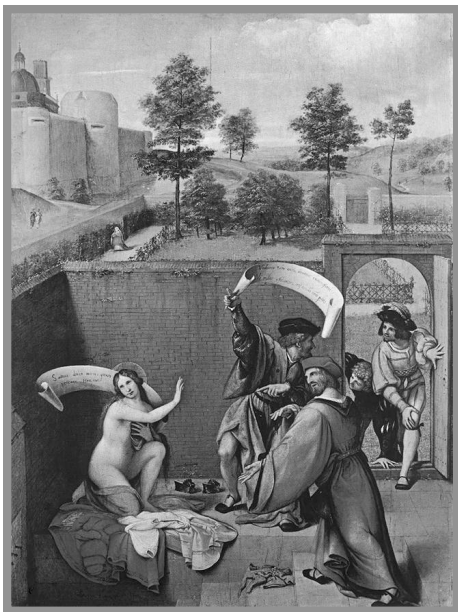
#### GARDEN POLITICS: THE ORANGERY

The palatial gardens in Western Europe took a different path than those in Islamic lands. Although Roger I encountered gardens during the conquest of Sicily and southern Italy, (1061 – 1091 CE) centuries passed before similar grounds were laid in northern lands.<sup>21</sup> Interestingly, the outbreak of the plague

influenced the spread of oranges. Boccaccio's *Decameron* is set in the midst of a plague and contains characters that are sequestered in a garden. This early literature impressed the elite classes with such force that they moved to imitate the characters, down to the setting of a royal courtyard. The *Decameron* provided a model from which they could base their interpretations.<sup>22</sup> Moreover, the smaller population and agricultural base meant that land could be appropriated for these purposes. When citrus joined the garden repertoire in the early sixteenth century, its dispersion of the orange was not as rapid as the previous dispersal.<sup>23</sup> One place where citrus was featured was at the Pitti Palace, in its attached Boboli Gardens.<sup>24</sup> Lying in the urban center of Florence, it is in a setting similar to Cordoba and Seville. What sets it apart from previous gardens is the accommodations needed and undertaken to sustain this citriculture. The littoral of Mediterranean Italy readily supports citriculture; its climate is mild and it has adequate rainfall. However, the cold winters of Tuscany will gravely harm oranges and other citrus. To overcome this obstacle, oranges and other citrus were planted in large terracotta and barrel stave pots. This portable platform allowed the trees to be moved indoors or to protected areas.<sup>25</sup> Unlike their southern counterparts, these trees were moved when the gardener or weather deemed it necessary. The added mobility was more than just protection for the trees; it also endowed a new plasticity upon the garden. Fountains, architectural forms, statuary, and other immovable features could be augmented

with flowering trees that provide shade. In these settings, an ever-changing palette of shade, fragrance and view was available to the patron.

Italy has a long tradition of gardens with the examples from the Roman era spanning urban and rural settings. However, many of these gardens were sites of individual repose, a private place for introspection, study, or entertainment. The role of politics in these gardens was muted; more effort was expended on public art. The emphasis was on the place in the city, so gardens were restricted in their footprint.<sup>26</sup> In a 1571 painting by Lorenzo Lotto, *Susanna and the Elders*, (figure 5.3) the antagonists intrude upon her privacy. These miscreants crossed two walls, an outer perimeter and an internal enclosure. The Italian gardener used masonry walls to delineate and separate the private zone from the wider world. The small size emphasizes its purpose, and the dramatic theme reveals the perception of the garden as a deeply personal inviolate place.<sup>27</sup>



If patios in Spain were public settings, these are mostly private ones.<sup>28</sup> The other structure in this scene, the castle walls, will also change. Many European castles were originally defensive fortifications, built solely to serve a military purpose.<sup>29</sup> Within a century, these buildings would be transformed from military forts to opulent residences

Figure 5.3. Lorenzo Lotto, *Susanna and the Elders*. Oil on wood, 50 × 60 cm. Galleria degli Uffizi, Florence. (Source: Wikimedia Commons.)



There is a martial facet to the earliest orange plantings in France. Charles VIII of France, after encountering gardens during his campaigns in Italy, commissioned the first royal orangery in his chateau at Amboise in 1495.<sup>30</sup> In another war, this one against Spain, Francis I was held in captivity in an Islamic garden. These episodes, along with the subsequent marriage of Francis to Eleanor of Portugal, set in motion the development of the royal residence and garden.<sup>31</sup> Francis also set the tone for subsequent monarchy by making the garden part of the battlefield. In 1523, Francis declared the Duke of Bourbon to be in rebellion. Francis subsequently plundered the Duke's estate and seized a celebrated orange tree from it. The king had this large tree uprooted, transported, and transplanted to his palatial gardens. This tree was subsequently named after Francis and lived for over 300 years.<sup>32</sup> That longevity stood as an icon of the militancy that the future kings of France would promote with their gardens. It was Francis's successor, Henry II, who followed the practices of his father and built a residence and garden for his mistress at Chateau d'Anet. The building he had constructed is the first to use the moniker, *orangery*.<sup>33</sup> These northern European gardens were not refuges or hideaways; they were complex stages for political pageantry.<sup>34</sup>

Two books were particularly prominent in the establishment of orangeries. One describes notable buildings and the other is an agricultural manual. Jacques Androuet de Cerceau issued his two volume set *The Most Excellent Buildings of France* from 1576-1579, which was immensely popular among the wealthy.<sup>35</sup> In

1600, Olivier de Serres penned the *Theatre d'Agriculture et Menage des Champs*; and it is an extraordinary tome that was considered state of the art until modern times.<sup>36</sup> That aspect of the book underscores the value of its mix of practical, commercial, and aesthetic purposes. It is literally a how-to manual for all farm activities, sowing grains, maintaining orchards and vineyards, and raising livestock. By devoting chapters to garden layouts, de Serres communicated to a culturally literate and wealthy audience. That he wrote that citrus could be grown for a profit in the south and if no expense is spared, be grown anywhere, reveals the inroads that oranges made.

The famous orangery of Versailles, commissioned by Louis XIV in 1674, represents the pinnacle of warfare by status display.<sup>37</sup> While contemporary tourists flock to the Hall of Mirrors and other royal apartments, it should be understood that the orangery and gardens that were the centerpiece of this opulent palace.<sup>38</sup> This place was so influential that neighboring German princes responded by building similar edifices. By the first decade of the 1700's, orangeries were started in Dresden, Erlangen, Kassel, and Wickersheim.<sup>39</sup> These buildings trace the evolution of the garden from private space to public magnificence. Where the gardens of southern Europe were located in urban centers, many of these palaces were situated away from the population center. This change in location afforded an expansive plan, giving both the patron and the architect the ability to employ a variety of vegetative and water elements. The purpose of which was create an illusion of carving the garden from the

surrounding wilderness. This detached location also emphasized the status of the owner, and his ability to summon subjects and workers to his remote residence.<sup>40</sup>

It is likely the orange tree was selected for this prominence because of its aesthetic appeal and symbolism. Amboise may be the northern limit for growing citrus in the ground.<sup>41</sup> North of that latitude, the orangeries needed central heating and the trees were in pots.<sup>42</sup> Expensive to build and maintain, these structures were limited to those who could afford such extravagance.<sup>43</sup> Patronized by the ruling class and designed primarily for a political or social purpose, these orangeries brought in exotic plants with minimal attention paid to extending their cultivation to the public sector. Even when horticultural practices were devised and extended to the local populace, the intention was to signal a prowess in this art.<sup>44</sup> No longer did citrus and oranges symbolize paradise nor did they provide income. These were efforts that demonstrated a mastery over nature, and coupled with an ostentatious display of wealth, all to express political superiority. The presence of oranges solidified the status of the sovereign, as one who could command vast resources and force the surrounding lands to bend to his will. If the previous gardens are the forerunner to the modern botanical gardens, these examples resemble the contemporary public park; the exception being that to visit these places, the public needed an invitation.

The orange tree was integrated into a variety of niches in the overall agricultural picture. Although not a particularly difficult tree to cultivate, it is not

as hardy or tolerant of variable climatic events as other fruit trees. Its appeal is obvious, for the orange in the garden provided a unique experience, a combination of evergreen foliage, exceptionally fragrant flowers, and complementary colored fruit. Its versatility is undeniable; it was used to emulate a paradise setting, creating a place where all the senses were activated. When the intent was to demonstrate mastery and wealth, oranges were the vehicles to prove that ability. Most noteworthy is that when new lands were opened, oranges were incorporated into the products among the distribution. Although George Washington cannot be compared to the French monarchy in a political sense, it is telling that one of the edifices Washington was eager to erect on his Mount Vernon estate was the orangery.<sup>45</sup> Perceiving his role as more than as a military or a political leader, Washington also wanted to be the farmer in chief. His decision to grow oranges had both the quality of being a scientific endeavor and a political statement. The former falls into the category seen previously, the development of an agricultural base. As to the latter, it could be said this was a departure from emphasizing personal wealth and was intended upon placing the prominence on the country itself. No longer were oranges restricted to the elite and cultured; now these trees were available to all.

In its native lands, the orange held exalted status.<sup>46</sup> The Han Chinese court had a minister who was in charge of accepting tribute oranges from the southern provinces in a manner that was repeated centuries later.<sup>47</sup> Although it is unknown whether the greater populace consumed these oranges, undoubtedly

the elite class considered it a status food. That modern Chinese orange cultivation was subjected to catastrophe by political decision suggests that oranges still possessed an elite connotation.<sup>48</sup> The next chapter will build on this horticultural base and examine the role of oranges in the food paradigm.

The HTML page attached to this thesis, "European Gardens and Orangeries," examines this topic using Google Maps.<sup>TM</sup> That service provides the reader with the opportunity to see the gardens in a context of the surrounding region.

## CHAPTER SIX: ORANGES IN THE GEOGRAPHY OF FOOD

It is self-evident that food is essential to life and that it is a universal attribute in all populations. What make food an exceptional indicator are the aspects that it reveals about our society. It informs the observer of the climate and the terrain that the culture occupies. Food divulges the state of relations between neighbors<sup>1</sup> and reveals the trade routes they travel. The food that is consumed and how it is prepared gives us insights to the cultural tendencies of the society. This essay examines the progression of the orange as food, from its appearance as an item of tribute to its ubiquitous place on the table.

Food can be defined as anything swallowed with the intention of nourishment, restoration, intoxication, or any other bodily response. This broad description allows the inclusion of non-nutritious substances, e.g., wine, seasonings, flavorings, and adjuncts, which are common additions to the diet.<sup>2</sup> As for cuisine, this describes the typical diet of a society.<sup>3</sup> Within any given society, certain foods are given favor; these foods are universal and important components of the cuisine. Consider the term *Italian food*; when it is used, most people immediately think of pasta and bread, both items made from wheat. If one hears *Chinese food*, then we think of a dish that includes rice. In this way societies are often identified with the food that is common, typical, and distinguishes their cuisine. Anthropologists describe these foods as *core foods*.<sup>4</sup> Added to this are the *secondary* and the *peripheral foods*.

Core foods are central to every society. Settled people historically have focused on a particular grain or grain mix as their core food.<sup>5</sup> That decision is usually one that is made for them by their geographic location; one cannot grow what one does not have nor can one cultivate something that will not thrive in the environment. Supplementing the core diet are the secondary foods, which are usually meats, vegetables, fruits, and dairy. In pastoral populations where dairy and meat are considered the core foods, vegetables and fruits remain secondary foods. Peripheral foods have the broadest definition. These foods may be rarely consumed because they are seasonal, are expensive, or are limited for another reason.<sup>6</sup>

Peripheral foods have always commanded heightened attention. The classic example is the trade of peppercorns between India and Rome, which was particularly lucrative.<sup>7</sup> When interest for a peripheral food is strong, great efforts will be expended.<sup>8</sup> Expensive and rare spices as seasoning ingredients are natural components in status displays.<sup>9</sup> Some peripheral foods that acquired symbolic values were incorporated into religious and social activities. One example is the citron, which was the first citrus fruit cultivated in the Mediterranean basin. As part of the Festival of the Tabernacles, the Jewish population solely directed this propagation to satisfying a demand.<sup>10</sup>

The orange first appears in history as an item of tribute by the Chwang (see above). Since it was offered in tribute, it indicates that oranges were considered peripheral food.<sup>11</sup> The abundance of black pepper and oranges today

demonstrates that peripheral foods do not always remain rarities. When oranges were introduced to the west, they were cultivated in ornamental gardens.<sup>12</sup> This too describes a continuation of that peripheral role. The use of the sour orange in dressing meat implies a consumer of some prestige.<sup>13</sup> The subsequent use of the peel for essential oils in perfumes and soap making further describe the wealth of the user. Moreover, it is unlikely the oranges competed with apples for space in the field;<sup>14</sup> and although olive trees share the climate requirements of citrus, olives provide a high value crop with greater versatility. It was the geographic restrictions, the seasonal availability, and the inherent fragility of fruit that pushed oranges into their peripheral role. The introduction of sweet oranges in Europe, combined with later improvements in transportation and storage technology, are what brought oranges to the markets as a secondary food.

Secondary foods can be important indicators of a culture and society because these foods are usually restricted to geographic boundaries. Their availability and use describe the environment in which they are grown. Since they also can be obtained over trade networks, they provide indications of their value in society. This aspect is vital because where core foods are often staples, which can be transported over great distances and have a long shelf life, secondary foods are usually perishable and are only distributed over short distances. The appearance of a new secondary food may be the result of an influx of immigrants. For many people, foods from the homeland are a bridge to another time or place.<sup>15</sup> Another factor is the desire for variety in the diet. The



Islamic agriculture revolution that brought oranges to the Mediterranean focused on the introduction of the secondary foods: sugar cane, eggplant, spinach, and similar foods, were the bulk of the importations.<sup>16</sup>

This provides a link to the most notable characteristic of secondary foods, which is when they are added to the diet, they do not displace existing forms. A fruit or vegetable added to the local market may diminish the consumption of other foods already consumed but will not replace it.<sup>17</sup> The addition of these new foods added to the variety and was often a sign of pride in many societies. Many of the medieval travel writers and geographers emphasized and regaled the variety of secondary foods of a given market and disdained the ones that had a paucity of selection.<sup>18</sup> The markets of Basra, Cordoba, and Hwang Chou were renowned for the astounding selection of food available, which is an indication of the wealth of the residents of those cities.<sup>19</sup> It also follows that for a peripheral food to attain secondary status there must be some inherent appeal. To that, note that the contemporary Chinese diet does not include large amounts of fruit.<sup>20</sup> This is mentioned because from this origin point, the orange crossed the needed to cross the Indian subcontinent. On that landmass, sour oranges and Rangpur limes share a common form and are plentiful. Sweet oranges were apparently not as plentiful as Arab traders did not obtain or mention them.

The dispersal of the sweet and sour orange to New World sites was significant in the transition of the orange from peripheral to secondary food.<sup>21</sup> Those colonists were a select group, *de facto* royalty. Whether a humble friar or

*conquistador*, they laid claim to the land, and brought the foods of their choice.<sup>22</sup> Mariners, cognizant of the value of citrus, were probably the first to adopt citrus as a secondary food.<sup>23</sup> Nevertheless, in North America, oranges remained a peripheral food for centuries. In the late eighteenth century, George Washington erected a greenhouse that was aligned with his other agricultural projects, a program geared towards identifying and establishing crops for the new country (see above). However, his plantings of sour orange trees were not oriented towards food production, but rather were planned for ornamental purposes.<sup>24</sup> Given that the majority of groves were of the sour variety, one could reasonably assume the flavor continued to relegate them to the periphery.<sup>25</sup> Sweet oranges were available, but they were in French controlled New Orleans and in the Spanish missions in California, so access to them was severely limited.<sup>26</sup> What brought oranges in from the periphery was a radical makeover of the continental transportation networks.

The traditional model in geography regarding food is the Von Thünen circle<sup>27</sup> (figure 6.1). Von Thünen proposed that land use is determined by the cost of transporting a given item from its place of origin to the market of its consumption. He recognized that if all factors were equal, the economics of transporting the foods and other fundamental items to market would determine its availability. His typical circle describes dairy and horticultural products, i.e., vegetables and fruits, as being grown closest to any given the market. When refrigeration is unavailable, perishable items are replenished on a daily basis.

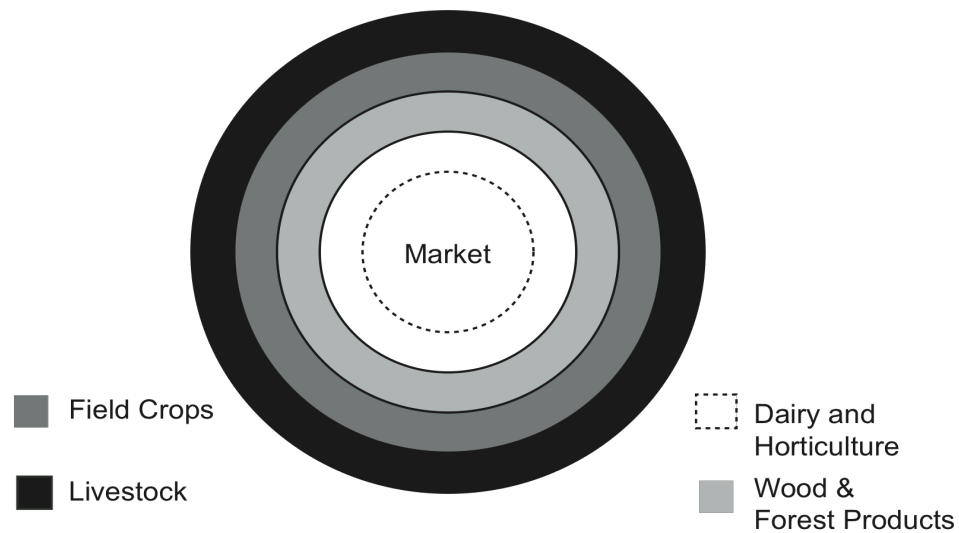


Figure 6.1. The Von Thünen Circle.

Wood and forest products are heavy and difficult to transport so locating them close to the market reduces transportation costs.<sup>28</sup> Grains and other staples can be stored remotely and brought to market on an as needed basis.<sup>29</sup> Finally, livestock at the outlying fringe can be brought to market on the hoof so transporting them in this manner is cost effective. Where this model is still useful, changes in technology in transportation and storage have altered it.

In the United States, oranges were among the first foods to be commercially shipped via the new railroad lines.<sup>30</sup> When those railroads reached the western groves during the 1880's, it changed the dynamic. A relatively low cost of transportation, combined with the introduction of refrigeration, meant fruit could be moved over a greater distance.<sup>31</sup> While nearly every state in the United States has apples and other fruits available from local sources, commercial orange cultivation is limited to states with a sufficiently warm

climate.<sup>32</sup> Suddenly, oranges that were grown far from population centers became available in distant and lucrative markets. Another important aspect was their mid-winter arrival. California navel oranges were delivered to those distant eastern and northern markets where they could be stored in unheated warehouse. The last factor was that other fruits were out of season and unavailable in a fresh state. Undoubtedly this enhanced the position of oranges and added to their popularity.<sup>33</sup> These innovations made oranges plentiful and economical, paving the road from the periphery to the mainstream. The other state that was a major producer, Florida, had the advantage of sea routes that connected its groves to eastern seaboard ports. However, this advantage was all but lost when devastating freezes in 1894 and 1895 decimated the groves.<sup>34</sup> However, not all was lost; another technology brought Florida back to prominence in citrus and orange production.

The practice of processing of foods into alternative forms dramatically changed the economics of bringing foods to market; and perhaps the best example of that change is the orange. Previously, the fruits were shipped exclusively as a fresh item; and processing was limited to the packing of crates. However, when the technology of frozen concentrated juice was introduced in 1948, the growers quickly adopted it.<sup>35</sup> This adoption was so widespread that since 1950, nearly 80% of the Florida orange crop is processed into juice.<sup>36</sup> This technology fueled an exponential growth of the market for citrus and oranges. If we examine this practice in terms of the von Thünen model, it is clear that the

frozen juice producer, Minute Maid, buys the oranges from Florida growers as a local buyer, which conforms to that standard model. Where the difference lies is that in the von Thünen model, the market is the end customer. In this case, the end customers may be two steps further down the chain.<sup>37</sup>

It must be stated that the von Thünen model for secondary foods is still in effect and is prominently visible. In urban centers, farmer's markets bring horticultural products directly from the field to the consumer. Another overlooked source of secondary foods are personal gardens and plots attached to residential housing. Born from the tradition of doorway foliage, used both as decoration and for consumption, these individual plantings to provide immediate access to secondary foods. In these cases, fruit trees may not be the result of hobby gardeners. They are often the remnants of previous agriculture or attempts by developers to identify with that history.<sup>38</sup>

Oranges will never occupy a position as a core food. Produced in abundance, societies rely upon core foods for sustenance.<sup>39</sup> Core foods appear in nearly every food event; e.g., wheat can be served as a gruel, porridge, or breakfast cereal as the morning meal, then as bread during midday meal, and in noodles, beer, and cakes during the evening repast. Furthermore, within those preparations are the array of forms it may take; consider how many types of breads and noodles exist. Usually staples, e.g., grains such as wheat, rice and corn, are the most common core foods. Meat, fish, dairy products, tubers or legumes can be a core food.<sup>40</sup> So important are the core foods, that they are often

subject to political and trade mechanisms such as tariffs, import duties, export restrictions, and other restrictions that are designed to enhance the status of the domestic supplier. To have something ready to release to the market, growers and governments build silos and granaries to store the harvest for later distribution. Keeping the population fed has always been and still remains an important mission; food riots are not sparked by shortages of fruits and vegetables.

Despite not being a core food, oranges have attained a status previously reserved for these foods. The orange may not be a national food, but it is closely identified with the states of Florida and California. Moreover, these states devote considerable resources to citrus cultivation and to oranges in particular. Beyond those efforts, the United States government, through its Agriculture and Commerce departments, elevated these fruits to a status usually reserved for staple grains.<sup>41</sup> The United States is not alone in this policy; all major citrus producing countries have promoted the orange to national prominence. Brazil's efforts to revive its orange cultivation after the Second World War have been as concerted as the green revolution in Mexico.<sup>42</sup>

For a given food to be chosen for cultivation, it must occupy a position as a core, secondary or peripheral foods to propel it through society.<sup>43</sup> It is significant that oranges were not necessarily planted for consumption, there are many instances of oranges in the Mediterranean basin that were originally cultivated in ornamental gardens and similar specialized plots. The landlords of these gardens

were often the elite and ruling classes, and as such, likely imparted a prestigious status upon the orange. Those qualities then imparted a standing to the fruit of deserving a royal or elite rank. Indeed, during medieval banquets, the number of orange sections a person was allotted was connected to the status of the diner.<sup>44</sup> In this situation, the status of person who consumes it, “a meal fit for a king,” elevates the standing of the food being consumed.<sup>45</sup> By these actions the orange was given an elevated place in the diet and in its overall status.<sup>46</sup>

Nonetheless, prestige was insufficient to move oranges from a tertiary position in the diet. Only when the variety of citrus became available was it more widely consumed. The sour oranges that were cultivated across the Mediterranean could not be eaten out of hand and so were limited to seasoning fish and roasted meat or in for use in drinks. It was the introduction of the sweet orange that brought about an increase in attention and a wider consumption. Yet that was still inadequate, for the distance from the groves to the markets prevented the growers from delivering necessary quantities to affect change. It was the transportation advances that brought oranges to markets and to their current status as a secondary food.

## CHAPTER SEVEN: AESTHETIC CONSUMPTION

The appeal of citrus lies in its versatility. At this point, it is vital to recall that the first orange introduced to the west was the sour orange. This fruit is all but unpalatable for out of hand eating; it was used for juices and preserves.<sup>1</sup> Watson argues that citrus was underappreciated; in societies where wine and beer consumption was not prevalent, citrus juices were a welcome alternative to water.<sup>2</sup> Moreover, even when the pulp was consumed whole or juiced, it left behind a rind that is filled with essential oils, which are useful in culinary arts and perfume making.<sup>3</sup> The flower is especially fragrant and lends itself to perfume and soap production. Such uses reinforce the theme of a wealthy patron sponsoring groves. The production of perfumes required substantial investment, the ingredients were expensive, the talent rare, and would attract a select clientele. Therefore, the diffusion of the orange was in part determined by its extracted value by those who consumed it.

Food as an object of desire has a long history in art. An example of this is *A Table of Desserts* by Jan Davidsz de Heem (figure 7.1). The provenance of this painting is interesting, it was once owned by Louis XIV of France.<sup>4</sup> Depicting an eclectic collection of fruit, it is a fanciful composition that brings together fruits of different seasons all in a perfect state. Although the purpose of the image was not to document dietary habits, it highlights the





Figure 7.1. Jan Davidsz de Heem, *A Table of Desserts*. Oil on canvas, 149 x 203 cm. Musée du Louvre, Paris. (Reprinted with permission from WorldImages Database.)



Figure 7.2. Willem Kalf, *Still Life with a Oriental Rug*. Oil on of canvas, 65 x 54 cm. Ashmolean Museum Oxford. (Reprinted with permission from WorldImages Database.)



Figure 7.3. Luis Egidio Melendez, *Still Life with Oranges, Jars, and Boxes Sweets*. Oil on canvas, 48 x 35 cm. Kimbell Art Museum, Fort Worth. (Reprinted with permission from WorldImages Database.)

changes that occurred. Prior to the seventeenth century, fruits were not featured in the diet. The prevailing belief before that time was that most fruits were cold, and thus unfit for consumption by adults.<sup>5</sup> This image is one of opulence and wealth celebrating a sumptuous event. The emphasis is on the variety that fills the table and the quality of the utensils, such as the silver ewer and bowl. By the time of this image, therefore, the consumption of fruit had become a status event.<sup>6</sup>

Willem Kalf's *Still Life with a Oriental Rug* (figure 7.2) follows in the same vein providing unintended information about dietary habits.

Tolkowsky wrote that the Dutch learned to infuse citrus rind essential oils into the wine glass from the Chinese.<sup>7</sup> This use of the orange reveals a fascinating aspect of how quickly certain foreign foods are incorporated and by whom. In this case, mariners, not a celebrated group or one that is normally considered being trendsetters, learned of the practice in a distant land. Afterward other groups, perhaps merchants, copied those sailors. This diffusion was art in motion, the sharing of an aesthetic experience, but one that did not filter down from the elites or the wealthy but rather rose from the lower classes.<sup>8</sup> Oranges are not consumed as a secondary food, rather still used in a peripheral manner. The setting remains one of wealth and prestige; the fine porcelain bowl that contains the fruit suggests that oranges were still considered prestigious.

The Melendez painting, *Still Life with Oranges, Jars, and Boxes of Sweets*, (figure 7.3) hints at a change in the perception of oranges.<sup>9</sup> Produced one hundred years later, and in a country that cultivated citrus, the oranges in this image are in a pedestrian setting, not in a sumptuous one. The boxed confections also signal a change in the diet. Although the confectioners may have deeper roots,<sup>10</sup> the flow of sugar from the New World changed previous dynamics.<sup>11</sup> That change brought to the forefront the commercial version of marmalades and jellies. It is noteworthy that when this confection appeared in England it became characteristic of British cuisine and was not intended as a breakfast item, afternoon tea was its original place.<sup>12</sup> This change could be attributed to the increased production and availability of food. If one is served but one food event per day, it is unlikely that secondary or peripheral foods are in the diet. As the need for core foods are satisfied during meals, then small food events, i.e., snacks, consisting of fruit or other sweet food, can be added.

Referring back to the workshop of Joos van Cleve, recall that he produced numerous versions of the Holy Family in his career (figures 7.4 & 7.5). In these two depictions, the combination of wine and citrus is prominent. However, since these predate the Dutch trade, it doubtful these images were intended to describe the orange as a snack; this arrangement of food appears to be exclusively symbolic.<sup>13</sup> Where the modern scholar may



Figure 7.4. Joos van Cleve, *Holy Family*. Oil on wood, 53 x 40 cm. Gemaldegalerie der Akademie der Bildenden Künste, Vienna. (Reprinted with permission from WorldImages Database.)



Figure 7.5. Joos van Cleve, *Holy Family*. Oil on wood, 43 x 32 cm. Metropolitan Museum of Art, New York. (Reprinted with permission from WorldImages Database.)

wish to interpret the exact meaning of these icons, the question that is ignored is whether the patron was familiar with the actual items depicted. Assuredly northern Europeans knew grapes and cherries, but how many saw actual oranges and pomegranates? The crude rendition of the orange in the Vienna image suggests the artist was not working from a live model while the later versions of this theme depict the orange in a more accurate manner. Perhaps the reason for this dichotomy is that the inclusion was not solely done for religious reasons, instead the inclusion had some financial considerations. Working in Antwerp, van Cleve probably served patrons in the merchant class and these in turn wanted to embellish their economic standing.<sup>14</sup> It is possible that by drawing fruits from Spain at a time when

trade connections were expanding,<sup>15</sup> the patron was expressing both sacred and secular themes.

Visual documentation of oranges as a snack food may be nonexistent but they appeared in the popular culture. The theater patrons of England during the reign of Elizabeth I brought oranges to the show.<sup>16</sup> Vended by a corps of "orange girls," Britain was the center of this citrus commerce, with much of the produce coming from Portugal.<sup>17</sup> Around that same time another fascinating use for the fruit also appeared, one that continues today. During the pre-Lent carnival, in Binche, Belgium, costumed actors known as *Gilles*, hand out, or sometimes throw, oranges from baskets they carry.<sup>18</sup> A similar event occurs in Ivrea, Italy where participants pelt each other with oranges.<sup>19</sup> These two instances are notable because neither location is in a place where oranges were commercially grown; the oranges were imported. This combination working class frivolity and a previously elite foodstuff is without precedent. If the king was to be given twenty-one sections,<sup>20</sup> what was to be made of this willful discarding of a previously valuable fruit? That the action coincides with a period of collective personal denial is a beguiling happenstance. Whatever the reason, the sudden appearance in the marketplace at an affordable price was a tremendous upheaval. While oranges did not lose their cachet with the elite class, orangeries were built well into the nineteenth century; the new paradigm was extended to recently discovered lands of the Americas.

The New World dispersal of oranges was both deliberate and haphazard. It was deliberate because the Spanish knowingly included orange seeds in their cargo.<sup>21</sup> It was haphazard in that the spread of those trees across Florida was due more to the wandering aboriginal population than as the result of intentional plantings by the colonial immigrants.<sup>22</sup> Interestingly, the otherwise generous troupe of mission fathers who tended the first California groves, hoarded the fruit and seeds they produced.<sup>23</sup>

The difference here is that the dispersal of citrus here was not motivated by the previous intentions. These oranges were not valued for their visual qualities; the feral and commercial groves were not planted for aesthetic reasons. Nor was there an appeal based on status, these groves did not demonstrate a mastery over nature or enhance the status of the grower. When oranges were planted, it was a commercial operation, when oranges were eaten, there was little regard for status. The aesthetic of flavor was paramount.<sup>24</sup>

Travelers of this period praised the exotic fruits, e.g., bananas, mangoes, coconuts, and pineapples, they encountered.<sup>25</sup> Yet when William Wolfskill, the founder of California's commercial citriculture, planted his first grove, he was taunted with predictions of failure.<sup>26</sup> That derision was transformed into acclaim in the travel literature of the late nineteenth century, which often emphasized the citrus groves.<sup>27</sup> When the Columbian Exposition of 1896 further exposed eastern visitors to California produce, its

appeal was unmatched.<sup>28</sup> That event, combined with a freeze in Florida that decimated their groves, gave California an open path to the eastern markets.<sup>29</sup> This road was paved by the images of persuasion and of personal pride found on the ends of the crates containing the fruit.

The adage, *form follows function*, applies to the art of the orange crate.<sup>30</sup> The shipping of the oranges by railroad and their subsequent auction in the warehouse predisposed them to be sold in boxes. Filling that space with art was a natural progression and was enabled by the recent emergence of lithography. Initially the growers believed that they needed to appeal to the purchasing consumer, usually the housewife, and so commissioned pastoral images (figure 7.6). That changed when a survey by Sunkist in 1918 discovered that the women buying the oranges did not recognize their labels. What the citrus exchange recognized was that the audience for their advertisements was the male jobber.<sup>31</sup>

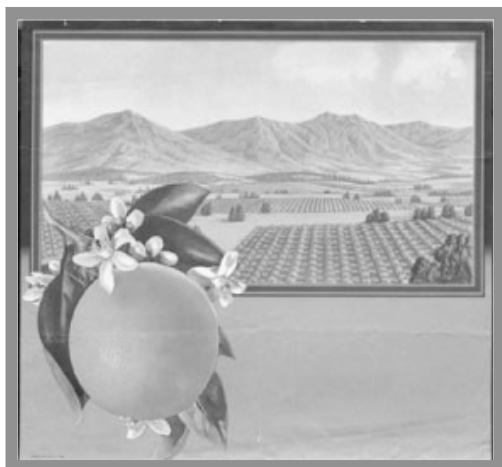


Figure 7.6. Western Lithograph, *Blank Stock Label*. Lithograph, 25 x 27 cm. (Reprinted with permission from Jason Bentley.)

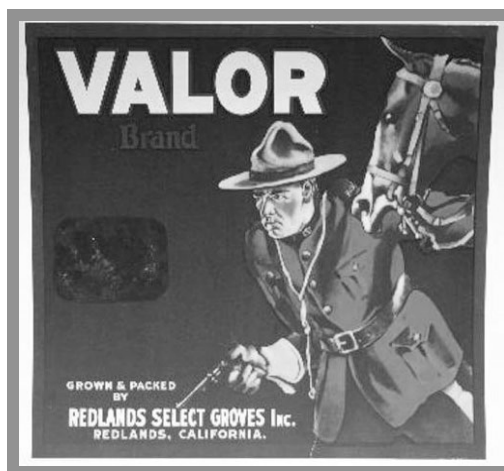


Figure 7.7. Redlands Select Groves, Western Lithograph, *Valor*. Lithograph, 25 x 27 cm. (Source: Pomona Public Library.)

From then on, the patterns and images gained a harder edge; the lettering became bolder, the images more active and exciting<sup>32</sup> (figure 7.7). Moreover, the images did not enhance the appeal of the orange to the consumer, which was inherent and needed no augmentation. These images of adventure and vitality represented masculine themes were intended to appeal to those jobbers. Soft images were not abandoned; however, images of gun wielding soldiers are obviously incongruent with the purchase of fruit.<sup>33</sup>

This was a fascinating situation. The growers who commissioned this art had a specific audience whom they wanted to entice. They also wanted to appeal to the consumer who was further down the chain. This situation is different from the model we expect, the one where the artist produces a work that appeals to a patron. The art of the orange crate label followed another standard, one where the artist works for the patron, but the patron intends for the piece to speak to another audience. As a result, not all the subsequent art of the orange crate was action and excitement; it continued to draw from the previous symbolism of the orange as one of purity, virginity, and fecundity, as well of that of wealth and luxury. In Orange Blossom image (figure 7.8) the fruit could be either a breakfast food on a fine table or an elegant dessert. An interesting example is one used by the Mutt brand (figure 7.9) with its comic character revisits that elite status then lampoons it. Since the establish that grower's reputation in the mind of intention was to





Figure 7.8. Anderson, Wotton, & Godfrey, Fruit Packers, Mutual Label and Lithograph, *Orange Blossom*. Lithograph, 25 x 27 cm.



Figure 7.9. Tulare County Fruit Exchange, Schmidt Lithograph, *Mutt*. Lithograph, 25 x 27 cm.



Figure 7.10. American Fruit Growers, Western Lithograph, *Blue Goose*. Lithograph, 25 x 27 cm.

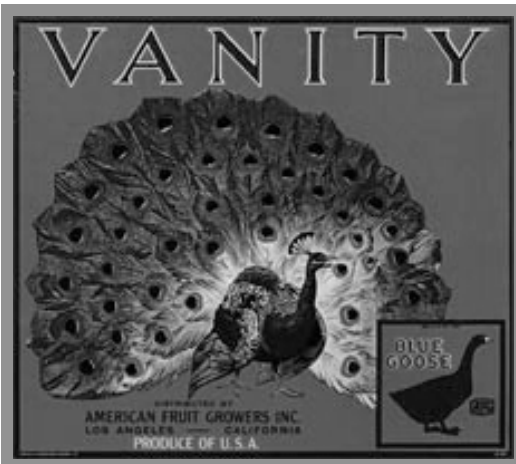


Figure 7.11. American Fruit Growers, Western Lithograph, *Vanity*. Lithograph, 25 x 27 cm.

(Source for figures 7.8 – 7.11: Pomona Public Library.)

differentiate the growers to various intermediaries and the wholesale buyer, this image of self-deprecation is enterprising. The secondary audience, not the jobber but the end consumer, likely influenced the selection of the design since it uses characters from popular culture.<sup>34</sup> What should be recognized about the Mutt label is that it emphasized the aesthetic experience of taste.

Where other labels concentrated on establishing the brand name and creating a reputation based on aspects of visual aesthetics, this brand asked the consumer to overlook any possible flaws and concentrate on the experience of eating it. Although this art was not produced to be the focus of the attention, it needed to convey a message that was understood and appreciated by both the jobber and the end customer.

On that theme of attractive oranges here are two brands, Blue Goose and Vanity, (figures 7.10 and 7.11) which were different grades of the fruit sold by American Fruit Growers.<sup>35</sup> The oranges were graded and selected for as ordinary or premium based on the size, color, shape, condition, and texture.<sup>36</sup> However, none of these characteristics directly reflects the flavor for they are purely physical indicators.<sup>37</sup> The item that had more influence on the flavor was the careful placement of the fruit in the crate, and the wrapping of it with tissue paper to protect the fragile rind membranes. The paper prevented the desiccation of the fruit and inhibited the spread of mold between the individual fruits.<sup>38</sup> While this practice was intended for that practical reason, it had an added aesthetic benefit; it created an aura of distinctiveness to the end customer. The experience of opening the tissue wrapper and reading the trademark had a remarkable affect on end customer. The individual orange became a gift, and the experience of opening them was equated with the unwrapping a special present.<sup>39</sup> In this case, a system that was developed to prevent spoilage and damage, also

heightened the tactile sensual experience. While its use has declined in America, the art on citrus labels remains a signifier in the export citrus market. California exports high value citrus to the Chinese and Japanese markets and a major distributor in that market kept their traditional airplane motif to differentiate their offerings.<sup>40</sup> In a culture where a gift box or basket is well received, exceptionally formed fruit inspires great appreciation.<sup>41</sup> This is a case where the physical form of the fruit, its color, shape, and texture has value to the recipient and in effect becomes art in itself.<sup>42</sup> This aesthetic, where the objectively measured physical form can be compared against an ideal appearance, blurs the line between art, science, and technology. It also confuses the difference between that which is naturally occurring and of anthropogenic origin.<sup>43</sup> The label art alerts the cognoscenti to the presence of the natural art.

This underlines the evolution of the consumer of oranges and how the art associated with the fruit changed with it. When they are first mentioned, oranges were presented as tribute (see Chapter Two). They continued to hold prestige when Islamic gardeners cultivated sour oranges (see Chapter Two). The tart and savory flavor combination, well represented in many cuisines, signified that the host of the table was a person of class and refined taste. The scarcity may have been responsible for its dignified position on the table and the mythology surrounding it certainly enhanced it. However, when it became widely available to northern Europeans, its status remained

relatively unchanged. Although the fruit was obtained from the orange girls or peddlers, and it was perceived a snack food for nights on the town and celebrations; (See above.) they also were associated with the legend of the Saint Nicholas, one which provided an imprint of holiness that was opposite to those bawdy revelers.<sup>44</sup> The greatest change occurred when oranges were introduced to the New World because then they were dispersed without the previous expectations. From that point on, perceptions that developed were ones that depended on its flavor.

The paradigm changed with the advent of the technology of frozen concentrated orange juice in 1948.<sup>45</sup> Along with the other drivers of change in the postwar American diet, refrigeration,<sup>46</sup> distribution networks and increased acreage, the fruit lost that cachet of being rare. Regardless, the popularity of the fruit continued and its special status remained in place. The ubiquitous orange of the present day is a contemporary phenomenon. The eldest generation of today was yesteryear's children; they are group whose perception of the fruit has changed the most. For them, the ability to acquire and distribute oranges to family and friends will rekindle those childhood memories and bring the sense of accomplishment. For the subsequent generations, those born in the early 1950's, and they had a different experience. Orange production has increased each decade. Now that is commonplace, their ability to obtain them without difficulty

demonstrates an improvement of their status from that of the previous generation.

## CHAPTER EIGHT: THE ART HISTORY AND GEOGRAPHY OF THE ORANGE

The remarkable aspect of oranges, and other of citrus, is that when considered in the geographic terms of realm, region, and place,<sup>1</sup> they cross realms and dominate the regions therein.<sup>2</sup> Few other foods can claim the same level of economic importance, and fewer enjoy such widespread popularity. The cultivation of oranges may be confined to subtropical climes, but the demand for them extends worldwide. It is significant that the diffusion and expansion of oranges did not depend solely on the taste appeal of the fruit. One contributing factor was the overall versatility of the fruit. The ability of gardeners to build systems to accommodate the tree was another important aspect. Finally, the apophenia surrounding the tree and its fruit, a situation where multiple meanings could be derived from its physical form, surely contributed to its adoption. In modern times, orange producers exploited the improvements in technology, transportation networks, and food processing to enhance the status of the orange (see Chapters Two and Four).

From the beginning, oranges held extraordinary status. The Chwang offered oranges as tribute to acknowledge the suzerainty of the Han (see Chapters Two and Three). This was extraordinary when considered in context. Food was a valuable commodity, and growing surplus food for the emerging cities was an uneven proposition. While food has always been included in levies, in this case it was a foreign power who specified an annual harvest as tribute. That the Chwang devoted labor and land to producing peripheral foods is the important aspect.

This expansion diffusion, with its reverse flow in hierarchy from a lower status up to a higher one, indicates that the appeal was innate. Whether it was the novelty, a biological inclination, or political shrewdness, there is no doubt the Han embraced what can be considered as a paltry gift.<sup>3</sup> There was something special in oranges for their allure to be so strong.<sup>4</sup>

Overlooked in this episode was the improvement in the Chinese infrastructure. The construction of canals allowed barges to bring textiles and agricultural products from the south to the northern court. Early trade networks focused on textiles and durable items such as jade, obsidian, and lapis lazuli.<sup>5</sup> The growth in the transportation network created an economy where the staples, rice and millet, could be shipped along side of the luxury goods, e.g., silk and perishable foods. It is a given that oranges were a small portion of products transported. Nevertheless, this was a perishable item that was transported for aesthetic reasons. The oranges were intended for consumption; that is obvious. However, the oranges were presented still attached to their branches, and this symbolism spanned many levels (see Chapters One and Three). Those oranges arrived with flourish and flair, an aesthetic event that spanned sight, scent, touch, and taste, and so should be regarded as something more than a food delivery.<sup>6</sup>

That presentation of tribute was more than fulfillment of an obligation; it was performance art on a political stage. The subjugated people needed to demonstrate loyalty to both sides, to the victors and to themselves. Docility only extends so far, and social cohesion suffers if all self-identity is abandoned. It can

be safely assumed that there was some pride in the recognition of the tribute, i.e., if the fruit pleased the emperor, it was a compliment to the provider. The Chwang wanted the emperor to believe that they gave to him the best that they had to offer. The solar aspect in the fruit likely enhanced its role. A solar symbol can be construed as an acknowledgment of the righteousness of the emperor's rule.<sup>7</sup> These displays of environmental art prefigure contemporary artists using the same themes; e.g., Andy Goldsworthy and Chris Drury, and this proclaims the durability of this art form. Nature may have created the orange but the Chwang expressed subservience and unity with their presentation of it.

The temporal gap between the appearance of oranges in China and its subsequent cultivation in Arab gardens is puzzling, and the reason for it cannot be definitively determined. It is possible that the Chinese held oranges in such high regard that they did not share them beyond a restricted circle. Another factor could be that the trade infrastructure was intended to support development within China and that the Chinese sent only limited items out for trade.<sup>8</sup> It is unquestioned that for oranges to diffuse to the west, they needed to cross the Indian subcontinent<sup>9</sup> and that the highest traffic for trade was seaborne along the coast (see Chapter Two). There, the warmer climate had to play a role. Where some mandarins thrive in the heat, many varieties of sweet oranges stop growing in temperatures encountered in the southern portion of the subcontinent (see Chapter Two). Moreover, those sweet oranges that mature in this climate are likely to have insipid flavor and unappealing coloration. The similarity



between sour oranges and Rangpur limes seems to have superseded its desirability in the food regime (see Chapter Two). Still India must have been the bridge from China, so perhaps the span crossed the modern state of Uttar Pradesh to Hindu Kush. The climates of those regions are more suitable for orange cultivation. If the diffusion followed this interior passage, then other obstacles besides the climate were present. The Chinese storage techniques of packing the fruit in earth-filled jars or in straw packed baskets were appropriate for a river barge, but these techniques would have been too cumbersome for overland animal transport (see Chapter Six). Furthermore, this conduit would have supported only the transportation of seeds.<sup>10</sup> Lacking an example or pattern to follow, the reluctance by farmers to devote acreage and effort to an unknown end is an understandable stance.

The marvel of the Islamic gardens does not lie in the technology they introduced; it is not revolutionary to rely upon well-known practices. Despite being ornate and luxurious, the gardens themselves were not truly original; they were also descended from ancient tradition (See Chapter Four). The marvel lies in the substantial efforts by the populace and in the multitude of introduced plants. The Romans occupied many of the same lands much earlier in history, and the two approaches cannot be more different. The Roman agricultural policy compares to a mining operation. Fields were sown with crops that were either already established in the place or planted with ones brought from the Italian peninsula. Those crops were harvested and sent to distant markets.<sup>11</sup> Little

effort was made to collect plants to diversify the crops. While the Roman diet included a variety of plant foods, that menu was determined by local produce. Conversely, central to the Islamic tradition was the introduction of new foods (see Chapters Four and Six). The revolution lies in the changes variety of crops and in the expansion of the diet. Whether the purpose was to bring aesthetic enjoyment or to establish commercial production, the willingness and desire to embrace novelty is remarkable. And it cannot be denied, that among the myriad of introduced foods, oranges and other citrus held preeminence (see Chapter Six).

The variety of uses with overlapping aesthetic and practical appeal was an influence in the adoption of the orange. The climate of Oman hints that the paramount use of the fruit was culinary (see Chapter Two). That aside, the flowers are numerous, fragrant and bright white in contrast to green foliage while the rind contains essential oils that can be obtained after extracting the juice. In that regard, all the parts of the orange are useful. The popularity of the fruit must have been substantial, for when the caliph of Baghdad imported oranges to his garden, he reportedly brought trees (See Chapter Four). For that to occur, a nursery industry must have developed.<sup>12</sup> The allure of the orange lies in their tripartite usage: oranges could be food on the table, a symbol of paradise in the garden, and a base for perfumes. That versatility could justify the expenditure invested in the grove. That is important because this expansion appears to have relied on mercantile exchange (See Chapter Two). It is unknown whether

oranges were offered as gifts or tribute. However, it is certain that oranges were among the commercial crops grown (see Chapter Four).

The plantings in the courtyards of the mosques in Cordoba and Seville show that not all groves were profit oriented or were centered on the personal enjoyment of an elite patron. The aspect that deserves prime consideration is the speed of that diffusion. Where it took nine hundred years for the orange to cross four thousand kilometers to reach India from China, it traveled the remaining six thousand kilometers in sixty years.<sup>13</sup> That diffusion occurred over a superior trade network and was combined with a thriving information exchange, the latter being of utmost importance (see Chapter Four). The diffusion needed descriptions of the fruit as well as instructions on how to care for the trees and use the fruit. The approbation that was bestowed on the trees is remarkable. In these two settings, citrus conveyed a sense of luxury being afforded to all. Public acts of benevolence are central to good order in society. Where caravanserais and public baths provided practical, down-to-earth benefits, the establishment of public groves had the effect of creating an urban oasis. The former were needed and no doubt welcomed by the public, but the latter gained prestige and favor. The setting is important, in that courtyard of orange trees provided a tangible representation of paradise and purity with its shade, flowers, and fruit.

The gardens of the wealthy on the European continent had a different purpose. In these locations, royalty and a wealthy elite competed against each other with their status displays (see Chapter Five). Created as exhibitions of skill

and resources, this cultivation of specialized foliage was science practiced as art. These orange trees were intended to prove the expertise of the atelier. It is true that the flavor of the fruit and the fragrance of the flower were appreciated, but they were also placed in secondary position with regards to their very existence and the difficulty of the task (see Chapters One and Five). Across northern Europe, the cultivated oranges were in defiance of the winter cold, a man against nature position. In Britain, the emphasis evolved to possessing a variety of plants with a focus on the exotic (see Chapter Five). Even when the orange and citrus trees lost their centrality, the emphasis was a status display of wealth. The previous custom of equating high cost with high art was certainly in force. These plantings contributed to the diffusion through their reinforcement of the symbolism and their affiliation with wealth.

The wider dispersal needed an expansion of commercial citriculture, which in turn owes its existence to the introduction of the sweet orange from China. Portuguese merchants immediately recognized the inherent appeal of the fruit and used their geographic advantages of location to establish groves for a new commercial market. Within a decade, these merchants delivered oranges to the London market, bringing fruit from both the European mainland and from their South American colonial tracts. This international trade network was novel and perhaps the first one based solely on fruit.<sup>14</sup> They brought such a quantity that the fruit became available to the lower economic class (see Chapter Seven). Received with immediate and gleeful acceptance, this was a harbinger of the

modern scene of the ubiquitous orange. That market was based solely on the flavor - the patrons demanded taste and were uninterested in other qualities. If a symbol could be invoked, it was a decidedly base one that centered on the vendor. These oranges did not confer honor or invoke status. The vending of oranges was by those who were low on the socioeconomic scale. This diffusion of oranges happened because the newer variety proved popular; the market was eager, and the commercial producer was able to expand.

There are two instances where the oranges are freely distributed, and both coincide with commercial expansion while retaining a royal theme. The Carnival of Binche in Belgium has an atmosphere of generosity and benevolence (see Chapter Seven). The costumes of *Gilles* and their willingness to hand out expensive fruits conveys an element of the wealthy donating to the public weal. The easy explanation is that the fruit ripens in the winter and can be stored on the tree. Oranges and other citrus would be the only fresh fruit available. The accoutrements of nuts and raisins in the Binche suggest the intention was to deliver a food reward before the period of fasting begins. The other festival, which also occurs during the pre-Lenten carnival period, is in Ivrea, Italy. This event is vaguely reminiscent of the entrance of Francis I in Marseille.<sup>15</sup> In this event, oranges are used as projectiles in a pitched battle between multiple factions. The violent nature of the event probably grew from an earlier bean-throwing tradition where the benevolence of the local royalty was mocked.<sup>16</sup> In

both cases, a surplus of oranges is necessary, a situation that only could only come about with the surplus a commercial expansion could survive.

The Spanish explorers who introduced sour oranges, lemons, and limes to the New World did so with the express purpose of establishing groves for food (see Chapter Two). The favorable climate at the destination sites allowed broad dispersal to all the lands they colonized (see Chapter Two). Indeed, it was the ideal climate of Florida and the willingness of aboriginal population that facilitated a broad diffusion.<sup>17</sup> The dispersion of sour oranges was widespread and indiscriminate, and Florida's early wild groves are evidence of a liberal policy regarding the distribution of oranges. The economic bent of those establishments meant that their plantings were focused on increasing quantity and that they were indifferent to the possibility of a surfeit of groves. That immediate acceptance of citrus by the aboriginal population underscores its universal appeal. The preferences for vision and sound may be culturally learned, but biology holds sway over touch and taste.<sup>18</sup> That these were sour oranges that attained such broad acceptance emphasizes the underlying appeal of citrus.

California is among the last places where oranges arrived. The first groves planted in California missions were not shared with the natives or other immigrants; the friars tending them hoarded the fruit, the seeds, and trees (see Chapter Two). Those mission fathers behaved in a manner consistent with the gardeners maintaining European orangeries, closely guarding secrets and techniques developed in their purview. Although the orange could thrive in

certain microclimates of Southern and Central California, these friars chose not to share for reasons of their own. What explains this divergence from earlier eastern and southern colonization may be a result of their situation. The California missions were outposts rather than military forts, and they were determined to be self-sufficient in all matters. The winter harvest of citrus has inherent benefits, and perhaps there was the intent to maintain that advantage for as long as possible.<sup>19</sup> The essential difference is that the Florida terrain supported organic expansion, but the Mediterranean climate prevalent among the missions hinders such growth. Every grove in California was dependent on irrigation and required nurseries to provide rootstock and bud wood.

The diffusion of oranges began with a reliance on the aesthetic of the entire experience; the sight of the tree, the scent of the flowers, and the flavor of the fruit were equally important. Those early gardens and groves were established to provide stimulus and pleasure and must have incurred debt. By the time groves were established in California, they were commercial enterprises through and through; earning a profit was their *raison d'être*. The commercial markets transformed the symbolism of the tree and the fruit. In contemporary times, the nutrition aspect is emphasized while the taste is not as much highlighted as it is expected.<sup>20</sup> In a marketplace where sweeter and more consistent flavors are available, the value of the oranges lies in their quality of being healthful and tasty. That evolution is not surprising because the modern patron is far away from the previous ones. Food paradigms build their own

versions of sweet, sour, salty, or savory foods. The colonial expansion brought an exchange in cuisines between the realms, opening food paradigms that were previously isolated and limited to new items and to increased quantities.

An orange was served to pacify an oriental warlord. An orange tree was planted to symbolize paradise. An orange grove was housed to represent a king's mastery over nature. Orange seeds were sown to signify the holy purpose of the missions. Orange cultivation launched the fortunes of countries in every realm. Now oranges are serving to pacify the modern equivalent of that ancient warlord – the two-year-old child of a suburban American couple. The history of oranges is indeed remarkable.



## NOTES

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### Chapter One

1. Samuel Tolkowsky, *Hesperides: A History of the Culture and Use of Citrus Fruits* (Westminster: Staples and Staples, 1938), 148. Tolkowsky cites Ibn al-Awwâm, writing in the late 12<sup>th</sup> century, explaining that trees must be protected from "impure" women and that citrus fruits will "banish" evil thoughts from a woman's mind. There is no indication whether it has the same effect on the male gender.

2. Mirella Levi D'Ancona, *The Garden of the Renaissance: Botanical Symbolism in Italian Painting* (Firenze: L. S. Olschki, 1977), 273-74. The artists of the Italian Renaissance associated the blooming tree with the Virgin Mary, the bright white flower and sweet fragrance hold an aesthetic appeal that suggests purity. The botanical feature of concurrently bearing leaves, flowers and fruit, was interpreted as a symbol of chaste fertility.

3. Christopher Thacker, *The History of Gardens* (Berkeley: University of California Press, 1979), 147. The French formal garden demonstrated the ability of the patron to create civilization in the wilderness. That mastery extends to political intrigue. The founding of the gardens in Versailles starts with the arrest of the finance minister Fouquet by Louis XIV.

4. Pierre Laszlo, *Citrus: A History* (Chicago: University Chicago Press, 2007), 135. The behavior of theater patrons, described as throwing peels and other refuse at actors on the stage, indicates a rustic and downright rude level of sophistication.

5. Sylvia Saudan-Skira and Michel Saudan, *Orangeries: Palaces of Glass: Their History and Development* (Cologne: Evergreen, 1998), 88. The English version of the orangery lacked the political intrigue found on the continent. This was a place where a gentleman engaged in a hobby, where one demonstrated talent and knowledge; it was not the construction of civilization in the midst of the wilderness.

6. Amelia Simmons, *American Cookery* (Hartford: Simeon Bulter, 1798), 26-31. <http://digital.lib.msu.edu/projects/cookbooks/books/americancookery/amer.pdf>. In this book, oranges only appear in the dessert recipes. Conversely, lemons are used in savory recipes and desserts. It is fascinating that mangoes are suggested as an accompaniment to roast turkey.

7. Charles Nordhoff, *California: for Health, Pleasure, and Residence. A Book For Travellers And Settlers* (New York: Harper & Brothers, 1873), Chapter IX, <http://memory.loc.gov/ammem/cbhtml/calbkbibauthindex1.html>. Nordhoff tells of a twenty-acre grove providing an income that allows a farmer to enjoy a six-month vacation in Europe.

8. Food and Agricultural Organization of the United Nations, *Citrus Fruit, Fresh and Processed, Annual Statistics, 2006* (Rome: FAO, 2006), 9, [http://www.fao.org/es/ESC/en/15/238/highlight\\_243.html](http://www.fao.org/es/ESC/en/15/238/highlight_243.html). Every region listed by the UN has a

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significant producer of citrus in general and oranges in particular. This is direct evidence of the significance of the subject.

9. The orangery at Versailles and the courtyard of the Great Mosque of Cordoba are two such places.

10. Francesco Calabrese, "Origin and History," in *Citrus, The Genus Citrus*, ed. Giovanni Dugo and Angelo DiGiacomo (New York: Taylor & Francis, 2002), 36-48; John McPhee, *Oranges* (New York: Farrar, Strauss and Giroux, 1967), 16; Helen Harcourt, *Florida Fruits and How to Raise Them* (Louisville, KY: John P. Morton and Company, 1886), 62; Pliny the Elder, *The Natural History Of Cultivated Trees*, Book XVII, Chapter 22, *The Natural History*, ed. John Bostock and H. T. Riley, Perseus Digital Library, <http://www.perseus.tufts.edu/cgi-bin/ptext?lookup=Plin.+Nat.+toc>; and NC State Agricultural Extension, "Grafting and Budding," <http://www.ces.ncsu.edu/depts/hort/hil/ag396.html>. Citrus growers regularly use rootstocks to match the local soil conditions or provide certain characteristics such as disease resistance. The best example is the comparison of the citrus producing areas in the USA. In Florida orange growers bud Valencia, Hamelin, and Pineapple scions on rough lemon rootstock. This combination flourishes in the sandy, nutrient poor soils such as hammock and cleared pine forests. In California, navel oranges are often budded on sour orange rootstock. This combination thrives in the heavier playa soils, and withstands the salt build up brought on by irrigation. The consistency of California citriculture landscape reduces the need for a variety of rootstocks. Conversely, Florida has a wider range of soils, which the grower must consider. It is interesting many generations have assumed, and incorrectly so, that cuttings and grafting are recently perfected practices. Pliny noted that even in his day that many assumed this practice was a recent discovery, and he subsequently points out that the ancient Greeks practiced it to such a degree that it must have deep roots. A modern day example of this assumption can be found on the web page hosted by the agricultural cooperative at NC State.

11. Fernand Braudel, *The Structures of Everyday Life*, vol. 1, *Civilization and Capitalism, 15th-18th Century*, trans. Sian Reynolds (New York: Harper & Row, 1981), 415- 430; and Raymond E. Crist, "The Citrus Industry in Florida," *American Journal of Economics and Sociology* 15, no. 1 (1955): 4. In Europe, river barges and coastal ships carried the bulk of agricultural output to the market. It is likely that oranges coming from Portugal, Spain, Italy, and other Mediterranean countries landed in London, Antwerp, and other ports and once there, were not distributed far beyond that entry point. Florida was not the sole source, nor even the primary one, for citrus for the rest of the east coast of the US. Up until the beginning of the twentieth century, the American citrus market was dominated by Mediterranean imports.

12. Shane Hamilton, "Cold Capitalism: The Political Ecology of Frozen Concentrated Orange Juice," *Agricultural History* 77, no. 4 (2003): 564-66.

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13. United Nations Conference on Trade and Development. "Information on Citrus Fruit," <http://www.unctad.org/infocomm/anglais/orange/market.htm>.

14. "Fruit as Food," *Good Housekeeping*, December 1894, 251; Glenn H. Joseph, "Citrus Products: A Quarter Century of Amazing Progress," *Economic Botany* 1, no. 4 (1947): 415-18; and H. Vincent Moses, "G. Harold Powell and the Corporate Consolidation of the Modern Citrus Enterprise, 1904-1922," *The Business History Review* 69, no. 2 (1995): 150; W. G. O' Regan, "The Economic Impact of Technology on Farm Commodities: The Case of Oranges," *Journal of Farm Economics* 38, no. 5 (1956): 1779-82; and Douglas C. Sackman, *Orange Empire: California and the Fruits of Eden* (Berkeley: University of California Press, 2005), 97. Sunkist launched its "Drink an Orange" campaign in 1916 and the subsequent recognition that oranges were a rich source of vitamin C aided that cause; however, the economic turmoil of 1930's decreased orange juice consumption. Oranges were primarily consumed as whole fruit consumption before the introduction of frozen concentrated juice. The two to one ratio of whole to juice has since been reversed to a three to one ratio favoring juice.

15. Helen L. Kohen, "Perfume, Postcards, and Promises: The Orange in Art and Industry," *The Journal of Decorative and Propaganda Arts* 23 (1998): 46.

16. Larry Woiwode, "Ode to an Orange," *Harper's*, January 1986, 33-4. In this article, the author recounts his childhood experience with oranges. He describes the childlike fascination for the fruit with exceptional force and detail. The overall tone expresses the reverence for this fruit.

17. Tolkowsky, 1.

18. *Ibid*, 6.

19. Andrew M. Watson, *Agricultural Innovation in the Early Islamic World: The Diffusion of Crops and Farming Techniques, 700-1100* (Cambridge: Cambridge University Press, 1983).

20. Watson, 83-84.

21. Watson, 83-84.

22. Karl W. Butzer et al, "Irrigation Agrosystems in Eastern Spain: Roman or Islamic Origins?" *Annals of the Association of American Geographers*, 75, no. 4 (1985): 500.

23. *Ibid*.

24. Butzer et al., 502-3.

25. Leon D. Batchelor and Herbert J. Webber, ed., *The Citrus Industry* 1st ed. (Berkeley: University of California Press, 1943); and Leon D. Batchelor, Walter Reuther, and Herbert J. Webber, ed. *The Citrus Industry*, 2nd ed. (Riverside: University of California Press, 1968), <http://lib.ucr.edu/agnic/webber/>. The first edition was consulted

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and was compared to the later revised edition. It is notable that the opening chapter was not changed by revision. Despite its age, it appears to be reliable as other references, which are more recent, agree with the text.

26. Herbert J. Webber, "History and Development of the Citrus Industry" in Reuther, Batchelor, and Webber, *Citrus Industry* (see note 25), <http://lib.ucr.edu/agnic/webber/Vol1/Chapter1.htm#intro>.

27. James W. Cameron and Harold B. Frost, "Genetics, Breeding, and Nucellar Embryony," in Reuther, Batchelor, and Webber *Citrus Industry* (see note 25), [http://lib.ucr.edu/agnic/webber/Vol2/Chapter2\\_5.htm](http://lib.ucr.edu/agnic/webber/Vol2/Chapter2_5.htm). It is surprising how well some information has held up with the advances in science. The fundamental principles identified by the 1940's have been confirmed by subsequent research. The details have been filled in, but the overall picture remains static.

28. Harry W. Lawton and Lewis G. Weathers, "The Origins of Citrus Research in California," in Reuther, Batchelor, and Webber *Citrus Industry* (see note 25), [http://lib.ucr.edu/agnic/webber/citrus\\_history.pdf](http://lib.ucr.edu/agnic/webber/citrus_history.pdf). Unlike previous links this URL links to a Portable Document File (.pdf). That file either may open in the browser window or will be downloaded. Unlike the other references, this one is paginated. The reference number is to the printed number on the page.

29. Walter Ebeling, *The Fruited Plain: The Story of American Agriculture* (Berkeley: University of California Press, 1979).

30. Ibid, 346-359.

31. Sackman.

32. Sackman, 46. Australian eucalyptus trees were imported to southern California to act as windbreaks. The Santa Ana winds desiccated the citrus groves and eucalyptus trees grew fast with minimal water demand. Their rapid adaptation to the rest of California quickly changed the vegetative landscape of the state. The insect pests in the trees started another cascade of biological change.

33. William Cooper, *Odyssey of the Orange in China: National History of the Citrus Fruits in China* (Winter Park, Florida: W.C. Cooper, 1990).

34. Ibid, 22 – 24.

35. Ibid, 12-20.

36. Ibid, 52.

37. United Nations, Food and Agriculture Organization, FAO Statistics, "Production; Crops," <http://faostat.fao.org/site/567/default.aspx>. China moved from being thirteenth overall in world citrus production in 1969 to being second in 2005. During the same time, world citrus production also doubled.

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Notes to pages 6-8

38. Rainer W. Scora, "On the History and Origin of Citrus," *Bulletin of the Torrey Botanical Club* 102, no. 6 (1975): 369-375.
39. Scora, 372.
40. Edward A. Ackerman, "Influences of Climate on the Cultivation of Citrus Fruits," *Geographic Review* 28, no. 2 (1938): 289-302.
41. Alfred C. Andrews, "Acclimatization of Citrus Fruits in the Mediterranean Region," *Agricultural History* 35, no.1 (1961): 35-46.
42. Erich Isaac, "Influence of Religion on the Spread of Citrus," *Science* 129, no. 3343 (1959): 179-186.
43. *Ibid*, 186.
44. Sibhi Y. Labib, "Capitalism in Medieval Islam," *Journal of Economic History* 29, no. 1 (1969): 79-96.
45. M.K. Bennett, "Climate and Agriculture in California," *Economic Geography* 15, no. 2 (1939): 153-164; Samuel N. Dicken, "Central Florida Farm Landscape," *Economic Geography* 11, no. 2 (1935): 173-182; Sigismond deR. Diettrich, "Florida's Climatic Extremes: Cold Spells and Freezes," *Economic Geography* 25, no. 1 (1949): 68-74; Howard F. Gregor, "Agricultural Shifts in the Ventura Lowland of California," *Economic Geography* 29, no. 4 (1953): 340-361; Paul F. Griffin, and Ronald L. Chatham. "Population: A Challenge to California's Changing Citrus Industry," *Economic Geography* 34, no. 3 (1958): 272-276; Roland M. Harper, "Agricultural Conditions in Florida in 1925," *Economic Geography* 3, no. 3 (1927): 340-353; Robert W. Hodgson, "The California Fruit Industry," *Economic Geography* 9, no. 4 (1933): 337-355; Willis H. Miller, "The Localization of Functions in the Pomona Area, California," *Economic Geography* 11, no. 4 (1935): 410-425; Clifford M. Zierer, "The Citrus Fruit Industry of the Los Angeles Basin," *Economic Geography* 10, no. 1 (1934): 53-73; and Clifford M. Zierer, "Migratory Beekeepers of Southern California," *Geographic Review* 22, no. 2 (1932): 260-269.
46. Fernand Braudel, *Structures of Everyday Life*, vol. 1, *Civilization and Capitalism 15th-18th Century*, trans. Sian Reynolds, (New York: Harper & Row, 1981); Fernand Braudel, *The Wheels of Commerce*, vol. 2, *Civilization and Capitalism 15th-18th Century*, trans. Sian Reynolds, (London: Phoenix Press, 2002); Fernand Braudel, *The Perspective of the World*, vol. 3, *Civilization and Capitalism 15th-18th Century*, trans. Sian Reynolds, (London: Phoenix Press, 2002);
47. Philippe Ariès and Georges Duby, *A History of Private Life* (Cambridge, MA Belknap Press of Harvard University Press, 1987).
48. *Citrus: The Genus Citrus*, ed. Giovanni Dugo and Angelo Di Giacomo (London : New York: Taylor & Francis, 2002).

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49. Julia Frances Morton and Curtis F. Dowling, *Fruits of Warm Climates* (Miami: J.F. Morton, 1987), <http://www.hort.purdue.edu/newcrop/morton/index.html>.

50. Ibid, [http://www.hort.purdue.edu/newcrop/morton/sour\\_orange.html#Food/20Uses](http://www.hort.purdue.edu/newcrop/morton/sour_orange.html#Food/20Uses).

51. Daniel Jay Browne, *The Trees of America: Native and Foreign* (New York: Harper & Brothers, 1846).

52. Ibid, 69.

53. Ibid, 64-66.

54. Christopher Thacker, *The History of Gardens* (Berkeley: University of California Press, 1979).

55. Ibid, 9.

56. Ellen Churchill Semple, "Ancient Mediterranean Pleasure Gardens," *Geographical Review* 19, no. 3 (1929): 420-443.

57. Ibid, 420-22.

58. Ronald King, *The Quest for Paradise: A History of the World's Gardens* (Weybridge: Whittet Books Ltd, 1979).

59. King, 70-1; and Tolkowsky, 113-4.

60. D. Fairchild Ruggles, *Gardens, Landscape, and Vision in the Palaces of Islamic Spain* (University Park, Pa: Pennsylvania State University Press 2000).

61. Sylvia Saudan-Skira and Michel Saudan, *Orangeries: Palaces of Glass: Their History and Development* (Cologne: Evergreen, 1998).

62. Billie S. Britz, "Environmental Provisions for Plants in Seventeenth-Century Northern Europe," *The Journal of the Society of Architectural Historians* 33, no. 2 (1974): 133-144.

63. Billie S. Britz, "The Orangery in England and America," *The Magazine Antiques* 149, no. 4 (1996): 594-601.

64. Terry Comito, "Renaissance Gardens and the Discovery of Paradise," *Journal of the History of Ideas* 32, no. 4 (1971): 483-506.

65. Comito, 483.

66. Christopher Thacker, "La Maniere de Montrer les Jardins de Versailles," by Louis XIV and Others," *Garden History* 1, no. 1 (1972): 60.

67. Jean-Louis Flandrin, Massimo Montanari, and Albert Sonnenfeld, ed.. *Food: A Culinary History from Antiquity to the Present*, trans Clarris Botsford, Arthur Goldhammer, Charles Lambert, Frances M. López-Morillas, and Sylvia Stevens (New York: Columbia University Press, 1999).

68. Reay Tannahill, *Food in History* (New York: Crown Publishers, 1989).

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69. Linda Civitello, *Cuisine and Culture: A History of Food & People* (Hoboken: Wiley, 2004).

70. Civitello, 59. It is significant that in a text about food, the author notes the importance the *suftjah*, a check drawn on a distant account of a trader by an intermediary, in trade networks.

71. Paul Fieldhouse, *Food & Nutrition: Customs & Culture* (Dover, NH: Croom Helm, 1986).

72. Frederick J. Simoons, *Food in China: A Cultural and Historical Inquiry* (Boca Raton: CRC Press, 1991).

73. Simoons, 198. Oranges are stored in earth filled jars, or packed in straw and placed in baskets.

74. Phyllis Pray Bober, *Art, Culture, and Cuisine: Ancient and Medieval Gastronomy* (Chicago: University of Chicago Press, 1999).

75. Om Prakash, *Food and Drinks in Ancient India: From Earliest Times to 1200 A.D.* (Delhi: Munshi Ram Manohar Lal, 1961).

76. Prakash, 149, 220. The orange appears in India on the cusp of the Common Era, and becomes widespread in following centuries.

77. Thelma Barer-Stein, *You Eat What You Are: People, Culture And Food Traditions* 2nd ed. (Toronto: Firefly Books 1999).

78. Raymond Grew, ed. *Food in Global History* (Boulder, CO: Westview Press, 1999).

79. Raymond Grew, "Food and Global History," in Grew, *Food in Global History*, 8-10.

80. Good Housekeeping, 251.

81. Sigismond, 70; and Webber, "History and Development of the Citrus Industry."

82. Ebeling, 343-44. Wolfskill shipped his first box of California oranges to St. Louis in 1876. In 1885, the Southern Pacific railroad arrived in San Bernardino and LA, introducing competition and alternate routing for the produce. Within 10 years, the distribution network for fruit expanded beyond the previous examples of that agriculture. Grain was always shipped some distance, even if the fields were just outside city walls. This was fresh fruit transported overland for two thousand miles and unprecedented in commercial operations.

83. UN FAO, *Citrus Fruit: Fresh and Processed, Annual Statistics, 2006* (Rome: FAO, 2006), <http://www.fao.org/es/ESC/common/ecg/243/en/bull2006.pdf>, [http://www.fao.org/es/ESC/en/15/238/highlight\\_243.html](http://www.fao.org/es/ESC/en/15/238/highlight_243.html); UN FAO, "FAOSTAT, Home" <http://faostat.fao.org/site/291/default.aspx>; FAO, "FAOSTAT, Production," <http://faostat.fao.org/site/339/default.aspx>; FAO, "FAOSTAT, Crops," <http://faostat.fao.org/site/567/default.aspx>; FAO, "FAOSTAT, Trade," <http://faostat.fao.org/site/342/default.aspx>; FAO, "FAOSTAT, Trade, TradeSTAT," <http://faostat.fao.org/site/406/>

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default.aspx. The first reference is to the latest FAO Citrus Bulletin, with the home page hosting that document and earlier versions; it is a PDF document. The second reference is the Home Page for the statistics division of the FAO. The subsequent references in this note may be found on this page under the title provided. The third reference is to the Production database, where the reader can find production values for individual countries and regions of selected commodities. The fourth reference allows the reader to select the commodity and see the countries and regions produce it. This differs from previous entry in that the reader selects the country in the former, and the commodity in the latter. The final two references link to the trade data. "Trade" provides general data, e.g., total export values and price per unit. "Trade, TradeSTAT" allows the reader to select individual trading partners.

84. "American Memory, California as I Saw It" <http://memory.loc.gov/ammem/cbhtml/cbhome.html>.

85. Charles Nordhoff, *California: for Health, Pleasure, and Residence. A Book For Travellers And Settlers* (New York: Harper & Brothers 1873), <http://memory.loc.gov/ammem/cbhtml/cbhome.html>.

86. Mary C. Vail, *Both Sides Told* (Pasadena: West Coast Publishing Co 1888), <http://memory.loc.gov/ammem/cbhtml/cbhome.html>. This author sought "[t]o provide an accurate but cautionary description of Southern California as an antidote to the unrealistic claims..." in the literature that was commissioned by railroad and other real estate entities.

87. Lawton and Weathers, "The Origins of Citrus Research in California," 285.

88. Ludwig Salvator, *A Flower from the Golden Land* trans. Marguerite Eyer Wilbur, (Los Angeles: B. McCallister, 1929), <http://memory.loc.gov/ammem/cbhtml/cbhome.html>

89. Los Angeles Chamber of Commerce, *Orange Culture in Southern California From Seed to Consumer* (Los Angeles: CA 1912).

90. *The Diaries of George Washington*, ed.. Donald Jackson and Dorothy Twohig (Charlottesville: University Press of Virginia, 1978), <http://memory.loc.gov/ammem/gwhtml/gwhome.html>.

91. Washington, " *The Diaries of George Washington;*" and *The Writings of George Washington from the Original Manuscript Sources, 1745-1799*, ed. John C. Fitzpatrick, <http://etext.lib.virginia.edu/washington/>. Washington writes in his diary entry for Saturday, May 21, 1785, that his phaeton carrying nursery plants arrived from South Carolina. The cargo included orange, oak, and magnolia trees. Washington's consumption of citrus fruit is noted in entries on September 26, 1769, September 29, 1770, and May 10, 1774. It is interesting that both sour and sweet versions of oranges are described. The second reference contains a letter to Tench Tilghman, dated August 11, 1784. In it Washington requested the designs of a greenhouse owned by Mrs. Carroll.



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92. Britz (1996), 594-95.
93. McPhee.
94. Laszlo.
95. McPhee, 9-10.
96. Laszlo, 129-143.
97. Lazlo, 156-174.
98. John Salkin and Laurie Gordon, *Orange Crate Art* (New York: Warner Books, 1976).
99. Gordon T. McClelland and Jay T. Last *California Orange Box Labels: An Illustrated History* (Beverly Hills CA: Hillcrest Press, 1985).
100. "Digital Images Collection," *Pomona Public Library* <http://content.ci.pomona.ca.us/databases.php>.
101. "Citrus Label Collection" *Riverside Public Library* [http://www.riversideca.gov/LIBRARY/history\\_coll\\_citruslabels.asp](http://www.riversideca.gov/LIBRARY/history_coll_citruslabels.asp).
102. Browne, 63. The introduction of citrus to the New World continues the pattern of enthusiastic reception by cultures that were previous bereft of it.
103. Scora, 370.

## Chapter Two

1. Edward A Ackerman, "Influences of Climate on the Cultivation of Citrus Fruits," *Geographic Review* 28, no. 2 (1938): 290.
2. Julie Morton, "Sour Orange," in Julia F. Morton and Curtis F. Dowling, *Fruits of Warm Climates* (Miami: J.F. Morton, 1987), [http://www.hort.purdue.edu/newcrop/morton/sour\\_orange.html](http://www.hort.purdue.edu/newcrop/morton/sour_orange.html); Morton, "Orange" in Morton and Dowling, *Fruits of Warm Climates* (see previous), <http://www.hort.purdue.edu/newcrop/morton/orange.html>; and Henry Schneider, "The Anatomy of Citrus," in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), vol. 2, chap. 1, [http://lib.ucr.edu/agnic/webber/Vol2/Chapter2\\_1.htm#intro](http://lib.ucr.edu/agnic/webber/Vol2/Chapter2_1.htm#intro).
3. Schneider, "The Anatomy of Citrus." When grown in tropical climates, the fruit ripens but the rind remains green.
4. John McPhee, *Oranges* (New York: Farrar, Strauss and Giroux, 1967), 16. The orange color is the result of carotenes displacing the chlorophyll. As the temperature rises, the chlorophyll returns and masks the carotenes once more.
5. Francesco Calbrese, "Soil and Cultural Practices" in *Citrus: The Genus Citrus*. ed. Giovanni Dugo and Angelo Di Giacomo. (New York: Taylor & Francis, 2002), 36-43.
6. Morton, "Orange". Under the heading, *Climate*, she writes that oranges can be cultivated in areas receiving as little as 5 inches or 128mm of precipitation. This value

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undoubtedly depends upon a groundwater source beyond rainfall. Orange trees can be induced into dormancy by restricting water availability or by changing the photoperiod. Temperature has the same effect; however, in tropical environments where photoperiod and temperatures remain nearly constant, water availability is the only variable.

7. Ackerman, 289.

8. Howard B. Frost and Robert K Soost, "Seed Reproduction: Development of Gametes and Embryos" in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), [http://lib.ucr.edu/agnic/webber/Vol2/Chapter2\\_4.htm](http://lib.ucr.edu/agnic/webber/Vol2/Chapter2_4.htm); Rainer W. Scora, "On the History and Origin of Citrus," *Bulletin of the Torrey Botanical Club* 102, no. 6 (1975): 370-71; and Jesús M. Ortiz, "Botany: Taxonomy, Morphology and Physiology of Fruits, Leaves, Flowers," in *Citrus* (see note 5), 31.

9. Frost and Soost, "Seed Reproduction: Development of Gametes and Embryos."

10. Ortiz, 32-33; and Frost and Soost, "Seed Reproduction: Development of Gametes and Embryos."

11. McPhee, 34-35. This should not be a complete surprise. Although the root system will not determine fruit type, it can encourage certain characteristics and select for particular qualities. The rough lemon is extensively planted as rootstock in Florida because it is tolerant of the high water tables found in certain areas.

12. Scora, 372.

13. Herbert J. Webber, "History and Development of the Citrus Industry," in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), <http://lib.ucr.edu/agnic/webber/Vol1/Chapter1.htm>. Webber says it directly: "[c]omparatively little change has been required to develop our best present day varieties from the fruits of the most primitive types known."

14. Scora, 372; and Francesco Calabrese, "Origin and History," in *Citrus* (see note 5), 1-5. It is widely accepted that both the sweet and sour orange are a hybrid of two different forms of citrus. Scora assigns the difference between the sweet and sour versions as being due to the particular genetic material of the mandarin being used. Calabrese cites Scora as authoritative.

15. Ortiz, 19-25.

16. National Climatic Data Center, *GHCN-1*, *GHCN-2* (Asheville NC: NCDC), <http://www.ncdc.noaa.gov/oa/ncdc.html>. Reading a climograph is straightforward. All climographs use vertical bars to show the average precipitation value, in millimeters, for the given month. The diamond represents the average low temperature, where the triangle gives an average high temperature for the same period. The purpose of

climographs is to reveal the patterns of precipitation and temperature. Climographs were created using data derived from these datasets provided by the NCDC. When available, the 30 years annual average of precipitation, high, low, and mean temperatures is presented. On certain graphs only high and low temperatures are available, while on others, only the mean temperature was available.

17. Robert W. Hodgson, "Horticultural Varieties of Citrus," in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), <http://lib.ucr.edu/agnic/webber/Vol1/Chapter4.html#nature>. Hodgson describes the flavor of oranges in naturally watered land to be preferable to that of oranges grown in irrigated groves.

18. Hodgson, "Horticultural Varieties of Citrus."

19. Hodgson, "Horticultural Varieties of Citrus." Where cultivar and rootstock influence adaptability to soil and climatic conditions, the temperatures have the greatest influence on when fruit ripens.

20. William Cooper, *Odyssey of the Orange in China: National History of the Citrus Fruits in China* (Winter Park, Florida: W.C. Cooper, 1990), 1-4. *Shih Ching*, which translates in English to *The Book of Odes* or *The Book of Songs*, is a venerable text. The tribute of Yü is likely a reinterpretation of previous texts, which was modified to please a contemporary audience. Nevertheless, it is considered reliable by many scholars.

21. Calabrese, 2; and Cooper, 10. It is interesting that a customs official has the sole purpose of receiving on seasonal item. The dignitary in the court of Han emperor Wu Ti is described as being in charge of collecting tributes of *kan*. Cooper points out that *kan* differ from *chu* where the former refers to oranges and the latter to mandarins. However, Cooper also points out the difficulty of assigning definitive descriptions. The changing and impermanent state of the language prevents the modern scholar from gleaning an unquestionable interpretation. He cites the example that *chu* can indicate color, fruit, or both. Indeed, current vernacular assigns *chu kan*, *sha kan*, and *shih kan* all describing various kinds of oranges, much like our variety designations; e.g., Valencia, Navel, and Hamlin oranges.

22. Christopher Thacker, *The History of Gardens* (Berkeley: University of California Press, 1979), 55.

23. United Nations Food and Agricultural Organization, "Crop Water Management, Citrus," <http://www.fao.org/landandwater/aglw/cropwater/citrus.stm>; and UN FAO, "Crop Water Information: Citrus." [http://www.fao.org/nr/water/cropinfo\\_citrus.htm](http://www.fao.org/nr/water/cropinfo_citrus.htm).

24. UN FAO, "Crop Water Information: Citrus." The FAO describes citrus as being a viable commercial crop from 40°N - 40°S, and up to an altitude of 1800m in the tropics and 750m in subtropics.

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Notes to pages 23-26

25. Robert W. Hodgson, "The California Fruit Industry," *Economic Geography* 9, no. 4 (1933): 354-55; and Paul F. Griffin and Ronald L. Chatham, "Population: A Challenge to California's Changing Citrus Industry," *Economic Geography* 34, no. 3 (1958): 275-76. Porterville and Lindsay, California, are two locations where cool winter temperatures influence the placement of orange groves. The population growth of Riverside and Los Angeles counties pushed the orange groves out into the Central Valley. That region has a greater danger of experiencing freezing weather. By placing the oranges on the hillsides, they are protected from cold air, which flows down the slopes towards the valley floor.

26. Cooper, 44. The Pearl River delta is the primary citrus growing area in contemporary China. Because of the plentiful rainfall and soil composition, irrigation is all but nonexistent.

27. Om Prakash, *Food and Drinks in Ancient India, from Earliest Times to 1200 AD* (Delhi: Munshi Ram Manohar Lal, 1961), 220.

28. Prakash, 270.

29. Hodgson, "Horticultural Varieties of Citrus." Under the heading, Climatic Effects. The cold temperatures remove the chlorophyll from the fruit rind, revealing the underlying carotenes. When temperatures remain warm, the change in coloration is much slower, yielding fruit that is not as deeply colored, if a change occurs.

30. Ibid.

31. Ackerman, 289.

32. Calabrese, 43; Morton, 130-33; and Hodgson, "Horticultural Varieties of Citrus." Hodgson sums up the situation succinctly: "In general, therefore, the fruit grown in arid subtropical climates is more strongly and richly flavored than that produced in semitropical or tropical climates. Fruits or varieties that are characterized by relatively high acidity, however, such as the kumquats and some of the mandarins (for example, King and Kara) and their hybrids (for example, Temple tangor and Minneola and Seminole tangelos) are more pleasantly flavored in semitropical or tropical climates, and vice versa."

33. UN FAO, "FAOSTAT, Crops," <http://faostat.fao.org/site/567/default.aspx>; Planning Department of Uttar Pradesh, "Citrus," <http://planning.up.nic.in/innovations/inno3/ph/citrus.htm>. Pradesh and Maharashtra have the largest planted acreage of sweet oranges in India. Planted and harvested acreage is a better indicator than production weight for determining economic importance. The Planning Department of Uttar Pradesh writes that total citrus was third behind mangoes and bananas in 2001. More recent data from FAOSTAT reveals that citrus moved into second place in 2004. Although an increase in orange harvest was responsible for this change, oranges are still just two thirds of that of bananas. It is also important to note that mandarins dominate the Indian orange production. Similar in appearance, mandarins do not have the same commercial

characteristics. The most important difference is the skin, oranges are "tight skinned," namely the peel on oranges does not easily separate from the fruit. Conversely, once ripened, the peel on mandarins readily separates from the fruit. The popular Clementine orange is not an orange; it is a mandarin. That quality of loose skin prevented wide transportation or storage of these fruits until the advent of refrigeration. The FAO conflates mandarins with oranges in its data.

34. Planning Department of Uttar Pradesh, "Citrus." Hodgson, "Horticultural Varieties of Citrus." The Planning department of Uttar Pradesh lists *Mosambi* and *Sathgudi* varieties as being the dominant cultivar in regions near these cities. See entries for *Mosambi* and *Sathgudi* varieties under sweet oranges in Hodgson. In the section on sour oranges, Hodgson writes that the *Kitchli* is commercially cultivated in Guntur district.

35. Planning Department of Uttar Pradesh, "Citrus." Hodgson, "Horticultural Varieties of Citrus." Hodgson describes the dominant cultivar, the *Mosambi*, as having an unknown origin. It is conjectured that the Portuguese brought fruit to India from Mozambique. The morphology of the orange reveals it is not a sweet orange; it is instead an acid-less variety. The Planning Department of Uttar Pradesh reports the regions of Andhra Pradesh and Maharashtra have the largest planted acreage of sweet oranges and that these oranges are often destined for juice processing. The sweeter varieties are planted in the northern regions of Punjab, Haryana, and Rajasthan.

36. Andrew M Watson, *Agricultural Innovation in the Early Islamic World: The Diffusion of Crops and Farming Techniques, 700-1100* (Cambridge: Cambridge University Press, 1983), 45; and John Crawford, "On the History and Migration of Cultivated Plants in Reference to Ethnology-Fruits" *Transactions of the Ethnological Society of London* 5 (1867): 262-65. Watson and others cite Masûdi's *Golden Meadows* as pinpointing the introduction of citrus to Oman. Crawford describes the spread of oranges towards the islands of the Pacific. This region is not included because citrus did not diffuse beyond a restricted area. India is the probable conduit for the diffusion beyond Asia. It is assumed that oranges were available to Portuguese sailors when they arrived in the sixteenth century, and that those mariners probably increased the demand for the existing fruit and introduced new varieties. The important point to consider is that the plantings on Indonesia are at altitudes 4000' above sea level. This was necessary to overcome the affects of location at this tropical latitude. Furthermore, the fruit was not grown adjacent to the ports; it needed to be brought to market.

37. Planning Department of Uttar Pradesh, "Citrus."

38. John H. Harvey, "Garden Plants of Moorish Spain: A Fresh Look," *Garden History* 20, no. 1 (1992): 72. The apricot was available in Spain by 1100, but was not brought to England until after 1540.

39. Watson, 45. It is unknown whether oranges were sent as a gift, purchased in the market, sought out by the buyer, or any of the other pertinent aspects of this exchange.

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Notes to pages 31-36

40. Watson, 45-48; and Samuel Tolkowsky, *Hesperides: A History of the Culture and Use of Citrus Fruits* (Westminster: Staples and Staples, 1938), 119.

41. Ortiz, 22; and Morton "Sour Orange". Morton writes that "[a]ll parts of the sour orange are more aromatic than those of the sweet orange."

42. Tolkowsky, 117.

43. Ibid. Tolkowsky relates the account of the Abbasid Caliph Qahir who was deposed and blinded by his nephew. To exact some measure of revenge, Qahir told his nephew that a treasure was buried in the orange grove. This tricked the nephew into digging up the garden and was so deprived from enjoying the trees.

44. FAO, "FAOSTAT, Production," <http://faostat.fao.org/site/339/default.aspx>. The FAO estimates that Syria produced 430,000 tons of oranges in 2007. That figure is comparable to Algeria (415,000 tons) and is one quarter to that of Egypt, who is the leading producer in the region. Egypt grew 1.8 million tons in 2007.

45. Tolkowsky, 298.

46. Hodgson, "Horticultural Varieties of Citrus." He writes that color intensity is dependent on the chilling during cold nights. He points out that arid, subtropical climates have wide diurnal temperature swings and that this produces vibrantly hued fruit.

47. Tolkowsky, 276. He cites the gardener to Louis XIV saying that oranges from the New World Indies to be superior to those grown on the continent or those brought from Asia. However, those oranges did not grow well in the controlled climate of Versailles.

48. Tolkowsky, 113. The moniker of this place, and a similar one in Spain, is alternately known as the Patio los Naranjos.

49. UN FAO, "Crop Water Information: Citrus." Temperatures below 10°C will induce the necessary dormancy as will a reduced water supply in warmer climates. The dormancy, or perhaps better described as a rest period, is necessary for flowering.

50. C. W. Coggins, Jr. and H. Z. Hield, "Plant-Growth Regulators," in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), [http://lib.ucr.edu/agric/webber/Vol2/Chapter2\\_2.htm#abscission](http://lib.ucr.edu/agric/webber/Vol2/Chapter2_2.htm#abscission); and Calabrese, 43-45. Fruit abscission occurs spontaneously in high temperatures and low rainfall. Irrigation must be used to prevent the loss of fruit.

51. Nuha N.N. Khoury, "The Meaning of the Great Mosque of Cordoba in the Tenth Century Muqarnas" in *Volume XIII: An Annual on the Visual Culture of the Islamic World*, ed. Gülru Necipoglu (Leiden: E.J. Brill, 1996): 80-1; United Nations Food and Agricultural Organization, "Crop Water Information: Citrus," [http://www.fao.org/nr/water/cropinfo\\_citrus.htm](http://www.fao.org/nr/water/cropinfo_citrus.htm). The orange trees were added around 976 CE, coinciding with the expansion and renovations of that edifice. The combination of furrow and basin

irrigation used in the mosque courtyard is a technique that is still used in contemporary settings according to the FAO.

52. Watson, 45.

53. Watson, 83.

54. UN FAO, *Citrus Fruit: Fresh and Processed, Annual Statistics, 2006* (Rome: FAO, 2006), 14.

55. FAO, "FAOSTAT, Trade," <http://faostat.fao.org/site/342/default.aspx>.

56. FAO, "FAOSTAT, Crops," <http://faostat.fao.org/site/567/default.aspx>.

57. "FAOSTAT, Trade, TradeSTAT," <http://faostat.fao.org/site/406/default.aspx>. Netherlands is also in top ten of world's exporters of FCOJ. The FCOJ is imported from Brazil and the whole fruit from Mediterranean groves.

58. Sylvia Saudan-Skira and Michel Saudan, *Orangeries: Palaces of Glass, Their History and Development* (Cologne: Evergreen, 1998), 128-29.

59. Tolkowsky, 199, 231, and 225. The first reference describes Humbert II, the Dauphin of Viennois, purchasing tree in Naples for shipment to France, in 1336. The second reference alerts us to the Dutch industry that arose for the trade in seedlings and budwood. The last reference is the contrary, describing the pride of a gardener growing an orange tree in Belgium.

60. McPhee, 86.

61. Webber, "History and Development of the Citrus Industry."

62. Raymond E. Crist, "The Citrus Industry in Florida," *American Journal of Economics and Sociology* 15, no. 1 (1955): 6; Walter Ebeling, *The Fruited Plain: The Story of American Agriculture* (Berkeley: University of California Press, 1979), 156; and McPhee, 30. Unfortunately, that condition is not necessarily sufficient to prevent flooding. The water percolates through the "A" horizon of soil without problem; however, some of these soils have thin "A" and "B" horizons and a compacted "C" horizon. In those regions, the water table can be too high. To combat it, mounds or other landscaping is performed.

63. Crist, 1-2. British surveys of Florida in 1774 found numerous wild stands of sour oranges, the result of dispersal of seeds by aboriginal inhabitants. Although Indians undoubtedly spread oranges, they were not the only agent. Birds spread orange seeds, as did deer, raccoon and other mammals. Even rivers carried the fruit downstream.

64. Ackerman, 293. Two early freezes, in 1828 and 1835, set the stage for later episodes. The end of century 1894-95 freeze crippled the Florida industry. That freeze killed many of the trees in northern counties. Subsequent ones in 1963 and 1966 encouraged investment in Brazilian cultivation, as frozen orange juice makers sought to

diversity their sources. The freezes in 1986 and 1993 also substantially affected Florida citriculture.

65. Agnes Perez and Susan Pollack, *Fruit Tree Nuts Outlook*, United States Department of Agriculture (Washington DC: 2008), 19-20. Ironically, this housing boom is also bringing a return of feral groves. A downturn in the market in 2008 has left realtors and developers with excess properties. These groves are not maintained nor are the lots developed. There are fears that a serious disease of citrus trees, huanglongbing, (a.k.a. Citrus Greening) is being harbored in these untended groves.

66. *The Diaries of George Washington*, ed. Donald Jackson and Dorothy Twohig (Charlottesville: University Press of Virginia, 1978), <http://memory.loc.gov/ammem/gwhtml/gwhome.html>. The entry for Saturday, May 21, 1785, describes the arrival of Washington's phaeton carrying nursery plants from South Carolina. The cargo included orange, oak, and magnolia trees.

67. Daniel Jay Browne, *The Trees of America: Native and Foreign* (New York: Harper & Brothers, 1846), 64. The early groves were planted on the islands along the coast. This placement protected the trees from cold air fronts and allowed this relatively northern location. Charleston does not experience a Mediterranean climate nor is it truly subtropical.

68. National Agricultural Statistics Service, "South Carolina" (Washington DC: USDA, 2008), [http://www.nass.usda.gov/Statistics\\_by\\_State/South\\_Carolina/About\\_Us/index.asp](http://www.nass.usda.gov/Statistics_by_State/South_Carolina/About_Us/index.asp). The NASS reports that South Carolina is consistently the second largest producer of peaches in the United States.

69. Fernand Braudel, *The Wheels of Commerce*, vol 2, *Civilization and Capitalism 15th -18th Century*, trans. Sian Reynolds (New York: Harper & Row, 1984): 190-93. It was a common practice to plant seeds in remote locations to create a manufactured oasis. Rather than rely on distant and possibly nonexistent food stores, this practice established plantations both at colonial destinations and waypoints.

70. Tolkowsky, 253-55; and Scora 370. The trip to the Indian Ocean did not follow Vasco de Gama's original path along the west coast of Africa. Portuguese sailors discovered that the easier route was to follow the trade winds to Brazil, to sail through the doldrums along the Brazilian coast, then to catch the westerly trade winds across the South Atlantic. Despite the increased distance, the prevailing winds reduced the travel time because there was no need to tack against those winds. On one such trip in 1502, Joa de Nova introduced livestock, fruit trees and vegetables to the island of St. Helena. The purpose was to provide a stop where food could be obtained in the middle of journey. By 1583, the island was lush with the resulting vegetation.



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71. UN FAO, *Citrus Fruit, Fresh and Processed, Annual Statistics, 2006* (Rome: FAO, 2006), 8. Since 1980, Brazil regularly has been the world's leading producer of oranges.

72. UN FAO, (2006), 9.

73. Crist, 8. The rinds are distilled down to a molasses that is added to cattle feed.

74. Ebeling, 328-30. The missions were self sufficient, raising grains, fruits, vegetables and livestock.

75. Webber, "History and Development of the Industry." Joseph Wolfskill only obtained his seedlings in 1841, after the secularization and break up of the missions.

76. Webber, "History and Development of the Industry."

77. Knowles A. Ryerson, "Plant Introductions" *Agricultural History* 50, no. 1 (1976): 252

78. Pierre Lazlo, *Citrus* (Chicago: Chicago University Press, 2007), 72-74.

79. UN FAO (2006), 8.

80. Cooper, 8-9.

### Chapter Three

1. Frederick J. Simoons, *Food in China: A Cultural and Historical Inquiry* (Boca Raton: CRC Press, 1991), 196.

2. Mary Reed, *Fruits and Nuts: In Symbolism and Celebration* (San Jose, CA: Resource Publications, 1992), 18. Once more form and color contribute to the association; round and golden, orange slices resemble coins.

3. Reed, 18.

4. Marilyn Yalom and Reid Yalom, interview by Michael Krasny, Forum, KQED Radio, 26 May 2006, <http://www.kqed.org/epArchive/R805261000>. Descendants of Chinese immigrants to United States placed oranges on the graves of their ancestors, the ones whose bones were not returned to China. About at the 16:50 mark on the podcast Ms. Yalom describes the burial and memorial customs of Chinese gravesites.

5. Phyllis Pray Bober, *Art, Culture, and Cuisine: Ancient and Medieval Gastronomy* (Chicago: University of Chicago Press, 1999), 187. Pliny knew of citrons but he did not believe they could be grown in Italy. Some citrus fruit must have crossed oceans whole or in dried form; however, obviously not in such quantity as to affect dietary or gardening practices.

6. Alfred C. Andrews, "Acclimatization of Citrus Fruits in the Mediterranean Region" *Agricultural History* 35, no. 1 (1961): 46.

7. Samuel Tolkowsky, *Hesperides: A History of the Culture and Use of Citrus Fruits* (Westminster: Staples and Staples, 1938), 97-101. Pliny the Elder, *The Natural History Of Trees*, Book XII, Chapter 8, *The Natural Histories*, ed. John Bostock and H. T. Riley, in the Perseus Digital Library, <http://www.perseus.tufts.edu/cgi-bin/ptext?lookup=Plin.+Nat.+12.8>. Om Prakash, *Food and Drinks in Ancient India: From Earliest Times to 1200 A.D.* (Delhi: Munshi Ram Manohar Lal, 1961), 149. The leaves on the example that Tolkowsky provides resemble citrons. If these are indeed oranges, their absence of oranges from Pliny's Natural History is that much more puzzling. If Pliny was aware of citrus beyond the citron, he certainly would have mentioned them in "The Trees of India." Moreover, Prakash asserts oranges did not reach India until the Common Era. If that date is true, it is reasonable to assume that the quantity available for trade was small. This explains why it would be unknown beyond a restricted circle.

8. Karl Lehmann, "Sta Costanza," *Art Bulletin* 37, no. 3 (1955): 196.

9. Andrews, 46-7; Henry Schneider, "The Anatomy of Citrus," in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), vol. 2, chap. 1, [http://lib.ucr.edu/agnic/webber/Vol2/Chapter2\\_1.htm#intro](http://lib.ucr.edu/agnic/webber/Vol2/Chapter2_1.htm#intro). It also should be pointed out that these oranges cannot be described as an accurate rendition. The shape of the leaves is close, they have the proper oblong shape of sour oranges; however, they lack the distinguishing petiole usually found on that variety. The leaves are too long and oblong to be sweet oranges. It does not mean the artist was unfamiliar with oranges for the leaf morphology does not always produce that shape.

10. Lehmann, 193; and Karl Lehmann, "Sta. Costanza: An Addendum." *Art Bulletin* 37, no. 4 (1955): 291. Lehmann reports in second citation that Erwin Panofsky agrees with his suspicion of Santa Costanza having pagan roots.

11. Lehmann ("Sta Costanza"), 196.

12. Tolkowsky, 109, 115. Tolkowsky cites Leo of Ostia, for a two stories of sending oranges as an invitation to invade. The first one is that the Byzantine general Narses sent oranges to the Lombards in 565 CE, and the second one is that the Prince of Salerno sent them to the Normans, via returning pilgrims, in the eleventh century. The latter episode is plausible, widespread citrus was in place, and the former appears to be a re-telling of the story, setting it further back in history.

13. Tolkowsky, 280.

14. Jezreel Jones, "An Account of the Moorish Way of Dressing Their Meat (with Other Remarks) in West Barbary, from Cape Spartel to Cape de Geer," *Philosophical Transactions* 21 (1699): 251-2; and Tolkowsky, 119, 149. The garden was important, but the alternate uses were equally valuable. The preparation method of meat requires a relatively young animal and a peasant might be expected to sell such an animal instead of

consuming it. The distillation of oranges for the production of medicines and perfumes is a skilled art; it is likely beyond the means of an average peasant or townsman.

15. Painting is more than applying pigment; it is also the panel, plaster, canvas, or paper that the pigment is applied upon. One should consider the brushes, knives, and other tools used to apply the pigment, even the form used to enclose the resulting image.

16. Terry Comito, "Renaissance Gardens and the Discovery of Paradise," *Journal of the History of Ideas* 32, no. 4 (1971): 485.

17. Tolkowsky, 148. This is a curious superstition. While the tree can live for centuries, it also can be killed with just a few days of sub-freezing temperatures. So perhaps such an event explains the folklore that sprang up around citrus.

18. Tolkowsky, 223.

19. Comito, 492. He recounts the Renaissance poet Pontano extolling Venus for bringing oranges to Naples to celebrate the arrival of Aeneas and as a signifier of their "ancient brightness." The reality is that oranges were introduced by previous conquerors.

20. Arthur Cotterell, "Venus," in *A Dictionary of World Mythology* (Oxford: Oxford University Press, 1997), <http://www.oxfordreference.com.libaccess.sjlibrary.org/views/ENTRY.html?subview=Main&entry=t73.e295>. Venus was originally the goddess of the garden; it was later that she became associated with Aphrodite.

21. Mirella Levi D'Ancona, *The Garden of the Renaissance: Botanical Symbolism in Italian Painting* (Firenze: L. S. Olschki, 1977), 274. It is important to note that the trees depicted in Primavera are the sour orange. This image either predates the introduction of the sweet orange or was completed before that fruit made significant inroads. D'Ancona reports that the humanist Alciati said the sour orange was sacred to Venus, its flavor reflecting the bitterness of love.

22. John Oliver Hand, *Joos van Cleve: The Complete Paintings* (New Haven: Yale University Press, 2004), 52; and Mark Twain, *Innocents Abroad* (New York: Harper Brothers Publishers, 1911), 154. Individual devotionals have a long history; one only need think of ancient Mesopotamia and Egypt to be reminded of the depth of this practice. The difference for works such as this is the expansion of audience. Books or personal altars were expensive and thus restricted to wealthy patrons. The introduction of paintings as devotionals provided an inexpensive alternative, which became available to a wider audience. Twain's observation is that artists of this time inserted a fantastic ethnicity into the art. The Virgin resembles a woman from northern Europe more than she does a resident of Bethlehem. For the viewer to be inserted into the devotional, the setting, including the characters, needed to be familiar and expected.

23. Hand, 88; and D'Ancona, 274.

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24. Hand, 50-52; D'Ancona, 274. In Italian Renaissance tradition, Mary plays a game of "hide the orange" with the Christ child.

25. Especially surprising considering this is a sour orange; the thickness of the pericarp seems to indicate that to be so. One layer may be the comparison of life to the taste of the fruit. See note 22.

26. Francesco Calabrese, "Origin and History," in *Citrus: The Genus Citrus*, ed. Giovanni Angelo DiGiacomo (New York: Taylor & Francis, 2002), 8. Who introduced the sweet orange to Europe is a matter of academic debate. Whether it was Genoese sailors who brought them from the Levant or it was Portuguese merchants who brought them from India or China is irrelevant. The exact time of appearance is unimportant because it is unquestioned that the Portuguese had the greatest influence. That their nationality is associated with the sweet orange in numerous languages is sufficient evidence.

27. Pierre Laszlo, *Citrus: A History* (Chicago: University Chicago Press, 2007), 134-35.

28. Laszlo 134-35. The vendors of the fruit, referred to as "orange girls," were particularly low on the social ladder.

29. Sylvia Saudan-Skira and Michel Saudan, *Orangeries: Palaces of Glass: Their History and Development* (Cologne: Evergreen, 1998), 41-43. The authors describe the purpose in these locales as manipulating reality, placing a city dweller in the midst of nature. Orangeries are designed as a theater, the express purpose of impressing fellow monarchs the foremost design consideration.

30. Comito, 496-499. One opinion is that Islamic gardens integrated nature and those elsewhere in Europe were demonstrations of mastery over nature.

31. Lucia H. Albers, "The Perception of Gardening as Art," *Garden History* 19, no. 2 (1991): 165. The prevailing opinion was the nature is disorderly, and that man is obligated to impose discipline and bring about harmony.

32. Priscilla Boniface, "Orangery", Grove Art Online, <http://www.groveart.com.libaccess.sjlibrary.org/shared/views/article.html?section=art.063693>.

33. DiGiacomo, 63-4. Tolkowsky, 280.

34. Tolkowsky, 297, 167.

35. This is not to deny the commonly accepted symbolism of the vanitas genre. Rather the cosmopolitan symbolism layers on top of and serves to enhance the mortality theme found in the vanitas paintings. The regardless how far one travels or how sophisticated one may be, mortality comes to all. Nor does this assign all paintings containing citrus to the vanitas category.

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36. *The Diaries of George Washington*, Vol. 4. ed. Donald Jackson and Dorothy Twohig (Charlottesville: University Press of Virginia, 1978), <http://memory.loc.gov/ammem/gwhtml/gwhome.html>; and Billie S. Britz, "The Orangery in England and America," *The Magazine Antiques* 149, no. 4 (1996): 597.

37. Daniel J. Browne, *Trees of America* (New York: Harper & Brothers, 1846), 63.

38. Herbert J. Webber, "History and Development of the Citrus Industry" in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), <http://lib.ucr.edu/agric/webber/Vol1/Chapter1.htm#states>.

39. Walter Ebeling, *The Fruited Plain: The Story of American Agriculture* (Berkeley: University of California Press, 1979), 93-96, 146-148, 352-360. The popularity and availability of apples, peaches, and blueberries in the eastern US markets did not encourage introductions. That is not to say oranges were completely neglected. Before the establishment of the railroads, oranges were shipped from Florida via schooner and other sea routes. Packed in Spanish moss and brought to markets in depths of winter, the exoticism of the oranges was as much an attraction as their flavor.

40. Edward A. Ackerman, "Influences of Climate on the Cultivation of Citrus Fruits." *Geographic Review* 28, no. 2 (1938): 289. Ackerman describes the citrus industry as a "...modern phenomenon dependent on a rich, concentrated market and fast transportation."

41. Douglas C. Sackman, *Orange Empire: California and the Fruits of Eden* (Berkeley: University of California Press, 2005), 34-39.

42. Charles Nordhoff, *California: For Health, Pleasure, and Residence* (New York: Harper & Brothers, 1873), Chapter IX, <http://memory.loc.gov/ammem/cbhtml/cbhome.html>; Harry W. Lawton and Lewis G. Weathers, "Crop Protection, Postharvest Technology, and Early History of Citrus Research In California," in *The Citrus Industry*, vol. 5 (Riverside: University of California Press, 1989): 285; Helen L. Kohen, "Perfume, Postcards, and Promises: The Orange in Art and Industry" *The Journal of Decorative and Propaganda Arts* 23 (1998): 33-4; Helen Harcourt, *Florida Fruits and How to Raise Them* (Louisville KY: John P. Morton & Co, 1886); and John McPhee, *Oranges* (New York: Farrar, Strauss and Giroux, 1967), 91-99. Lawton and Weathers note that Nordhoff's book was "the bible of eastern emigrants" who went to southern California during the citrus boom. It should be noted that while Nordhoff was the most prominent of the many authors, not all were American. Ludwig Salvator wrote *A Flower from the Golden Land* in 1878, which was first published in Prague. A Tuscan noble, the book was influential in Europe. Kohen reminds us that Florida had the same breed of pioneer farmers and booster literature. Helen Harcourt's work stands as an example of that genre for that region. McPhee writes how land ceded to the railroads was in turn purchased by

speculators and sold to British firms. The propaganda was written that stated only a few trees yielded sufficient income to yield extravagant profit.

43. Gordon T. McClelland and Jay T. Last, *California Orange Box Labels: An Illustrated History* (Beverly Hills CA: Hillcrest Press, 1985), 5-7.

44. *Ibid.*, 30-38. Moreover, the label was not directed at end consumer, the wholesaler was the target. A survey by Sunkist discovered the consumers could not name any of the growers. Some labels were generic, known as stock labels, and were not associated with a particular grower or packinghouse. These could be used by small scales growers or were used by packinghouses to ship inferior quality fruit.

45. Sackman, 87-95.

46. *Ibid.*, 87, 96. Sackman cites Harold Powell, Chairman of the Sunkist Cooperative, for that quote. Sunkist wanted the orange to be perceived as more than a Christmas treat, instead they wanted citrus as part of the daily diet.

47. *Ibid.*, 97. Billboards were seen as an important medium because they did not require the consumer to purchase a magazine or listen to a radio program to be exposed to the message.

#### Chapter Four

1. Lucia H. Albers, "The Perception of Gardening as Art," *Garden History* 19, no. 2 (1991): 172. The author argues that as the arts lose prestige, less interest was ascribed to ranking the arts. At this time, gardening was assigned as a past time or hobby.

2. "Major Trends in U.S. Food Supply, 1909-99" *FoodReview* 23, no. 1 (2000): 8, 14; and Linda Scott Kantor, "Community Food Security Programs Improve Food Access," *FoodReview* 24, no. 1 (2001): 24. The role of the garden has changed in the past hundred years. The USDA estimates that Americans in 1909, on a per capita basis, had consumed one hundred and thirty one pounds of homegrown vegetables. In 1998, that value dropped to a paltry eleven pounds. From these data, it can be concluded that few people in the United States rely on the proceeds of their garden. Nevertheless, Kantor points out the role and importance of community gardens in bringing food to the urban poor.

3. Carl O. Sauer, *Agricultural Origins and Dispersals* (Cambridge, MA: MIT Press, 1969), 20. Sauer's investigations were directed at finding the discrete origination point of agriculture and this essay is not concerned with resolving that question. Nevertheless, the progression of horticulture to agriculture is relevant to the discussion. The argument that horticulture preceded agriculture is well supported in the archeological and historical record. Indeed, as Sauer points out many societies in the pre-Columbian world relied on horticulture, agriculture, and hunting and gathering. It appears that all three techniques are essential to supplying nutrition in pre-industrial societies.

4. Helen M. Leach, "On the Origins of Kitchen Gardening in the Ancient Near East," *Garden History* 10, no.1 (1982): 1-7; and Ellen Churchill Semple, "Ancient Mediterranean Pleasure Gardens," *Geographical Review* 19, no. 3 (1929): 421. Leach provides the obvious reasons for enclosing orchards, e.g., to repel animals and thieves. She reminds us that olives, grapes, figs, and dates have the longest history in the orchard and vineyard. The variety of foods available in the Roman marketplace is a testament to the productivity of native and inherited customs. Churchill describes gardens as being concomitant to intensive tillage and particularly conspicuous in warm climates. This opinion has not changed. Where the argument that beer preceded bread leans could be used to support a first cultivation of grasses, the role of grapes, dates and other fruit in the process is a balancing counter.

5. Naomi F. Miller and Wilma Wetterstrom, "The Beginnings of Agriculture," in *Cambridge World History of Food*, vol. 2 (Cambridge: Cambridge University Press, 2000), 1128. The archeological record shows that even the most rustic buildings appeared to have space that supported small-scale horticulture. Another supporting fact is that ancient official records describe the distribution of staple foods and occasionally meat or dairy, but rarely include fruits or vegetables. Unless the population suffered from rampant malnutrition and vitamin deficiencies, those secondary foods must have come from a personal garden.

6. Pliny the Elder, *The Natural History Of Cultivated Trees*, Book XVII, Chapter 22, *The Natural History*, ed. John Bostock and H. T. Riley, in the Perseus Digital Library, <http://www.perseus.tufts.edu/cgi-bin/ptext?lookup=Plin.+Nat.+17.26>. Pliny points out that grafting and budding had antique origins even during his time.

7. Victory gardens during the previous wars provide the best example. The more recent heirloom trend and emphasis on accounting of "food miles" as personal effort in combating climate change are other examples.

8. William C. Cooper, *Odyssey of the Orange in China: National History of the Citrus Fruits in China* (Winter Park: William Cooper, 1989), 1-4; Rainer W. Scora, "On the History and Origin of Citrus." *Bulletin of the Torrey Botanical Club* 102, no. 6 (1975): 369; Francesco Calabrese, "Origin and History," in *Citrus: The Genus Citrus*, ed. Giovanni Dugo and Angelo DiGiacomo (New York: Taylor & Francis, 2002), 1-3.

9. Calabrese, 2; Cooper, 3. Both sources cite the Shih Ching Book of Odes, and the Tribute of Wu Ti as the first mention of citrus, oranges included, in published literature. Cooper differentiates the fruits as being ku or chu, that is they were oranges, and not kan, which are mandarins.

10. Frederick J. Simoons, *Food in China: a Cultural and Historical Inquiry* (Boca Raton: CRC Press, 1991), 66-74; and William H. McNeill, "The Eccentricity of Wheels, or Eurasian Transportation in Historical Perspective," *The American Historical Review* 92, no. 5 (1987): 1123-22. The staple crop of rice by the Chwang contrasts to millet and

wheat that the Han had cultivated. McNeill describes the Chinese as being among the best to exploit the availability of waterways to move large amounts of food.

11. Cooper, 12. When food is presented as a tribute item, the offerings are of peripheral or secondary foods. The emphasis and intention of tribute is to impress the recipient. Conspicuous consumption and the spare no expense attitude gains favor. Baskets of oranges were not comparable to the barges of rice; the rice despite of greater quantity was of lesser value.

12. Cooper, 4; Simoons, 192. The historical production of fruit is low when compared to rest of world. This fact leads us to the conclusion the fruit was initially be grown as a cash crop.

13. Simoons, 18, 192. The first reference describes the unusual practice of already peeled oranges being dispensed by street vendors. This was done to allow the vendor to keep the valuable rind for other uses. The second reference describes the general disdain for fruit. Nevertheless, of scant acreage devoted to modern day fruit cultivation, oranges and mandarins occupy the greatest share of those plantings.

14. Sauer 20-25; Erich Isaac, *Geography of Domestication* (Englewood Cliffs, NJ: Prentice-Hall, 1970), 8; and Ram Chandra Bhusal et al, "Propagation of Citrus by Stem Cuttings and Seasonal Variation in Rooting Capacity," *Pakistan Journal of Biological Sciences* 4, no. 11 (2001): 1297. Cuttings are the removal of a sprout and placing it in soil or other growth medium. Roots spontaneously grow and the cutting becomes a stand-alone plant. Sauer and Isaac assert this likely predated seed culture because it was more visible and obvious to the instigators. The insertion of cutting into the ground may have led to the accidental discovery of this property. Chandra reports that trifoliolate oranges readily propagate from cuttings, sweet oranges a little less so, and that some mandarins will not do so at all. Rough lemons, another favored rootstock, also will sprout roots.

15. Douglas C. Sackman, *Orange Empire: California and the Fruits of Eden* (Berkeley: University of California Press, 2005), 69-72; and Cooper, 8. Sackman points out that the original Washington Navel oranges of southern California were effectively clones of a single specimen tree. As such, there was a premium placed on chimeras or trees with notable qualities that differed from the original stock. Budwood would be harvested from those trees, and then often budded on to sour orange rootstock. Cooper points out that USDA special agent Walter Swingle observed Chwang farmers grafted sweet oranges (*Citrus Sinesis*) on trifoliolate orange (*Poncirus Trifoliolate*) so that they could grow fruit in less than ideal soil and climate conditions.

16. Robert W. Hodgson, "Horticultural Varieties of Citrus," in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside:



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of California Press, 1968), <http://lib.ucr.edu/agric/webber/Vol1/Chapter4.html>.

17. Charles Nordhoff, *California: for Health, Pleasure, and Residence*. (New York: Harper & Brothers, 1873), <http://memory.loc.gov/ammem/cbhtml/calbkibauthindex1.html>; and Calabrese, 18. A tree is budded when a branch is attached to the bole of tree. A graft replaces the entire scion.

18. Calabrese, 36-48; and John McPhee, *Oranges* (New York: Farrar, Strauss and Giroux, 1967), 22-29. Citrus growers regularly use rootstocks to match the local soil conditions or provide certain characteristics such as disease resistance. The best example is the comparison of the citrus producing areas in the United States. In Florida orange growers bud Valencia, Hamelin, and Pineapple scions on rough lemon rootstock. This combination flourishes in the sandy, nutrient poor soils such as hammock and cleared pine forests. On the other side of the continent in California, navel oranges are often budded on sour orange rootstock. This combination thrives in clayey soils of the playa and alluvial deposits. Another benefit of that practice is that it works well in irrigated soil as it withstands the salt build up.

19. Isaac, 70. The origin of grafting is unknown. Olive groves and vineyards appear early in the southwest Asia; however, neither requires grafting. Pomegranate, apricot, and peach trees, all benefiting from grafting, appear in southwest Asia later in the historical record. It is conjectured that the technology and practice of grafting and budding spread westward simply because of the volume of fruits and vegetables that came from the east.

20. By commercial, the meaning is a grower of a significant quantity of trees. More likely a royal personage, it could also be religious order or a merchant; any of these could have reason to maintain a grove of 10 or more trees.

21. Andrew M. Watson, *Agricultural Innovation in the Early Islamic World : The Diffusion of Crops and Farming Techniques, 700-1100* (Cambridge: Cambridge University Press, 1983), 1; and Karl W. Butzer et al., "Irrigation Agrosystems in Eastern Spain: Roman or Islamic Origins?" *Annals of the Association of American Geographers*, 75, no. 4 (1985): 479-82. Butzer et al, dissents from that opinion. They describe the situation in Spain as not one of revolution in agriculture but one of increasing intensity. He lays out a convincing argument that the agriculture in Islamic Spain was not markedly different from Roman agriculture when it was in full production. Butzer describes situations where cash cropping, multiple harvesting, and other practices practiced by the Roman Empire; techniques that Watson claims to be innovations. Nevertheless, it is notable is that Butzer acknowledges that citrus fruits were a significant change to the crop variety of Spain. Oranges as a fruit became an important aspect of medieval landscape and later times.

22. Watson, 87-89.

23. Harm J. de Blij and Peter O. Miller, *Geography: Realms, Regions, and Concepts 2000*, 9th ed. (New York: John Wiley & Sons, Inc., 2000), 288-289. The diffusion spans both things such as animals, plants, diseases, etc., and ideas such as religion, agricultural practices, technology, etc. The diffusion of Islam brought about relocation diffusion of things, i.e., plants were brought from remote locations and established in new areas, and the contagious diffusion of the religion itself. All of this occurred as part of an expansion diffusion of both the people and the religion.

24. Samuel Tolkowsky, *Hesperides: A History of the Culture and Use of Citrus Fruits* (Westminster: Staples and Staples, 1938), 123.

25. Sibhi Y. Labib, "Capitalism in Medieval Islam" *Journal of Economic History* 29, no. 1 (1969): 90. Basra merchants held a special reputation as being involved in every trade. A contemporary authority, the venerable geographer Ibn Batutta, stated that one could go to any land and find a merchant from Basra trading there.

26. Semple, 421-25. In ancient times, gardens served as refuges and as well sources of food and ornamental products. The garden itself originated from the private orchards and evolved from its solely production based mode to one where the purpose was more ornamental. The walls provided privacy, the water source, whether spring or well, symbolized enduring wealth, the trees and flowers brought aesthetic pleasure.

27. Watson, 42-43. He describes citrus plantings as not being restricted to the elite and ruling class, but also appearing in the gardens of the rural poor. Citrus is relatively drought tolerant, and if large crops were not required, the trees would survive without irrigation. The return on investment must have been high. Another point to consider is that during this initial introduction, the pests and other diseases were probably not an issue. Viruses and bacterial infections are spread by rootstock and grafting; if the first plantings were by seed then the population was likely to be disease free. Furthermore, if seeds and small shipments of fruit were the genesis, it is likely that insect pests were rare. This example can be seen in modern times where the citrus in California was nearly pest free until the introduction of flora from Australia introduced exotic insects.

28. Tolkowsky, 112-13.

29. Karl Polanyi, *Traders and Trade, Ancient Civilization and Trade*, ed. Lamberg-Karlovsky and Sabloff (Albuquerque: University of New Mexico Press, 1975), 133.

30. Labib, 79 – 81. Although lacking the amenities of modern capitalism, the 10th century marketplace in Damascus or Alexandria was far more advanced than its European counterpart.

31. Henri Bresque and Pierre Guichard, "The World of the Abbasids, Apogee of Islam," in *Cambridge Illustrated History of The Middle Ages*, ed. Robert Fossier, trans. Janet Sondenheimer (Cambridge: Cambridge University Press, 1997), 265-277. This position is different from the Sahib a Sûk or master of the market. A tadjir works to

obtain goods and bring them to the market. The Sahib a Sûk regulated the intricacies and particulars of the market; he determined the prices, regulated who participated, decided the position of vendors, and above all, was responsible for tax collection.

32. Bresque and Guichard, 262; and Polanyi, 133-5. The tiraz or royal atelier needed an outlet for its products for its output could be distributed by personal exchange. Polyani cites the tamkar of Assyrian and Babylonian markets as the roots of this practice are ancient. While not all merchants spoke for the ruling entity or delivered their products, all merchants needed protection and some diplomatic cover. To earn that protection a quid pro quo situation must have been in place.

33. Watson, 5.

34. Bresque and Guichard, 265-73; and Labib, 83, 85-86. The famed *Karimi* merchants of Egypt were the exception in that they neither collected taxes nor were solely property owners. Their wealth and expertise was derived from the business being hereditary and their contacts numerous as well as worldwide. The *funduqs*, or specialized markets, were also vital in this commercial enterprise. *Funduqs* are devoted to a single product or range of products. Those markets focusing on textiles and luxury goods were the most lucrative, but the food markets were also prestigious.

35. Tolkowsky, 113; and Nuha N.N. Khoury, "The Meaning of the Great Mosque of Cordoba in the Tenth Century Muqarnas" in *Volume XIII: An Annual on the Visual Culture of the Islamic World*, ed. Gülru Necipoglu (Leiden: E.J. Brill, 1996): 80. The orange trees were added around 976 CE. These plantings coincided with the expansion and renovations of the mosque.

36. Robert Hillenbrand, *Islamic Architecture: Form, Function and Meaning* (New York: Columbia University Press, 1994), 442-44; and Shelia S. Blair and Jonathan M. Bloom, "The Mirage of Islamic Art: Reflections on the Study of an Unwieldy Field," *Art Bulletin* 85 no.1 (2003): 161-4.

37. The British model of 10 Downing Street as residence of Prime Minister and the House of Parliament the office. The U.S. White House follows the pattern of leader in residence – a work at home job.

38. Labib 86-87. It could be rightly described as having liminal properties as all these purpose overlapped. Not all purposes were listed; the truly economic roles were neglected. The medieval corporation had not yet fully evolved, so the burden of regulating exchange fell into the hands of the ruling parties. The ground the markets occupied were often state property, so rents were exacted.

39. Watson, 42.

40. D. Fairchild Ruggles, *Gardens, Landscape, and Vision in the Palaces of Islamic Spain* (University Park, PA: Pennsylvania State University Press, 2000), 29-31. Ruggles explains that the Caliph was expected to set the example, to attract the best and brightest

and deliver results to the society. Tenant farmers were hardly innovative; they relied on tried and true techniques while raising traditional crops. Someone had to take the initiative, to take the risk of new crops and new ideas, and this burden fell on the wealthy rulers. It should be noted that a tree was not just for the farmer but also for the generations to follow.

41. Alfred C. Andrews, "Acclimatization of Citrus Fruits in the Mediterranean Region" *Agricultural History* 35, no. 1 (1961): 35-46; and Tolkowsky, 100-01. The citron was introduced to Southwest Asia either before or during Achaemenid Empire. This is established as the fruit plays a central role in the Hebrew festival of the Tabernacle and it is assumed that they encountered the fruit during that time.

42. Isaac, 70. Interestingly, the author cites a specific time, 130 BCE, for the introduction of peaches and apricots from China to Mesopotamia.

43. Om Prakash, *Food and Drinks in Ancient India: From Earliest Times to 1200 A.D.* (Delhi: Munshi Ram Manohar Lal, 1961), 149, 220; and Patrick Bowe, "The Indian Gardening Tradition and the Sajjan Niwas Bagh, Udaipur," *Garden History* 27, no. 2 (1999): 196-98. This situation remains puzzle. If oranges were present in India as Prakash informs us, then why were they unavailable for trade? The reason may be that they were cultivated inland, away from trading centers on the coast. Bowe writes of British and Indian efforts in Udaipur and Lucknow to establish agricultural gardens. These gardens were expressly intended for scientific research and acclimation of new varieties. However, both locations are deep in the interior of India, far from the coast.

44. Harm de Blij and Peter Muller, *Geography: Realms, Regions and Concepts* 2000, 9th ed. (New York: John Wiley & Sons, 2000), 51-53.

45. Watson, 42; Ellen Churchill Semple, "Ancient Mediterranean Pleasure Gardens," *Geographical Review* 19, no. 3 (1929): 427-28; and Tolkowsky, 186-88, 231. Watson writes that the Islamic merchants and traders did not restrict their dispersal to seeds or fruit; trees and seedlings were among the importations. Semple informs us that the Phoenicians had similar practice. Tolkowsky writes that the Genoese imported trees, not just the fruit, from Naples. Genoa subsequently became a center for shipping trees to northern Europe for inclusion in Orangeries.

46. Ruggles, 27-29.

47. Ruggles, 22-28; and Andrew M. Watson, "The Arab Agricultural Revolution and Its Diffusion, 700-1100," *The Journal of Economic History* 34, no. 1 (1974): 21. Both authors note the flourishing manuscript trade of the late ninth century. Agricultural manuscripts were widely disseminated, and a substantial number of manuscripts covered the topic.

48. Ruggles, 28-29.

49. Ruggles, 27; Watson (1974), 10 – 15.

50. Watson (1983), 20.

51. Henri Bresque and Pierre Guichard, "From the Hegerian Model to the Arab Kingdom: Seventh to mid-Eighth Centuries," in *The Cambridge Illustrated History of the Middle Ages*, ed. Robert Fossier, trans. Janet Sonheimer (Cambridge: Cambridge University Press, 1997), 219-222. Revolts and riots are complex events but often at their root is the tax policy of the ruling class. It is doubtful that a well-fed society could be easily ignited into riotous conflagration.

52. Watson (1974), 11-13. The *noria* has an ancient origin. Simply described it is a bucket attached to a lever. The bucket is lowered into a water source (river, irrigation canal, and so forth) and lifted so the water can be poured onto field. The *shadduf* is also an ancient invention, a wheel with buckets on the outer rim. The water is collected from the source and bucket emptied into the field.

53. Watson (1983), 45-47. The European knights upon encountering orange groves in Syria, mistook them for wild stands. Although oranges can survive in that climate and terrain, they will not be especially productive without human intervention nor will they spontaneously expand.

54. Knowles A. Ryerson, "Plant Introductions," *Agricultural History* 50, no. 1 (1976): 249.

55. Walter Ebeling, *The Fruited Plain: The Story of American Agriculture* (Berkeley: University of California Press, 1979), 146; Daniel Jay Browne, *The Trees of America: Native and Foreign* (New York: Harper & Brothers, 1846), 63-64; and *The Diaries of George Washington*, ed. Donald Jackson and Dorothy Twohig (Charlottesville: University Press of Virginia, 1978), <http://memory.loc.gov/ammem/gwhtml/gwhome.html>. Browne estimates that before 1835, about two million oranges, packed in 15,000 barrels, were shipped north each year. This declined precipitously as a killing frost occurred in 1835. Washington's diaries list requests for, and the arrival of, citrus fruit in the entries on September 26, 1769, September 29, 1770, and May 10, 1774. It is notable that both the sour and the sweet versions of oranges are described. The entry for Saturday, May 21, 1785, describes the arrival of Washington's phaeton carrying nursery plants from South Carolina. The cargo included orange, oak, and magnolia trees.

56. Erston V. Miller, "The Natural Origins of Some Popular Varieties of Fruit," *Economic Botany* 8, no. 4 (1954): 342.

57. Ebeling, 355; Sackman, 69. Ebeling describes dramatic effect these trees had on California. The land values and prices increased an order of magnitude and accompanying demands for irrigation transformed the landscape. Sackman remarks on the difficulties that Sunkist and associated growers had to differentiate themselves. All the orange trees shared the same genetic material, and so were in effect, growing the same fruit. The sole difference was that the rootstock, which was adapted for the soil and

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the water conditions, and is important for overall health of the tree. Conversely, budwood determines the characteristics of the fruit. That common budwood yielded a relatively uniform fruit across all the growers.

58. Sackman, 46.

59. Sackman, 46; and Ebeling, 354. The two authors disagree as to the original source of the insects. Ebeling points to acacia trees brought to Menlo Park, California, while Sackman assigns the blame to the eucalyptus brought in for windbreaks in Southern California. What is likely is that both trees hosted the pest and contributed to the spread of the insect. It was the widespread planting of eucalyptus in southern California, intended to protect the trees from the desiccating Santa Ana winds, contributed to the rapid dispersal of this pest.

60. Ebeling, 354.

61. Ibid.

62. Ibid. However, now the modus operandi of the USDA of seeking predators with a broad appetite is being replaced with a more targeted approach. Ladybird beetles

63. Tolkowsky, 14.

## Chapter Five

1. Ellen Churchill Semple, "Ancient Mediterranean Pleasure Gardens," *Geographical Review* 19, no. 3 (1929): 420. Gilgamesh and other early sources emphasize the value of the garden. In Homer's *Odyssey*, Odysseus reveals himself to his father by recounting how many pear trees he inherited. It is notable that Odysseus tells not of olives; rather spoke of the more fragile pear tree.

2. Genesis 3:18. If Eden was paradise, the absence of field crops meant that it also lacked beer and bread, two items that have a long culinary history.

3. Semple, 421.

4. Semple, 427.

5. The displacement, which is the volume and weight, for shipping plants is substantial. The plants must be in pots filled with soil. This is cargo that requires care and watering, not dry goods that can be safely ignored for the duration of the voyage.

6. Lucia H. Albers, "The Perception of Gardening as Art," *Garden History* 19, no. 2 (1991): 163. Albers recounts the tale of the Persian prince, Cyrus the Younger showing his garden with obvious pride in the layout he conceived and executed.

7. For non-artists, the formal elements are line, shape, color/hue, value, space, and texture.

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8. Albers, 169. Albers cites Alexander Pope describing gardening as superior to sculpture because the former is closer to the primeval divine.

9. Christopher Thacker, *The History of Gardens* (Berkeley: University of California Press, 1979), 9-11. Thacker argues that the first garden was discovered; it was not made. This instance of apophenia reveals the predilection of humankind to find order in chaos.

10. Ronald King, *The Quest for Paradise: A History of the World's Gardens* (Weybridge: Whittet Books Ltd, 1979), 70.

11. Aga Khan Visual Archive, <http://archnet.org>.

12. Helen M. Leach, "On the Origins of Kitchen Gardening in the Ancient Near East," *Garden History* 10, no.1 (1982): 1-7; and Semple, 421. Walls served an obvious purpose in the rural environment; they prevented animals from ravaging the garden. However, in an urban setting, this need is superfluous. So what purpose do these walls serve? They control access, restricting entrance to specific portals and delineate the boundaries of the property.

13. Samuel Tolkowsky, *Hesperides: A History of the Culture and Use of Citrus Fruits* (Westminster: Staples and Staples, 1938), 148.

14. It is important here that role of man and nature within Islam be understood. Man is a steward of the earth; he is responsible for taking care of it. The Muslim is expected to build upon what is given to him or her and pass it on to the next generation.

15. "Madrasa." in the Oxford Dictionary of Islam, ed. John L. Esposito. Oxford Islamic Studies Online, <http://www.oxfordislamicstudies.com.libaccess.sjlibrary.org/article/opr/t125/e1369>. A *madrasa* is a school, sometimes religious often more secular. A modern simile is the university associated with a religious faith, e.g., Notre Dame, Baylor, and Georgetown.

16. Tolkowsky, 114. Tolkowsky assigns the planting to Ismail Ibn Mohammed al Sakhandi Nafh et Tib.

17. Tolkowsky, 114.

18. D. Fairchild Ruggles, *Gardens, Landscape, and Vision in the Palaces of Islamic Spain* (University Park, PA: Pennsylvania State University Press 2000), 28-30; and Tolkowsky 146-48. Ruggles discusses how the collapse of the Cordovan caliphate did not cease scientific discovery; to the contrary, it dispersed it across a wider area.

19. Sweet oranges were unavailable or unknown until much later. Sour oranges are especially fragrant and so lend themselves to gardens. The fruit can be eaten if sugar, or if more a surprising adjunct, salt, is added to it. As mentioned in previous chapter, the usual use was a seasoning for roasted meats.

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20. Mirella Levi D'Ancona, *The Garden of the Renaissance: Botanical Symbolism in Italian Painting* (Firenze: L. S. Olschki, 1977), 273-75. Artists of the Italian Renaissance recognized this condition and propagated it as a fertility symbol.

21. Christopher Thacker, *The History of Gardens* (Berkeley: University of California Press, 1979), 139; and Sylvia Saudan-Skira and Michel Saudan, *Orangeries: Palaces of Glass, Their History and Development* (Cologne: Evergreen, 1998), 11, 128-29. Thacker does not provide a chronology for appearance of gardens, and jumps immediately to the French formal garden of the sixteenth century. Saudan-Skira tells us of Charles VIII 1495 forays into Naples and informs us that the Henry II's Chateau d' Anet added a garden in 1547, and this gave us the moniker of orangery. Saudan-Skira provides a list of orangeries and their dates and interestingly the earliest date is 1538 for Castello Tuscany.

22. Tolkowsky, 186-8. Although the Crusades exposed the dukes, knights, and ruling class to the various luxuries available to the Islamic elite; their exposure to the residential life was limited. It may be convenient to assign a radical change in society during the Renaissance, it was more of an evolution that was far more complicated than we normally assign to that period.

23. Tolkowsky, 188; and John H. Harvey, "Garden Plants of Moorish Spain: A Fresh Look," *Garden History* 20, no. 1 (1992): 72. Other fruits were similarly retarded; peaches did not reach England until the fourteenth century and apricots were not introduced until 1540.

24. Saudan-Skira and Saudan, 14. Cosimo Medici II hired Alfonso Guilio Parigi to renovate his gardens. Oranges were included to represent "golden fruits of knowledge."

25. Saudan-Skira and Saudan, 10; and Tolkowsky, 186.

26. Billie S. Britz, "Environmental Provisions for Plants in Seventeenth-Century Northern Europe," *The Journal of the Society of Architectural Historians* 33, no. 2 (1974): 136. The high walls serve other purposes, a fruit-wall, was used to create a micro-climate that enhanced the ripening of fruit. In the background of the painting, the outer wall serves the purpose of providing shelter to the plants growing along it. Britz does not elucidate whether this technology was imported or invented there. It is known that tropical plants, e.g., bananas and sugar, were grown in Spain so some accommodations were developed to insure their survival. Unfortunately, the gardens did not survive so the underlying technology is lost.

27. John H. Harvey, "Spanish Gardens in Their Historical Background," *Garden History* 3, no. 1 (1974): 7-8.

28. James Dickie, "The Garden in Islamic Spain," in *The Islamic Garden* ed. Elisabeth B. MacDougall and Richard Ettinghausen (Washington DC: Dumbarton Oaks, 1976), 105. Dickie makes an interesting comment about the height of the walls in the Islamic garden. He asserts these walls separate and insulate the patron from the outside.



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He compares this to later European efforts that are expansive, demonstrations of culture over nature. The patios in Cordoba and Seville must be acknowledged to be public spaces, so the walls surrounding them had a different purpose.

29. Saudan-Skira and Saudan, 42. The vast majority of the sites discussed in this essay were started after the conclusion of the Thirty Years War in 1648. The citation describes the impetus being a desire to symbolize the rebirth of Europe. The great hall, a central fixture in Northern European courts was where the king received guests. The cold in winter and rain of the summer drove the court indoors. Until this time, outdoor activities were not held in permanent facilities, more often tents and other temporary structures were erected.

30. Terry Comito, "Renaissance Gardens and the Discovery of Paradise," *The Journal of the History of Ideas* 32, no. 4 (1971): 483-492; and Saudan-Skira and Saudan, 11. Of particular interest is the yearly tribute of seeds and cuttings the Neapolitans made to Charles and the subsequent French monarchs. Both authors note the enthusiasm of the French patrons for Italian gardeners. The early Italian models were likely less expansive than later French estates.

31. Tolkowsky, 201.

32. Tolkowsky, 202. The cost of this operation was reputedly quite high. Another aspect of this is that the reputation of fecundity of orange tree is well deserved. This tree was bearing fruit until its demise in 1897.

33. Saudan-Skira and Saudan, 11

34. Thacker, 139-40; and Saudan-Skira and Saudan, 41.

35. Tolkowsky, 202.

36. Ibid, 203. This first French language tome on the subject, Serres covered every subject from kitchen garden to outer fields. Regarding arbor care, the grafting and budding techniques were perfected to the extent that they are still in use today.

37. Thacker, 147. Not all warfare involves bloodshed. Louis XIV established the ornate garden to develop prestige and standing among the elite. The competition between the parties was intended to gain and impress allies. Unfortunately, Nicolas Fouquet, minister of finance, made the error of building a lavish residence and garden in Vaux and then inviting the king to its inaugural. The king was duly impressed and promptly accused Fouquet of embezzlement. After imprisoning the hapless minister, Louis appropriated Fouquet's team of LeVau, Le Brun, and LeNotre to create Versailles.

38. Tolkowsky, 207-10; and Christopher Thacker and Louis XIV, "'La Maniere de montrer les jardins de Versailles,' by Louis XIV and Others," *Garden History* 1, no. 1 (1972): 49. Tolkowsky relates an interesting aspect of its history, the amount of effort that the gardeners exerted to please the king. Louis demanded that he be provided fresh

blooms and oranges daily. Since this demand overrides the normal cycles of trees and nature, something drastic was needed. The royal gardeners discovered that if they withheld water from the trees to the point where it started to lose its leaves, once they started watering it again, the trees recovered would immediately go into bloom. Knowing this fact, the gardeners kept a series of trees, from well watered through to the edge of desiccation. This practice meant that they always had trees that could be coaxed into blooming. Louis XIV was so obsessed with oranges and their symbolism, if he was not known as the Sun King, he would easily be given the moniker of the Orange King. Thacker informs us that Louis was so proud of his garden, that he personally penned a guide to visiting it.

39. Saudan-Skira and Saudan, 129. Saudan-Skira writes that construction in Dresden was started in 1707, in Erlangen in 1700, in Kassel in 1703, and in Wickersheim in 1708. In each case, construction lasted a number of years, and in the case of Zwinger in Dresden for decades. These residences and gardens were intended to signal a return to peace and to develop sense of order. Indeed, in Dresden, the construction of Zwinger was part of an urban renewal project that rebuilt the core of the city.

40. Thacker, 147. Saudan-Skira and Saudan, 44-54. Zwinger in Dresden is an exception from the remote placement. Started in 1707, with work continuing for decades, this palatial garden also doubled as a theater. Prince Elector Frederick Augustus wanted Dresden to rival other European thrones. (Frederick also claimed the title of King Augustus II of Poland.) The team of Christoph Beyer and Daniel Matthäus Pöppelmann did more than design this structure; they renovated the city after a fire in 1685. It was the patronage of Frederick that brought Dresden its renown as a center of arts and industry.

41. The New York Botanical Garden specimen although in the ground is also in an enclosure, i.e., a greenhouse.

42. Saudan-Skira, 11; and Britz 133-32. Britz cites *Paradisi in Sole*, written by John Parkinson in 1619, that trees in pots are moved into galleries for the winter. If trees were in the ground, then a substantial wall that provided further protection was erected near them. This allowed a temporary structure to be erected and a heater added for the winter. By definition, an orangery is any architectural form intended to house citrus, specifically orange trees, during the winter months. Where orange trees tolerate some cold, indeed, they require temperatures below 40°F to reveal the characteristic color. Extended periods of sub 30°F temperatures will grievously injure it. To grow these trees in the climates of northern Europe, the trees either were placed in large pots, allowing their transport to winter quarters, or were planted in the ground with a structure surrounding them. In this latter situation, the structure needed to be partially dismantled during the summer months to allow the sun to shine fully upon the plants.

43. Britz, 134. Britz describes the elaborate building Salomon De Caus erected in Heidelberg in 1619 for the Elector Palatine. It is rarely discussed because it is not extant.

However, it was a complex wood frame that used shutters on both roof and sides. It protected four hundred in ground trees against the bitter cold German winter.

44. Albers, 164-65; and Tolkowsky, 210, 221. Albers recounts a number of noblemen who considered gardening their hobby. William III's gardener Jan van der Groen published his *Den Nederlanscher Hovenier* (The Dutch Nurseryman) in 1670. Tolkowsky cites anonymous texts published in 1680 and 1692, and Johannes Volckamer's 1708 & 1714 *Nurnbergische Hesperiden* for popularizing an expensive hobby.

45. *The Writings of George Washington from the Original Manuscript Sources, 1745-1799*, ed. John C. Fitzpatrick, <http://etext.lib.virginia.edu/washington/>. In a letter to Tench Tilghman, dated August 11, 1784, Washington requested the designs based on a greenhouse of Mrs. Carroll.

46. Cooper, 10-12.

47. Calabrese, 2; and Tolkowsky, 200. Calabrese describes the minister collecting branches bearing fruit and Tolkowsky tells of the same practice for the French king of Charles VIII in 1495.

48. Cooper, 52. Among the victims of Mao's Cultural Revolution were the orange groves in Guangdong province. They were cut down to remove the "revisionist root."

## Chapter Six

1. Fredrick Simoons, "Traditional Avoidance of Foods of Animal Origin: A Culture Historical View" *BioScience* 28, no. 3 (1978): 178. Are food taboos the result of conquest or relations the between warring parties? It is notable that flesh foods, including insects and other non-vertebrates, are among the most common food taboo.

2. Julia Frances Morton and Curtis F. Dowling, *Fruits of Warm Climates* (Miami: J.F. Morton), 1987. <http://www.hort.purdue.edu/newcrop/morton/orange.html#Food%20Uses>; Thelma Barer-Stein, *You Eat What You Are: People, Culture and Food Traditions*, 2nd ed. (Toronto: Firefly Books, 1999), 93; and Pierre Laszlo, *Citrus: A History* (Chicago: University of Chicago Press, 2007), 180. Wine is not the first drink that comes to mind when considering oranges; however, their use in fermented and distilled alcoholic beverages is widespread. The pulp alone is not the only part of the fruit that is consumed. Gaw Pay is the dried rind of the mandarin and used a seasoning ingredient in Szechuan cuisine. The rinds are candied in the European cuisines.

3. Paul Fieldhouse, *Food & Nutrition: Customs & Culture* (Dover, N.H.: Croom Helm), 54; and Oxford English Dictionary, s.v. "cuisine." The OED describes it as the "manner or style of cooking." Two of the early references use cuisine in the modern usage, to describe the style of cooking. The method of preparation can be as revealing as the ingredients.

4. Fieldhouse, 49.

5. Robert C. Allen, "Agriculture and the Origin of State in Ancient Egypt," *Explorations in Economic History* 34 (1997): 141-143; Fieldhouse, 49; Jean-Louis Flandrin, "The Humanization of Eating Behaviors," in *Food: A Culinary History from Antiquity to the Present*, ed. Jean-Louis Flandrin, Massimo Montanari, Albert Sonnenfeld, trans. Clarris Botsford, Arthur Goldhammer, Charles Lambert, Frances M. López-Morillas, and Sylvia Stevens (New York: Columbia University Press, 1999): 13-20; and Justin Jennings et al, "Drinking Beer in a Blissful Mood: Alcohol Production, Operational Chains, and Feasting in the Ancient World," *Current Anthropology* 46, no. 2 (2005): 276. Allen points out the changes that agriculture introduced were the ability to store excess, the increases in production with respect to space and labor, and seasonality of labor, and that these were considered benefits. Grains naturally fit into that paradigm. Flandrin reminds us that the reason grains were selected for cultivation is that they were considered an acceptable, even favored, food. Jennings et al, call attention to the versatility of grains and reminds us of the unanswered question: beer or bread, which came first?

6. There are also food additives. Consider sugar, it is not a core food nor can one ascribe a secondary role to it. Nevertheless, sugar appears in many meals and is an adjunct to diverse variety of foods.

7. Phyllis Pray Bober, *Art, Culture, and Cuisine: Ancient and Medieval Gastronomy* (Chicago: University of Chicago Press, 1999), 152, 189; and Oxford English Dictionary, s.v. "Pepper." Bober notes that Pliny deplored the amount of money leaving Rome to fuel the pepper trade with India. The OED etymology for pepper is rooted in the Latin piper, which is a loan word from Indo-Aryan.

8. Reay Tannahill, *Food in History* (New York: Crown Publishers, 1989), 177-180. Interestingly, that other table condiment, salt, defies exclusion to the peripheral category. In many respects, it is a core food as salted fish and meat were staple foods before refrigeration. It must be pointed out that the salt for preserving foods was not just common table salt (sodium chloride) but also included numerous nitrate salts, potassium nitrate being a common choice.

9. Jean-Louis Flandrin, "Seasoning, Cooking, and Dietetics in the Late Middle Ages," in *Food* (see note 5), 313-320. However, to be clear spices are part of the menu, not the central figure. Any status display included spices and rare foods; however, the entire experience would need to be considered, not just the presence of spices. Flandrin calls attention the mistaken popular opinion that spices covered the taste of spoiled foods. Any person having enough wealth to purchase spices also could afford decent fare. Furthermore the preservatives of choice, usually salt or vinegar, did not especially marry well with spices.

10. Erich Isaac, "Influence of Religion on the Spread of Citrus," *Science* 129, no. 3343 (1959), 179.

11. Frederick J. Simoons, *Food in China: a Cultural and Historical Inquiry* (Boca Raton: CRC Press, 1991), 44-45, 192-195. Simoons divides the cuisine of China into four schools, northern, eastern, western and southern. The southern Chwang sent their core grain, rice, along with the oranges. The northern Han, themselves wheat and millet cultivators, were duly impressed. Until the modern period, fruits were restricted to local cultivation.

12. Andrew M. Watson, *Agricultural Innovation in the Early Islamic World: The Diffusion of Crops and Farming Techniques, 700-1100* (Cambridge: Cambridge University Press, 1983), 42; and D. Fairchild Ruggles, *Gardens, Landscape, and Vision in the Palaces of Islamic Spain* (University Park, PA: Pennsylvania State University Press, 2000), 6.

13. Jezreel Jones, "An Account of the Moorish Way of Dressing Their Meat (with Other Remarks) in West Barbary, from Cape Spartel to Cape de Geer," *Philosophical Transactions* 21 (1699): 251-52; and Watson, 45.

14. Walter Ebeling, *The Fruited Plain: The Story of American Agriculture* (Berkeley: University of California Press, 1979), 276; and T.E. Crocker, W.B. Sherman and J.G. Williamson, "The Apple," University Florida IFAS Extension, <http://edis.ifas.ufl.edu/MG073>. The apple tree, adapted to temperate climate, has a chilling requirement, which is a set number of continuous hours of cold temperatures. Growing apples in Florida has only been recently introduced with new cultivars adapted to the warm temperatures.

15. Massimo Montanari, *Food is Culture*, trans. Albert Sonnenfeld (New York: Columbia University Press), 75-78; Roland Barthes, "Toward a Pyschosociology of Contemporary Food Consumption," in *Food and Culture: A Reader*, ed. Carole Counihan and Penny Van Esterik (New York: Routledge, 1997), 24. The operative phrase here may be "comfort food." Montanari reminds the reader that regionalism in food was a fourteenth century innovation, much of it springing from new trade routes. On that subject, note that European preserved meats may specify a particular cut but the other keys in the salt recipe and applications procedures usually cross any climatic barrier. In the geographic terms region and place, vegetables and fruits are less emblematic. Cincinnati, Ohio, is famous for its pork, not for its abundant apple orchards.

16. Watson, 78-80.

17. Raymond E. Crist, "The Citrus Industry in Florida," *American Journal of Economics and Sociology* 15, no. 1 (1955): 7. In the United States, when oranges overcame apples in terms of weight consumption it was the result of orange juice being added to the diet, not solely the result of apples being removed from the diet. In China, apple consumption dwarfs orange consumption by an equal percentage.

18. "William of Rubruck's Account of the Mongols," <http://depts.washington.edu/silkroad/texts/rubruck.html#customs>. Perhaps the best example is the Silk Road traveler William of Rubruck who describes every food he encounters. Much of his discussion centers on the food that was provided, or more often, not provided, to him.

19. David Waines, "'Luxury Foods' in Medieval Islamic Societies," *World Archaeology* 34, no. 3 (2003): 571-580; and Jerry Brotton, *The Renaissance Bazaar: From the Silk Road to Michelangelo* (Oxford: Oxford University Press, 2002), 168-69. Waines concludes that the overarching purpose of the trade networks was to increase variety. A wide selection was preferred to other considerations such as price or quality. Brotton reminds us that when Vasco da Gama reached India that his items for trade, which da Gama intended to trade with inhabitants along the west coast of Africa, were so paltry that he was all but laughed out of the court. It is possible to interpret the Rajah's response as an act of pity not a commercial exchange.

20. United Nations Food and Agricultural Organization, *FAO Statistical Yearbook, Country Profiles: China* (Rome: FAO, 2006), [www.fao.org/ES/ess/yearbook/vol\\_1\\_2/pdf/China.pdf](http://www.fao.org/ES/ess/yearbook/vol_1_2/pdf/China.pdf); and Simoons (1991), 192. The overall consumption by the Chinese has been rising over the decades; increasing by 600 calories since 1979 and reaching the contemporary average of 2900 calories per day. The Chinese consume a larger amount of their calories in the form of cereal grains as compared to the developed world. They also abstain from sugars in a most striking divergence from other countries. Simoons writes that most fruit in China is not eaten out of hand but instead is prepared.

21. Samuel Tolkowsky, *Hesperides: A History of the Culture and Use of Citrus Fruits* (Westminster: Staples and Staples, 1938), 258 and 303-305. The voyages of Columbus predate the Portuguese introduction of sweet oranges, so it was sour oranges that were initially imported. In Europe, the "orange girls" of early 16th century England sold sweet oranges to a decidedly mean consumer: theater patrons who threw the discarded peels at the stage. Nevertheless, that fruit should be compared to the contemporary fare sold in theaters, candy and popcorn, and considered to be peripheral to the diet.

22. Jean-Louis Flandrin, "The Early Modern Period," in *Food* (see note 5), 355-359. The exchange of foods between the Old and New World was somewhat one-sided. Wheat was the only the only European food item which had any affect in the New World. The fruits introduced were mostly of Asian origin, peaches, apricots, grapes, as well as oranges and other citrus.

23. Tannahill, 226-29; and Tolkowsky, 256. Curiously, citrus remained unrecognized as a scurvy preventative until the mid 1700's. Tannahill describes the spastic path of enlightenment regarding scurvy. Despite discovered as early as mid 1600's, the British Navy did not adopt an official protocol of using citrus juice to combat the disease until 1795. Tolkowsky describes the South Africa citrus industry as coming from the plantings obtained from seeds, seedlings, and cuttings obtained in St. Helena. Those island

plantings were not intended for commercial production, rather to provide secondary foods to Portuguese sailors. Dutch sailors followed the Portuguese route to the East Indies, sailing south to Brazil then across the South Atlantic to Cape of Good Hope and into the Indian Ocean.

24. *The Diaries of George Washington*, ed. Donald Jackson and Dorothy Twohig, vol. 4. (Charlottesville: University Press of Virginia, 1978), <http://memory.loc.gov/ammem/gwhtml/gwhome.html>. The entry for Saturday May 21, 1785 describes the arrival of his phaeton carrying plants as well as orange, oak, and magnolia trees. Washington's consumption is noted by entries on September 26, 1769, September 29, 1770, May 10, 1774, each one citing an order or delivery of both sour and sweet versions of oranges. Those trees were obtained from South Carolina, a state that hosted groves until the freeze events of 1823.

25. Daniel Browne, *The Trees of America: Native and Foreign* (New York: Harper & Brothers, 1846), 63.

26. Browne, 63-65; Crist, 4; Ebeling, 146; and Roland M. Harper, "Agricultural Conditions in Florida in 1925" *Economic Geography* 3, no. 3 (1927): 340-343. One may reasonably assume that when Florida was acquired by the United States, that the citrus production should have increased markedly. However, Florida was sparsely settled prior to the Civil War, and because of its relatively poor soil, its agricultural output was primarily in logging and fisheries. Citrus, specifically oranges, was favored because of both the price they commanded and their ability to thrive on the cleared pine hammock. And while there were notable pioneer groves in Florida, these were relatively few and their output did not inspire consumption. Indeed, Crist informs us that the U.S. citrus market was dominated by European imports until the late nineteenth century.

27. Harm de Blij and Peter Muller, *Geography: Realms, Regions and Concepts 2000*, 9th ed. (New York, John Wiley & Sons, 2000), 51-54.

28. Modern society overlooks the importance of wood and forest products. They comprise the shelter leg of the food - water - shelter triangle that are necessary for survival, so they occupy an equally essential position to sustenance.

29. Mireille Corbier, "The Broad Bean and the Moray: Social Hierarchies and Food in Rome" in *Food* (see note 5), 129. Corbier notes that Rome exemplified the von Thünen model until the imports of oil and grain, brought about by sea borne imports, which changed the economic landscape. However, the change was not in the pattern but in the quantities delivered. Rome could support a larger urban core; it was not constricted by the grain produced in the surrounding fields.

30. Harry W. Lawton and Lewis G. Weathers, "The Origins of Citrus Research in California," in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), 283-85. The

transportation of oranges from Southern California to St Louis initiated the modern model of food transportation. The modern concept of “food miles” is based on these ideas that the impact of transportation, i.e., the fuel costs and resulting carbon output, favors locally grown produce over remote sources.

31. Yves Péhaut, "The Invasion of Foreign Foods," in *Food* (see note 5), 463-65. Péhaut points out this revolution in transportation and refrigeration was also economical. Cost of shipping oranges from California to East Coast amounted to less than one quarter of total retail price. He also tells how it changed the European landscape. The change elevated Spain and Italy to be prime local producers and introduced Brazil and South Africa as the out of season producers. Conversely, groves in France slowly shrank in size and production, even as per capita consumption increased.

32. See note 14. Apples are not commercially grown in Florida.

33. "Fruit as Food," *Good Housekeeping*, December 1894, 251; and Douglas C. Sackman, *Orange Empire: California and the Fruits of Eden* (Berkeley: University of California Press, 2005), 96. *Good Housekeeping* signaled the change in status. The magazine cited the expanded availability and the reduction in price for citrus moved these fruits from being a special treat to being an everyday occurrence. That change in dietary pattern was the prime mission of the California citrus cooperative, Sunkist. They hoped to have oranges, on the tree or in the supply chain, available year round.

34. Sigismond deR. Diettrich, "Florida's Climatic Extremes: Cold Spells and Freezes," *Economic Geography* 25, no. 1 (1949): 71; "The Orange Trees of Florida" *New York Times*, December 21, 1895; "Florida's Great Loss and California's Gain," *New York Times*, February 11, 1895; Harper, 343; and Ebeling, 343. A significant cold snap occurred during the last week of December 1894 and in the first week of February 1895. The event was catastrophic to growers and attained folkloric status in the state, becoming known to the residents as the “big freeze.” Record low temperatures, combined with sub-freezing temperatures that lingered for days, killed nearly half the producing trees. Harper writes that land prices of Florida in 1900 were one-half of the value they held in 1890. Ironically, it was different type of climatic event that propelled California into citrus production. Ebeling points out that Southern California suffered a severe drought from 1862-1864. That had a tremendous affect on the agriculture and animal husbandry of the region. The three years of drought killed off substantial numbers of cattle. As ranchers abandoned the region, the farmers who remained in place were able to bring about the implementation of “no fence” laws. These ordinances freed the orchard and vineyard owners from erecting barriers to protect their land and the trees and vines therein. Moreover, if a stray animal damaged the crops, then the owner of that animal was responsible for providing relief. These civil procedures paved the way for the establishment orchards, vineyards, and citrus groves. This situation pushed the remaining cattle ranches north towards the Central Valley. Ironically, citrus was pushed into that same region by the demand in housing.



35. Shane Hamilton, "Cold Capitalism: The Political Ecology of Frozen Concentrated Orange Juice" *Agricultural History* 77, no. 4 (2003): 565. The USDA released the patent for FCOJ in 1948 and within a year, forty percent of the Florida oranges were processed. That value swelled to seventy percent by 1952 and continued to increase to current levels.

36. Ibid, 565.

37. The shortest path beyond grower to buyer at roadside stand is when the orange grower cooperative sells its oranges to a supermarket chain who sells them directly to consumer. Often the cooperative sells the product to distributor who in turn sells to numerous wholesale and retail outlets. The addition of juice processing adds another customer on consumption path. Recall that the country of the Netherlands is a major exporter of fresh oranges and FCOJ.

38. Mike Davis, "How Eden Lost its Garden," *Perspecta* 30 (1999): 65; Michael McDonough, "Selling Sarasota: Architecture and Propaganda in a 1920s Boom Town," *The Journal of Decorative and Propaganda Arts* 23 (1998): 25-26; Helen L. Kohen, "Perfume, Postcards, and Promises: The Orange in Art and Industry," *The Journal of Decorative and Propaganda Arts*, 23 (1998): 33-5; and Michael Pollan, 9 Oct 2008 <http://www.nytimes.com/2008/10/12/magazine/12policy-t.html>. In the first reference it is clear the transformation of southern Californian groves incorporated its celebrated past. The Florida boomtowns used tropical theme in their advertisements to attract buyers. The agricultural depth of small plots can easily be under appreciated. As recently as WWII, small-scale horticulture, commonly know as victory gardens, provided 40% of the domestic food supply in the US.

39. They also sustain the spirit as every population identifies itself with its selected items.

40. A staple usually has a shelf life longer than 12 months. Long-term storage is an essential feature to have a year round source, in cases of single cropping, and then storage must at least last until next harvest and shortly beyond that date.

41. Perhaps the most telling aspect of this status is that citrus from Florida cannot be shipped to Arizona, California, Hawaii, Louisiana, and Texas. These regulations are in place to prevent the spread of disease and pests associated with citrus cultivation.

42. Abecitrus, [http://www.abecitrus.com.br/english/historia\\_us.html](http://www.abecitrus.com.br/english/historia_us.html).

43. Fieldhouse, 75-80. Fieldhouse uses Abraham Maslow's approach when describing food choice as a motivational model. Maslow's hierarchy of needs is a well-studied model with broad acceptance. Maslow's hierarchy of survival, security, belonging, self-esteem, and self-actualization hinges on the ladder principle that as each need is satisfied, a person will move up fulfill the next one. This process is self-sustaining and continuous. Food as a means of survival is fulfilled by sufficient intake. Although this is a rather obvious requirement, its importance cannot be understated.

Consider all the expenses and costs used to insure adequate wheat and corn production in the United States, the protection program in place for rice in Japan, and the failed collectivist policies of the USSR. The sense of belonging is satisfied when a person perceives himself or herself as part of society, eating the same foods as their family and society. The affinity for immigrants to bring their foods, specifically their core foods, is the best example of this practice. These immigrants use these foods to self identify themselves. It also occurs in stationary situations, e.g., the Chinese differentiated themselves from their Mongol neighbors by their disdain for dairy products. On a personal level, oranges may fulfill this need in an unexpected manner. The first experience a child has with an orange will probably not be a solitary experience. The child will most likely first encounter it as a parent or sibling shares a segment from their orange. This event will be repeated throughout their lifetime as they share these fruits with family and friends. Indeed, oranges appear to be uniquely suited for this role. The experience of sharing and the position of being either a giver or a recipient creates a bond between the people involved. The culmination of the human experience is the fulfillment of the needs for self-esteem and self-actualization. Core foods accumulated and distributed among one's family and friends imparts a sense of achievement of being able to provide, to "bring home the bacon" is the colloquial description. Acquiring the premium or choice secondary and peripheral foods create opportunity for status displays that has never been ignored.

44. Scora, 370.

45. Tolkowsky, 297.

46. Watson, 45.

## Chapter Seven

1. Julia Frances Morton and Curtis F. Dowling, "Sour Orange," in *Fruits of Warm Climates* (Miami: J.F. Morton 1987), <http://www.hort.purdue.edu/newcrop/morton/index.html>. Under the heading of food uses, Morton tells us "[t]he normal types of sour orange are usually too sour to be enjoyed out-of-hand."

2. Andrew M. Watson, *Agricultural Innovation in the Early Islamic World: The Diffusion of Crops and Farming Techniques, 700-1100* (Cambridge: Cambridge University Press, 1983), 45-46.

3. Samuel Tolkowsky, *Hesperides: A History of the Culture and Use of Citrus Fruits* (Westminster: Staples and Staples, 1938), 280-81; and Angelo DiGiacomo, "Development of the Citrus Industry: Historical Note," in *Citrus: The Genus Citrus*, ed. Giovanni Dugo and Angelo DiGiacomo (New York: Taylor & Francis, 2002), 61-62. Tolkowsky writes of the industry in Provence, France shipping orange fruits and blossoms to the perfume makers in Paris. Di Giacomo points out how the methodology of essential oil extraction is essentially unchanged since the first decade of the 1800's.

4. Adeline Collange, "A Table of Desserts," Paintings: Dutch Paintings, The Louvre Museum, [http://www.louvre.fr/llv/oeuvres/detail\\_notice.jsp?CONTENT%3C%3Ecnt\\_id=10134198673225621&CURRENT\\_LL\\_V\\_NOTICE%3C%3Ecnt\\_id=10134198673225621&FOLDER%3C%3Efolder\\_id=9852723696500813&fromDept=true&baseIn dex=144&bmUID=1189640360845&bmLocale=en](http://www.louvre.fr/llv/oeuvres/detail_notice.jsp?CONTENT%3C%3Ecnt_id=10134198673225621&CURRENT_LL_V_NOTICE%3C%3Ecnt_id=10134198673225621&FOLDER%3C%3Efolder_id=9852723696500813&fromDept=true&baseIn dex=144&bmUID=1189640360845&bmLocale=en).

5. Jean-Louis Flandrin, "Seasoning, Cooking, and Dietetics in the Late Middle Ages," in *Food: A Culinary History from Antiquity to the Present*, ed. Jean-Louis Flandrin, Massimo Montanari, Albert Sonnenfeld, trans. Clarris Botsford, Arthur Goldhammer, Charles Lambert, Frances M. López-Morillas, and Sylvia Stevens (New York: Columbia University Press, 1999), 324; Jean-Louis Flandrin, "From Dietetics to Gastronomy: The Liberation of the Gourmet," in *Food* (see previous entry), 420-24; and Innocenzo Mazzini, "Diet and Medicine in the Ancient World," in *Food* (see first entry), 146. The classical Galen model is that children and youth are hot and so should balance that condition with cold food. Adults and the older population were considered to be cold and were advised to avoid cold food.

6. Jean-Louis Flandrin, "Introduction: The Early Modern Period," in *Food* (see note 5), 362. The last course in the French meal was described simply as "fruit."

7. Phyllis Pray Bober, *Art, Culture, and Cuisine: Ancient and Medieval Gastronomy* (Chicago: University of Chicago Press, 1999), 187; and Tolkowsky, 167, 296-97. Tolkowsky recounts the advice of Tanara of Bologna, who in 1651 recommended that a person should add a drop of orange juice and rub the beaker with orange peel. This practice supposedly came from the ancient Rome. However, Bober disputes that contention that citrus was widely known in Roman times. In Tolkowsky's second reference, the practice is described as being appropriated by the Dutch from Chinese elites. What is not clear is whether the wine was Chinese or imported, or whether it was made from rice or grapes.

8. Bober, 246-47. It needs to be acknowledged that the elite had been adulterating their wine for centuries prior to this practice. Bober cites recipes including sugar, cinnamon, and ginger as being popular as an end of meal *digestif* in the fourteenth century.

9. Kimbell Art Museum, <https://www.kimbellart.org/Index.aspx>.

10. Françoise Desportes, "Food Trades," in *Food* (see note 5), 282. Candy makers in Spain, Southern Italy, and Sicily, formed guilds in the fifteenth century.

11. Alain Huetz de Lempis, "Colonial Beverages and the Consumption of Sugar," in *Food* (see note 5), 383-84.

12. Jean Louis Flandrin, "Dietary Choices and Culinary, Technique, 1500-1800," *Food* (see note 5), 409. Flandrin notes how sugar moved from being present in numerous recipes for dishes served throughout a meal, to being segregated to particular dishes, i.e.,

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desserts, which were served at the end of the meal. In the sixteenth century, recipes for various preserves also started to appear, as did sweets and other confections. Not discussed is the appearance and evolution of breakfast donuts, pastries and coffee is such a revolution in diet that it deserves its own investigation.

13. The collection of grapes, cherries, and a pomegranate, all have meaning beyond that of simply being food.

14. John Oliver Hand, *Joos van Cleve: The Complete Paintings* (New Haven: Yale University Press, 2004), 2. Hand cites Albrecht Dürer as describing Antwerp as wealthy and fertile ground for a working artist.

15. Tolkowsky, 290. Although trade between Spain and Antwerp has earlier origins, the ascension of the Hapsburgs as the regent over both areas accelerated the mercantile exchange.

16. Tolkowsky, 301-04; Laszlo, 134-6; and John McPhee, *Oranges* (New York: Farrar, Strauss and Giroux, 1967), 2; Elizabethan England is loosely defined as late England in sixteenth century. McPhee write this tradition continues with film goes in Ireland.

17. Fernand Braudel, *The Wheels of Commerce, vol.2 Civilization and Capitalism, 15th-18th Century*, trans. Sian Reynolds (London: Phoenix Press, 2002), 75-80. The rest of Europe participated according to geographic position. Braudel describes the growth of the street peddler and vegetable merchant in seventeenth century. As the sporadic fair – based economy evolved to a more continuous merchant based one, a greater variety of foods are stored and sold. While grapes readily convert to raisins, oranges are restricted in their conversion to a product that can be easily shipped or stored.

18. The Carnival of Binche, <http://www.carnavaldebinche.be/page.php?lang=fr&menu=3&sousmenu=25>; and Pierre Laszlo, *Citrus: A History* (Chicago: University of Chicago Press, 2007), 133. Although the tourist board claims an ancient tradition, Laszlo contends that the addition of oranges to the festivities have a more recent origin. Despite making this assertion that the change came about in the twentieth century, he provides a quote from a mid-nineteenth century traveler describing the presence of oranges.

19. Ibid. The various fairs and social events relying on plentitude of oranges are interesting. The "battle" that occurs annually in Ivrea is especially strange. The expense alone indicates this must have modern roots that depend on over-production.

20. Scora, 370.

21. Herbert J. Webber, "History and Development of the Citrus Industry" in *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), <http://lib.ucr.edu/agnic/webber/Vol1/Chapter1.htm>. Seeds were on the early voyages; later seedlings were exchanged between

territories. The former indicates the pre-eminence the fruit attained, the latter the importance attached to it. Seeds are easy to transport, seedlings require that much more effort.

22. Daniel Browne, *The Trees of America: Native and Foreign* (New York: Harper & Brothers, 1846), 63-64. American explorers found groves of wild oranges, result of Spanish and Indian exchange. It is unknown whether the Indians deliberately planted seeds. Nonetheless, the fruits were recognized and exploited.

23. Webber, "History and Development of the Citrus Industry." Webber recounts Jose del Carmen Lugo stating that the mission planters withheld the orange seeds. The question remains whether this was done for an economic reason or whether citrus still possessed a sacred reputation.

24. Walter Ebeling, *The Fruited Plain: The Story of American Agriculture* (Berkeley: University of California Press, 1979), 146. Florida's pioneer cultivators shipped their crops by schooner to Philadelphia, New York, and Boston. Packed in barrels with Spanish moss as wadding, the flavor was not the sole attraction; the exotic nature of the fruit and its winter availability was a significant factor.

25. William H. Brewer, *Up and Down in California*, (New Haven: Yale University Press, 1930), Chapter 1, <http://memory.loc.gov/ammem/cbhtml/cbhome.html>. Prior to the transcontinental railroad, the route from the east coast of the U.S. to the west coast was by steamship to Panama, across the isthmus by rail, and then once more by ship up to California. During that crossing and in the subsequent stops in Acapulco Mexico, travelers were exposed to tropical and subtropical fruits. Brewer exemplifies the typical traveler response when presented with a plethora of fruits – joy exultation and praise. Few if any praise the food made from cows or the pigs, but everyone notices the fruit.

26. Webber "History and Development of the Citrus Industry." Under heading of "Early California Orange Groves" Webber credits Wolfskill's perseverance for his success despite doubt of others.

27. Harris Newmark, *Sixty Years in Southern California, 1853-1913*, ed.. Maurice H. Newmark and Marco R. Newmark (New York: Knickerbocker Press, 1926), Chapter XIV, <http://memory.loc.gov/ammem/cbhtml/>; and Charles Nordhoff, *California: For Health, Pleasure, and Residence* (New York: Harper & Brothers, 1873), Chapter XVI, <http://memory.loc.gov/ammem/cbhtml/>; and Louis Salvator, *A Flower from the Golden Land* trans. Marguerite Eyer Wilbur (Los Angeles: B. McCallister, 1929), Chapter 12, <http://memory.loc.gov/ammem/cbhtml/>. If Charles Nordhoff was responsible for bringing American city dwellers west, then Salvator was responsible for bringing Europeans to California. Sunset Magazine, a publication of Southern Pacific Railroad, constantly used oranges in advertisements for travel to California.

28. California World's Fair Commission, "Final Report" (Sacramento: Superintendent State Printing, 1894), 46- 50. This revival of the fair tradition brought together commerce, art, and leisure. The central location provided opportunity for greater participation and attendance than ones in coastal locations. One especially interesting exhibit was the one erected by Los Angeles County. It was globe composed of 6,280 oranges.

29. "Florida's Great Loss and California's Gain," *New York Times*, February 11, 1895. From the headline, it is obvious the prevailing opinion was that California would benefit from the misfortune in Florida.

30. Gordon T. McClelland and Jay T. Last, *California Orange Box Labels: An Illustrated History* (Beverly Hills CA: Hillcrest Press, 1985), 1-4. The orange crate had already been selected by commerce; baskets were difficult to transport and to store. Packing crates fit easily in boxcars, and could be stacked in the destination warehouse.

31. *Ibid*, 38. Auctions for the fruit took place in urban warehouses. The scene was the auctioneer, surrounded by bidders, set among the crates of fruit. The labels gave the bidders a name and grower to identify.

32. *Ibid*, 38.

33. Douglas C. Sackman, *Orange Empire: California and the Fruits of Eden* (Berkeley: University of California Press, 2005), 94-97. It must be acknowledged that Sunkist did not rely solely on fruit crates to advertise their products. Although the farmers objected to the costs and did not believe advertising to be necessary, Sunkist consistently ran a diverse advertising campaign. The cooperative even commissioned billboards, then a new media form. These were perceived to be especially effective because the target did need not to buy a magazine or to listen to the radio to be exposed to the message.

34 The complementary character of Mutt, Jeff, is on top of the orange.

35. The color scheme on Blue Goose is an orange background with blue figure. Vanity has a slightly more red background with same blue figure.

36. Sackman, 147. Sunkist standards were Extra Fancy, Fancy and Choice, a sorting system that does not appear to have category for an ordinary or common orange.

37. Robert W. Hodgson, "Horticultural Varieties of Citrus." *The Citrus Industry*, ed. Walter Reuther, Leon D. Batchelor, and Herbert J. Webber, 2nd ed. (Riverside: University of California Press, 1968), <http://lib.ucr.edu/agnic/webber/Vol1/Chapter4.htm>. Hodgson points out irrigation in arid climates produces an attractive, well-shaped fruit. However, better tasting fruit is obtained from naturally watered groves.

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38. George Harold Powell, *Letters from the Orange Empire*, ed. Richard G. Lillard (Los Angeles: Historical Society of Southern California and A.K. Smiley Public Library, 1990), 6-8. The paper wrapper also prevented the oranges from abrading against each other during transport.

39. Larry Woiwode, "Ode to an Orange," *Harper's*, January, 1986, 33-4. In this article, the author recounts his childhood experience with oranges. He describes a childlike fascination for the fruit with exceptional force and detail. Most telling is his geographic location of North Dakota and the observation of an orange as "glowing in the light."

40. <http://www.fillmorepirucitrus.com/Brands.htm>. Fillmore Piru ships oranges under Glider and Airship Brand, the latter being the premium fruit.

41. The affection of Japanese for high value fruit is notorious. During trips through the Hokkaido countryside, this author encountered orchards where reflectors were attached to individual apples to promote uniform color.

42. The other elements of art line and mass are appreciated but not as strongly emphasized. The desire for and definition of physical "perfection" is largely a matter of emphasis. The presentation of the food plays a substantial role in prestigious meal; one need only to think of a meal at an informal setting and one in a prominent restaurant to understand the importance. The act of presentation is often used to separate, and usually to elevate, a food event. The arrival of the birthday cake, during what is already a celebrated event, heightens the experience.

43. The grotto style garden, one using naturally found objects, namely rocks, is common across cultures.

44. Tolokowsky, 178. The legend of Nicholas has the saint either leaving bags of gold or oranges for orphans. It is fascinating that oranges could be equated with sudden wealth.

45. Crist, Raymond E. "*The Citrus Industry in Florida.*" *American Journal of Economics and Sociology* 15, no. 1 (1955): 8-10.

46. Sandy Isenstadt, "Visions of Plenty: Refrigerators in America around 1950," *Journal of Design History* 11, no. 4 (1998): 318; and Edward A. Ackerman, "Influences of Climate on the Cultivation of Citrus Fruits," *Geographical Review* 28, no. 2 (1938): 289.

## Chapter Eight

1. Harm de Blij and Peter Muller, *Geography: Realms, Regions and Concepts 2000*, 9th ed. (New York, John Wiley & Sons, 2000), 2-10.

2. *Ibid.*, 86-87, 188-90, 211-12, 257-58, 299-301, 369-70. The realms of Europe, North, Middle, and South America, North Africa and Middle East, Sub-Saharan Africa,

each contain a region where citrus is a significant crop. Furthermore, it is important to recognize that realms are temporal events. Islam imported the orange into its realm around 900 CE, and Spain exported oranges from its realm in 1493.

3. Recall that rice cultivation accompanied citriculture. It is unknown whether grafting and budding was also part of this exchange.

4. Samuel Tolkowsky, *Hesperides: A History of the Culture and Use of Citrus Fruits* (Westminster: Staples and Staples, 1938), 8; William Cooper, *Odyssey of the Orange in China: National History of the Citrus Fruits in China* (Winter Park, Florida: W.C. Cooper, 1990), 13. Tolkowsky recounts an interesting story where merchants gave a governor's young son oranges. The governor rebuked the men for attempting to bribe him through his son. Cooper tells us that by 1178, the Chinese had cataloged eight types of oranges, and 23 kinds of citrus in total.

5. William H. McNeill, "The Eccentricity of Wheels, or Eurasian Transportation in Historical Perspective," *The American Historical Review* 92, no. 5 (1987): 1123-28. Most if not all trade carried durable goods. For every shipment of wine or oil from Greece, the returning ship often brought grain or timber.

6. One practical reason for the tribute event is that it demonstrates the state of the transportation network. If a branch, complete with leaves and fruit can be delivered intact with minimal damage one thousand miles from its origin that provides physical evidence of a functioning system. From a martial viewpoint, the time spent growing oranges is time that could not be spent raising an army.

7. As a metaphor the sun is exceptionally plastic. At the center of the solar system, it is the ultimate source of light and an eternal fixture. Life, knowledge, permanence, and purity are but a few characteristics that can be derived from it. The Han emperor was often referred to as the "son of heaven," so a celestial symbol is especially appropriate.

8. Pliny the Elder, *Voyages to India*, Book VI, Chapter 26, *The Natural History*, ed. John Bostock and H. T. Riley, in the Perseus Digital Library, <http://www.perseus.tufts.edu/cgi-bin/ptext?lookup=Plin.+Nat.+6.21>. The canals in China moved cargo north and south. The ports along the southeast coast were the primary zones for external trade. That sweet oranges were planted in Indonesia until Portuguese sailors brought them indicates the fruit was restricted but does not reveal the reasons. The Ganges River was known to Pliny but sea voyages to India only reached the west coast.

9. The climatic conditions of the silk trade routes across central Asia prevented any cultivation of citrus in those areas.

10. Trees, whether from seed or cutting, need the larger platform of barge or cart to accommodate the necessary soil; grafts and budwood need existing rootstock.



11. Innocenzo Mazzini, "Diet and Medicine in the Ancient World," in *Food: A Culinary History from Antiquity to the Present*, ed. Jean-Louis Flandrin, Massimo Montanari, Albert Sonnenfeld, trans. Clarris Botsford, Arthur Goldhammer, Charles Lambert, Frances M. López-Morillas, and Sylvia Stevens (New York: Columbia University Press, 1999), 146. In the Roman diet, vegetables were obtained from local sources and grains were obtained from remote fields. The Greeks had a similar model importing timber, grain, and cattle from Black sea exporting oil and wine in return.

12. Ellen Churchill Semple, "Ancient Mediterranean Pleasure Gardens," *Geographical Review* 19, no. 3 (1929): 420. This was not the genesis of that industry; it has ancient roots. The supposition is that infrastructure expanded more to increase the variety of plants and trees than it did to plant in new geographic places.

13. The values are especially rough. The physical distances are great circle distance from Guangzhou, China to Mumbai, India for the first leg, and from Sur, Oman to Cordoba, Spain, so represent an unobtainable ideal. The temporal measurements rely on restricted data, oranges could have been in India, and overlooked from a very early origin. Oranges arrived in India during the cusp of the Common Era, yet did not reach Oman until 910 CE.

14. Fernand Braudel, *Wheels of Commerce*, vol. 2, *Civilization and Capitalism, 15th-18th Century*, trans. Sian Reynolds (London: Phoenix Press, 2002), 211-14; and Pierre Laszlo, *Citrus: A History* (Chicago: University Chicago Press, 2007), 135.

15. Tolkowsky, 274. The description Tolkowsky provides is that the women of Marseille threw oranges to Francis as he entered the city.

16. Historic Carnival of Ivrea, <http://www.carnevalediivrea.it/defaulteng.asp>.

17. Humans were not the only animal dispersing seeds, raccoons, opossums, and birds also fed on trees spreading seeds. Oranges also float down watercourses, and so disperse seeds in that manner too.

18. Julie A. Mennella, M. Pepino, and D. Reed, "Genetic and Environmental Determinants of Bitter Perception and Sweet Preferences," *Pediatrics* 115 (2005): e216 - e222. The investigators of in this study found that infants and children have a biological bias towards the sensation of sweetness. In their tests on infants, it was revealed that we prefer sweet foods and that the other flavors depend on taster. Nevertheless, food preferences are often cultural. The best example is that bread, a food that holds preeminence in the western diet, is an afterthought in rice dominated food regimes. To its credit, an orange was always welcomed and absorbed into the society's eating habits.

19. William H. Brewer, *Up and Down California in 1860-1864*, ed. Francis P. Farquhar (New Haven: Yale University Press, 1930), <http://memory.loc.gov/ammem/cbhtml/calbkbibAuthors01.html>. Brewer's remarks about stocking up on fruits while in Panama and Acapulco are informative. From his accounts, it is clear that there was a

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thriving market for fruit in these ports, and that the market was dependent upon these travelers. His later visit to the then defunct San Gabriel mission describes the early orange groves.

20. John McPhee, *Oranges* (New York: Farrar, Strauss and Giroux, 1967), 8; and Shane Hamilton, "Cold Capitalism: The Political Ecology of Frozen Concentrated Orange Juice." *Agricultural History* 77, no. 4 (2003): 558-60. McPhee recounts the difficulty he had finding fresh squeezed orange juice in Florida. The reason was that other tourists complained that fresh orange juice was inconsistent. Hamilton describes the early advertising campaigns touting the uniformity in flavor of frozen concentrated juice, regardless of season.

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