GROWING GARDENS: BOTANICAL GARDENS, PUBLIC SPACE AND
CONSERVATION

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ABSTRACT

Botanical Gardens in the Twentieth Century: Advent of the Public Space

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This thesis examines the history of botanical gardens and their evolution from ancient spaces to the modern gardens of the 20th century. I provide a brief overview of botanical gardens, with a focus on the unique intersection of public participation and scientific study that started to occur within garden spaces during the 20th century, which still continues today. I reveal the history of gardens that influenced the uses of gardens today, with a focus on: the first ancient gardens and the dependency societies had on them, the influence of science in gardens starting in the Enlightenment period, the shift away from scientific gardens and the introductions of public gardens in the early 20th century, and the reintroduction of science into gardens during the conservation movement of the 1950s.

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INTRODUCTION

Near the 210 Freeway in Pasadena California is the pristine Los Angeles County Arboretum and Botanical Garden. Within the sprawling, 127-acre grounds, visitors can attend festivals with names that resemble a Broadway show, like “GROW!” attend summer educational camps for kids, do yoga in the garden, enjoy storytelling, take botanical art lessons, rent books from the library, buy plants grown at the garden from the gift shop, or learn how to be a modern-day gardener. The *L.A. Times* reports: “Visitors can walk through a landscape dotted with fruit-producing trees from around the world, past a pond fed with rainwater collected on-site and through to a nettled enclosure housing raised vegetable beds, a worm farm, compost bins and a chicken coop.”¹ Within the walls of this same location is a living collection of thousands of rare plant species, like the *Tabebuia impetiginosa* (also called the Pink trumpet tree), a species introduced to the horticultural market by the Arboretum. There is also a wide range of endangered species from around the globe preserved here and used to educate the public.

The Los Angeles County Arboretum and Botanical Garden, and many others just like it throughout the United States, are the epitome of great public attractions, while simultaneously serving as places of historical significance and immense scientific importance for the study of conservation. The modern-day botanical garden space is a one-of-a-kind place where history, science and the

¹ Susan Carpenter, “LA Arboretum to Open Sustainable Garden for Festival,” *LA at Home*, Los Angeles Times Home and Garden, (May 3, 1012), http://latimesblogs.latimes.com/home_blog/2012/05/la-arboretum-garden-festival.html.

public intersect. By incorporating public attractions, historical elements and conservation education in one dynamic space, gardens have been able to uniquely bridge the gap between science and the public where they both have common interests, particularly around conservation of plants. This institution was not always used in this unique way, but developed because of specific historical developments, scientific advances and cultural needs.

The simultaneous use of gardens as a public place and as a place of scientific research is new and unique to the 20th century modern botanical garden. In looking at the evolution of the earliest gardens to today's use of gardens, there are four important stages in garden history. First was the emergence of the formal gardens in ancient societies. From as far back as 24,000 BC, gardens were utilized by sedentary cultures to create reliable sources of food, becoming so important to survival that they also became places of religious significance and sources of power for large empires wishing to manipulate and control accessibility to different food sources. These early gardens showcase the first examples of individuals and governments developing dependencies on gardens as places important to their existence. Second was the introduction of scientific interests in gardens during the Western Renaissance and Enlightenment periods. This was when gardens became places of discovery, set up specifically to observe and study plants. Over time, the influx of scientific thinking within the garden setting led to the official classification of the first botanical gardens and to the support of scientific gardens by universities and government institutions with a vested interest in their discoveries. The third stage

was the shift of gardens from places funded by state or educational bodies, accessible to a limited few, to public gardens open to all. Through a combination of waning scientific interest in gardens and historical events like the urban sprawl that followed two world wars, botanical gardens opened their doors to the public in the first half of the 20th century. The fourth and final stage was at the onset of the environmental movement in the 1950s when scientists once again renewed their role in the gardens, only this time focusing on both scientific conservation and educating the public, who were already active participants within botanical gardens. This important chapter created the unique combination of science and public involvement that exists today.

Just as ancient subsistence gardens were necessary for survival, today's gardens are being used by scientists to learn about issues to our planet's survival like plant conservation and the protection of native species and local ecologies. At the same time, the broader public has taken an interest in the same topics, creating an intersection point where scientists have an opportunity to engage with the public directly and amplify the effects of their research efforts through education of the public. With the conversation being mostly about conservation, both the public and scientists are able to work together in a unique way.

Comprehensive histories written specifically on botanical gardens are few and far between. Most histories describe garden design and the uses of pleasure and subsistence gardens or the value of gardens to culture and religion for a specific time period. Arthur Hill wrote in 1915 the first historical study concentrating solely on the concept of "botanical gardens," a term used to

describe western gardens that incorporate science that did not come into existence until after the 18th century. In Hill's article, "The History and Function of Botanic Gardens," he relates the role of gardens in ancient society to modern western botanical gardens and outlines the history of science in the botanical garden in the 16-18th centuries.² However, Hill stops at the imperial era and no other author has since given a comprehensive history of gardens that goes through the end of the 20th century.

Three authors document the history of ancient gardens: Maureen Carroll, John Prest and Christopher Thacker. Maureen Carroll's, *Earthly Paradises: Ancient Gardens in History and Archaeology*, explores ancient gardens from an archaeological perspective, discusses the importance of nature to ancient culture and gives evidence to show ancient societies' belief in a heavenly paradise based on garden plots.³ John Prest relates garden design to religious belief in ancient cultures and 17th century European gardens in his book, *The Garden of Eden: The Botanic Garden and the Re-Creation of Paradise*.⁴ Christopher Thacker's book, *The History of Gardens*, is a comprehensive overview starting with garden ideas in the cultures of ancient Greece, Rome, Persia, China, Japan and Islam. It also outlines the philosophies and perspectives behind garden design in these different ancient societies.⁵ Each of these authors gives insight to

² Arthur W. Hill, "The History and Function of Botanic Gardens" *Annals of the Missouri Botanic Garden* 2, no. ½ (Feb-Apr. 1915): 185-240.

³ Maureen Carroll, *Earthly Paradises: Ancient Gardens in History and Archaeology* (London: The British Museum Press, 2003).

⁴ John M. Prest, *The Garden of Eden: The Botanic Garden and the Re-Creation of Paradise* (New Haven and London: Yale University Press, 1981).

⁵ Christopher Thacker, *The History of Gardens* (Berkeley: University of California Press, 1979).

the importance of gardens to culture and religion and the human connection to nature.

The history of the modern botanical garden starts with 15th -16th century western gardens. The first two comprehensive histories written of the early modern botanical garden were not written until 1997 and 2000 by authors Donald McCracken and Richard Drayton. Richard Drayton's book, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World*, tracks the growth of the botanical garden in relation to the struggle for imperial power by Europe and the United States during the age of exploration, showing how imperial powers used gardens as collection sites for zoological and botanical specimens in order to show off their wealth and status to the world.⁶ Donald P. McCracken writes a history about the role of botanical gardens in the imperial age of Britain in *Gardens of Empire: Botanical Institutions of the Victorian British Empire*. McCracken shows how the modern botanical garden was born out of the Enlightenment period and explains how botanical imports and colonial gardens benefited the British Empire but fails to discuss any other broader perspectives of gardens.⁷

Three authors, Anne Leighton, Kathleen Fennessy and Therese O'Malley, have explored the role of gardens in the 19th and 20th century, looking specifically at how they developed within new nations. These studies give historical insight to botanical gardens from the 19th to the 20th century. Anne Leighton's two books,

⁶ Richard Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* (London: Yale University Press, 2000).

⁷ Donald P. McCracken, *Gardens of Empire: Botanical Institutions of the Victorian British Empire* (Washington: Leicester University Press, 1997).

American Gardens in the Eighteenth Century: "For Use or For Delight" and *American Gardens of the Nineteenth Century: "For Comfort and Affluence,"* do not specifically study the botanical garden, but report on developing home, kitchen and private estate gardens in the United States.⁸ Kathleen Fennessy studies botanical and zoological gardens in Australia during the 1860s and 1870s in her book, *A People Learning Colonial Victorians and Their Public Gardens*. Fennessy reveals the story of how botanical gardens were formed to serve and educate the public and used by farmers as tools to learn how to use the land more productively.⁹ Therese O'Malley's article, "Your Garden Must be a Museum to You: Early American Botanic Gardens," explores the American government's desire to use botanical gardens to break away from European imperial control by planting and experimenting with growing plants for economic purposes in the 18th and 19th centuries.¹⁰

Some historical evidence of the uses of botanical gardens can be found in agricultural literature and scientific histories of botany. Nelson Klose's book, *America's Crop Heritage: The History of Foreign Plant Introduction by the Federal Government*, briefly mentions botanical gardens in the context of plant introduction for the use of agriculture from the 17th to mid-19th century United

⁸ Ann Leighton, *American Gardens in the Eighteenth Century: "For Use or For Delight"* (Massachusetts: The University of Massachusetts Press, 1976); Ann Leighton, *American Gardens of the Nineteenth Century: "For Comfort and Affluence"* (Amherst: University of Massachusetts Press, 1987).

⁹ Kathleen M. Fennessy, *A People Learning Colonial Victorians and their Public Museums 1860-1880* (Melbourne: Australian Scholarly, 2007), 162-202.

¹⁰ Therese O'Malley, "Your Garden Must be a Museum to You: Early American Botanic Gardens", *The Huntington Library Quarterly* 59, no. 2/3 (1996): 207-231.

States.¹¹ Joseph Ewan's book, *A Short History of Botany in the United States*, is divided into chapters describing the history and development of different scientific botanical fields.¹² In giving the detailed history of botany, Ewan unknowingly gives evidence to some of the uses of botanical gardens in the developing stages of the United States. Ellison Hawks wrote *Pioneers of Plant Study* in 1969 highlighting key historical figures that advanced scientific studies in the botanical sciences.¹³ Hawks, like Ewan, gives key insights into the history and uses of botanical gardens in the United States in the 17th and 18th centuries and also connects modern plant cultivation to knowledge and plant cultivation in antiquity.

Each of the works written about gardens explains the known history of ancient gardens, or how botanical gardens have been used by science up until the 18th and 19th centuries. However, none has documented the transitions of gardens to public spaces in the twentieth century and the reintegration of scientific agendas into the garden space since the 1950s. Additionally, none of these looked in depth at the unique situation gardens are in today as they balance the role of science and public agendas. My objective is to look at the stages throughout garden history that dramatically shifted the role of gardens in society at that time, and to then describe how those shifts have culminated in the incredibly unique use of space that defined 20th century gardens.

¹¹ Nelson Klose, *America's Crop Heritage: The History of Foreign Plant Introduction by the Federal Government* (Iowa: The Iowa State College Press, 1950).

¹² Joseph Ewan, ed., *A Short History of Botany in the United States* (New York: Hafner Publishing Company, 1969).

¹³ Ellison Hawks, *Pioneers of Plant Study* (New York: Books for Libraries Press, 1969).

CHAPTER 1: THE FIRST GARDENS

Evidence from archeological sites indicates that for thousands of years people have had knowledge of many plants derived from food gathering techniques. Eventually, as cultures became sedentary and learned how to manipulate nature, crop cultivation became an important part of survival and subsistence. From the evolution of the earliest gardens in history, we observed an important connection between ancient societies and the gardens that became their food source, places of religious importance and sources of power.

As ancient peoples developed sedentary lifestyles, the seasonal growth of food crops and subsistence gardens was at the heart of human survival. Gardens provided a reliable source of food that enabled people to remain in one spot and to support communities that eventually evolved into cities. Evidence of ancient garden plots, planting beds, trenches, written records and pictorial representation in painting and sculpture demonstrate the importance of gardens in ancient society.¹⁴ Egypt had kitchen gardens and orchards as early as 2400-2200 BC.¹⁵ Egyptian archives show early construction of agricultural trellises and intensive fruit and vegetable cultivation for consumption in the city from 305-30 BC.¹⁶ Agriculture in China was founded by Emperor Chin-nung 2737-2697 BC and by the Han dynasty in 206 AD gardens displayed natural landscapes.¹⁷ In ancient Assyria, irrigation canals assisted the cities and date palms and gardens were

¹⁴ Maureen Carroll, *Earthly Paradises*, 60-65.

¹⁵ Ellison Hawks, *Pioneers of Plant Study*, 17.

¹⁶ Christopher Thacker, *The History of Gardens*, 14.

¹⁷ Ellison Hawks, *Pioneers of Plant Study*, 29-30.

laid out across city landscapes.¹⁸ Some of first references of gardens are those found in Athens of Theophrastus 370-286 BC and Epicurus 341-271 BC.¹⁹ Ancient garden sites in North and South America show that gardens were cultivated for economic and aesthetic purposes.²⁰

As gardens played a larger role in supporting large communities, ancient societies became increasingly dependent on them for survival. As a result, the gardens and ornamental groves began taking on religious significance. These societies held religious festivals and ceremonies within gardens, developed gods and goddesses related to the gardens and even associated gardens with fertility, paradise and the afterlife.²¹ One of the earliest examples is in Greek and Roman mythology, which connected the sacred grove with deities of gardening who were responsible for agricultural prosperity, fertility and wedding feasts.²² Festivals for gods and goddesses were held at temple gardens in ancient civilizations like the Egyptian, Roman and Persian societies. The ancient temples of Egyptian gods had outer courts of gardens and the tombs of wealthy Egyptians had actual gardens that had to be maintained.²³ Ancient Greek and Hebrew language considered the meaning of the garden enclosure to be analogous to the terms paradise, extravagant park, sacred grove and kingly.²⁴ In the ruins of Pompeii, archaeological evidence shows numerous tombs connected to villas by a garden

¹⁸ Ellison Hawks, *Pioneers of Plant Study*, 25.

¹⁹ Christopher Thacker, *The History of Gardens*, 13.

²⁰ Arthur W. Hill, "The History and Function of Botanic Gardens," 185-186.

²¹ Maureen Carroll, *Earthly Paradises*, 60-65.

²² Christopher Thacker, *The History of Gardens*, 9, 12.

²³ Maureen Carroll, *Earthly Paradises*, 60-65.

²⁴ Christopher Thacker, *The History of Gardens*, 15-16.

with trees, flowerbeds and water features.²⁵ Author Maureen Carroll states, “The garden could be directly accessed from both the villa and tomb, indicating the intimate connections between the spaces for the dead and the living.”²⁶

This connection between gardens and religion continued and by the third century gardens became associated with Christianity, representative places of heaven on earth. While the gardens themselves were not worshipped, the places of beauty were indicative of God’s love for man and man’s ownership of the natural landscape.²⁷ As Christianity grew in Europe, the garden signified an earthly paradise representing the Garden of Eden from the Old Testament book of Genesis.²⁸ The concept of the Edenic garden was created when medieval literature depicted gardens used for knightly and spiritual pleasures, as places where “Adam and Eve, Virgin and Child, knights and ladies [would] gather for moments of recreation and delight.”²⁹ Christian monasteries of the middle ages developed cloister gardens and monks allocated patron saints to watch over gardens, representing the religious significance and importance of the garden space to early Christians.³⁰ The belief in the sacredness of the garden and the term Edenic garden is still used today to describe gardens that are aesthetically pleasing, holy spaces of rest and peace.

In addition to being places necessary for subsistence and of religious significance, over time gardens became more sophisticated and the ability to

²⁵ Maureen Carroll, *Earthly Paradises*, 79.

²⁶ Ibid.

²⁷ Ann Leighton, *American Gardens in the Eighteenth Century*, 2-3.

²⁸ Christopher Thacker, *The History of Gardens*, 15-17.

²⁹ Ibid., 10.

³⁰ Thacker, *The History of Gardens*, 10, 13.

regularly access, plan and control food sources and plant biology became a source of power for political rulers. Limitations in food supply or the ability to grow a particular plant or crop species meant a society was either dependent on another society to provide it, or they went without. An abundant collection of plant species provided independence and was often a visual display of an empire's wealth or far-reaching power. As a result, ancient rulers would commission parties to bring back plants or crops from all over the world.³¹ For example, the ruler Sargon of Mesopotamia is said to have crossed the Taurus Mountains to bring back specimens of trees, vines, and figs for acclimatization in 2500 BC.³² An expedition was organized by Queen Hatshepsut of Egypt in 1500 BC to collect plants and procure an incense tree.³³ Chinese collectors were dispatched by the emperor to distant parts of the empire to bring back plants to be cultivated for their economic and medicinal values.³⁴

Beyond being symbols of power and control over food sources, gardens progressed to become a sign and symbol of wealth for rulers. As their empires grew and fortunes increased, many leaders created lavish gardens for aesthetic purposes and gardens evolved from purely places of subsistence to places of leisure. For example, in ancient Babylon, exotic trees and shrubs were transplanted to the city and flowers were cultivated for their scent.³⁵ One of the earliest examples of an aesthetic and possible botanic garden is the Royal

³¹ Klose, *America's Crop Heritage*, 3.

³² Ibid.

³³ Ibid.

³⁴ Arthur W. Hill, "The History and Function of Botanic Gardens," 185-186.

³⁵ Ellison Hawks, *Pioneers of Plant Study*, 26.

Gardens of Thotmes III from around 1000 BC.³⁶ This garden had a head gardener, Kekht, and was attached to the Temple of Karnack and thought to have economic importance.³⁷ The Persian garden of King Darius the Great, 521-485 BC had raised walls to mimic the palace walls to indicate the wealth and prestige of the kingdom.³⁸

Throughout the ancient world, gardens were closely tied to the survival of individuals, through subsistence gardening, as well as the survival of societies through religious meaning and rulers who used gardens to build power. As this paper will show, this pattern emerged again towards the end of the 20th century, as scientists and the broader public turned to gardens to tackle global conservation issues that must be addressed for our own survival today.

³⁶ Arthur W. Hill, "The History and Function of Botanic Gardens" 186.

³⁷ Ibid.

³⁸ Christopher Thacker, *The History of Gardens*, 27.

CHAPTER 2: SCIENCE AND GARDENS

The initial uses of gardens for subsistence, places of religious significance and sources of governmental power have remained prevalent throughout most of history. The next really significant chain of events to shift in the use of gardens began when naturalists studied plants in great detail and the scientific field of botany emerged.

The shift that transformed the focus on gardens as places of scientific research began in Western Europe with the advent of the Renaissance around the late 15th and early 16th centuries. The Renaissance was an age of high art and music, a time when European thinkers analyzed the ideas and artistic forms of ancient Roman and Greek civilization. The knowledge and ideas taken from studying ancient texts was not confined to art or music, but ran the gamut and permeated all areas of European life including medicine and the importance of plants to society. Renaissance scholars interested in medicinal knowledge of the Greeks and Romans copied pharmaceutical information from ancient classical texts in order to glean knowledge from what they thought were highly intellectual superior civilizations.³⁹ Scribes mimicked the classical texts by writing remedy books giving recommendations on how to treat sicknesses and disease with different herbs, flowers and fruits.⁴⁰ This interest in the scientific study of plants for medicinal purposes led to an effort to create gardens dedicated to perpetuating scientific observation and classification of plants. The first gardens

³⁹ Hawks, *Pioneers of Plant Study*, 133.

⁴⁰ U.P. Hedrick, *A History of Horticulture in America to 1860* (Oxford University Press, Inc., 1950; reprint, Portland Oregon: Timber Press, 1988), 28.

to be officially deemed botanical gardens were developed at universities and monasteries housing plants to be studied for their medicinal qualities.⁴¹ Over time these gardens became known as botanical gardens across the western world.

Beginning in the 16th and 17th centuries, many of the countries that were at the forefront of the Enlightenment movement began to expand their quest for new global trade markets. As imperialistic European empires started exploring the seas for new land and natural resources, they brought plant and animal specimens back to Europe. Live plants were incorporated into royal, private and university gardens to display imperial wealth and to be studied for their cultivation potential, medicinal properties and possible trade benefits.⁴²

These first, early forms of the botanical garden were often called physic gardens. One of the first known physic gardens was established in 1545 at the University of Padua, Italy (See Figure 1).⁴³ With exotic plant specimens coming in from around the world, physic gardens were divided into four sections, North, South, East and West, to showcase plants from the four corners of the earth (See Figure 2).⁴⁴ As Enlightenment thinking advanced economic and technological innovation, merchants enhanced their wealth and built their own pleasure and physic gardens to fill with exotic and foreign plants.⁴⁵ Many of these private gardens were eventually donated to universities or botanical societies. For example, the famous Royal Botanical Gardens at Kew, London, started out

⁴¹ Arthur W. Hill, "The History and Function of Botanic Gardens," 190.

⁴² Gary A. Krupnick and W. John Kress eds. "Conclusion," in *Plant Conservation: A Natural History Approach* (Chicago: The University of Chicago Press, 2005), 313.

⁴³ Thacker, *The History of Gardens*, 127.

⁴⁴ Prest, *The Garden of Eden*, 42.

⁴⁵ McCracken, *Gardens of Empire*, 29; Prest, *The Garden of Eden*, 43.

as pleasure gardens for the queen, but were dedicated in 1760 by the British royal family to botanical study, and in 1772 George III increased the original nine acres to make room for the plants coming in from the British colonies.⁴⁶

As the 18th century world system developed linking the “Oriental” East and colonial New World to Europe, the frequency of “new” plant discoveries increased tenfold. European nations created botanical gardens in colonies and imperial posts around the globe, set up to provide food for sailors and colonial towns, and to experiment with cultivation techniques using new exotic species. Within newly developing colonies, gardens were first created for subsistence just as they were in ancient societies. These new colonial gardens, called kitchen gardens.⁴⁷ Native Americans taught early colonists how to cultivate native plants and colonists sent new varieties to Europe for further study, while other old European plant varieties traveled in the opposite direction and became naturalized in the American soils.⁴⁸

Because of the need to study new plant species and cultivation techniques, gardens that were becoming closely associated with observation and study were established throughout Europe and the American colonies. In addition to the university gardens that already existed from the onset of the Enlightenment period, additional gardens were founded by naturalists. Naturalists were wealthy and educated Enlightenment thinkers who believed that God could be known through careful observation of the natural world. To them, the botanical garden

⁴⁶ Klose, *America's Crop Heritage*, 11.

⁴⁷ Ann Leighton, *American Gardens in the Eighteenth Century*, 2.

⁴⁸ Ann Leighton, *American Gardens in the Eighteenth Century*, 361; Ewan, *A Short History of Botany in the United States*, 147.

was a place where they could work and worship God through the observation of plants.

Naturalists supported new Enlightenment ideas of knowledge and reason by studying plants at botanical gardens and financing plant exploration expeditions on a transatlantic scale. Naturalists did this to bring back live and dried plant specimens to garden sites for further study. Sir Joseph Banks of London and John Bartram of Philadelphia were two renowned eighteenth century naturalists who supported expeditions and funded the study of the natural sciences at botanical gardens.⁴⁹ In 1728, John Bartram created and funded what is known as one of the first botanical gardens in the United States. Sir Joseph Banks went on several expeditions and was considered the first director of the Kew Royal Botanic Gardens in England.⁵⁰ Another naturalist named Christopher Witt from Germantown, Pennsylvania, established one of the first botanical gardens in the United States in 1718. He collected and planted medicinal herbs on his 125 acres and later sent these native species to Europe for further research.⁵¹ Another important naturalist, Isaac Norris, established a botanical garden that housed rare plants known for their uses as cordials, stomach remedies and culinary herbs.⁵² In 1730 the *Linnaean Botanic Garden* at Flushing, Long Island was established by the Prince family incorporating both native and

⁴⁹ For a comprehensive list of American botanical contributors see Ewan, *A Short History of Botany in the United States*, 1-25; Ewan, *A Short History of Botany in the United States*, 4-8; "The Huntington Botanical Garden," The Huntington, Library, Art Collections, and Botanical Gardens, [database on-line], accessed on March 5, 2011, www.huntingtonlibrary.aspx?id=210&linkidentifier=id&itemid=210.

⁵⁰ U.P. Hedrick, "Botanic Explorers and Botanic Gardens," 86.

⁵¹ Klose, 9-10.

⁵² U.P. Hedrick, "Botanic Explorers and Botanic Gardens," 85.

foreign plant species.⁵³ In 1801 David Hosack a physician, botanist and mineralogist established the Elgin Botanic Garden in New York to teach his medical students at Columbia College.⁵⁴

By the late 18th and early 19th centuries, naturalists advanced the studies and observation of plants into a science and created the field of botany, or plant science. This did not occur overnight as naturalists scoured the globe for new plant varieties that could be developed and marketed in the emerging western capitalistic economy. The establishment of a formal science of botany helped to improve the quality of documentation. By the seventeenth century, botanical documentation was a regular part of studies at botanical gardens.⁵⁵ The advancements in botany also refined processes for botanical study, and data collection, as well as improving the focus on chemistry and the analysis of plant materials done at botanical gardens.⁵⁶ Each part of the plant was studied, classified, and examined under a microscope to determine its function, structure and classification (See Figure 3).⁵⁷ To create some consistencies and structure in naming conventions, in 1753, Carle Linnaeus published a book, *Species*

⁵³ Klose, 9-10.

⁵⁴ Ewan, *A Short History of Botany in the United States*, 148; Alexander Leitch, "Hosack, David," *A Princeton Companion* (New Jersey: Princeton University Press, 1978), accessed on June 06, 2011, http://etcweb.princeton.edu/CampusWWW/Companion/hosack_david.html.

⁵⁵ Kai Larson, Brian Morley, and Gustav Schoser, eds. "Proceedings," *International Association of Botanic Gardens, Tenth General Meeting and Conference* (Germany: Frankfurt/M. FRG, 1989) 2, 15.

⁵⁶ Dr. Vernon Haarstad of Tulane Medical School, in *A Short History of Botany in the United States*, edited by Joseph Ewan, 148.

⁵⁷ Henry Kraemer, "Chapter I: Principle Groups of Plants, Introductory," in *Applied and Economic Botany for Students in Technical and Agricultural and Medical Colleges, For Chemists, Food Analysts and For Those Engaged in The Morphological and Physiological Study of Plants* 2 ed. (London: Chapman & Hall, John Wiley & Sons, Inc., 1914), 1-2. Several of the sources starting with this one were found at an on-line database, Biodiversity Heritage Library. Scanned forms of journals, newspapers and books can be found at the Biodiversity Heritage Library, <http://www.biodiversitylibrary.org>.

Plantarium, which gave botanists guidelines for classifying plants and established the Linnaean style of plant nomenclature.⁵⁸ This was also when, specific types of plant studies developed around different plant varieties including physiology, phycology, mycology, plant pathology, bryology, lichenology, pteridology and paleobotany.⁵⁹

With major advances being made in areas of plant observation, cultivation and botany, universities began teaching the botanical sciences. Botanists began studying within botanical gardens at university sites to further their own research and teach their findings to their students.⁶⁰ Over time, as the information provided via garden research grew, university gardens evolved to include laboratories, greenhouses, libraries, and herbariums built to facilitate scientific research.⁶¹

In the early 1800s, university curriculum in the United States taught students about the introduction of valuable economic plants.⁶² The pursuit of plant studies for their monetary value came into being and economic botany took precedence in universities and gardens. The goal of university education was to systemize the cultivation techniques of certain plant species and find species that could be sold as food commodities to domestic and foreign markets. The

⁵⁸ Thacker, *The History of Gardens*, 127; Henry Kraemer, "Chapter IV: Botanical Nomenclature," in *Applied and Economic Botany for Students in Technical and Agricultural and Medical Colleges, For Chemists, Food Analysts and For Those Engaged in The Morphological and Physiological Study of Plants* 2 ed. (London: Chapman & Hall, John Wiley & Sons, Inc., 1914), 432.

⁵⁹ Ewan, Table of Contents in *A Short History of Botany in the United States*, vii.

⁶⁰ Ewan, *A Short History of Botany in the United States*, 4.

⁶¹ J.C. Arthur, "Some Botanical Laboratories of the United States," *Botanical Gazette* 26, no. 12 (Dec. 1885): 395-406; Peter Mickulas, "Designing the Garden," *Britton's Botanical Empire: The New York Botanical Garden and American Botany, 1888-1929, Memoirs of The New York Botanical Garden*, vol. 94 (Bronx, New York: The New York Botanical Garden Press, 2007), 282-289.

⁶² "Botanical Instruction in This Country," *Science* 7 no. 163, American Association for the Advancement of Science (Mar. 19, 1886): 251-252.

financial incentives to plant discoveries were an important driver of science's role in botanical gardens. For early American leaders, financial freedom through economic botany also represented independence from European markets. They became highly interested in developing their own cash crops and becoming a perfect self-sustaining agrarian utopia.⁶³

This early thinking about creating economic independence through crops progressed throughout American history and propagated the importance the United States government placed on gardens for much of the country's history. James Madison, Thomas Jefferson, John Quincy Adams, Ben Franklin and Charles Wilson Peale were a few American leaders interested in advancing plant studies. James Madison and Thomas Jefferson took steps to build the first national botanic garden established at the National Mall in 1820, in order to house plant species that would benefit and advance the study of economic botany, showcase the wealth and commercial success of the United States and teach farmers new horticultural techniques.⁶⁴

The United States government financed expeditions and used Navy ships and personnel to find new plant material having potential economic value. Captain John Harris of the U.S. Navy brought back lima beans from Peru in 1824.⁶⁵ In 1827 Commander Jacob Jones of the U.S. Navy sent a keg of alfalfa

⁶³ Therese O'Malley, " 'Your Garden Must be a Museum To You.' Early American Botanic Gardens," 213.

⁶⁴ Ibid.; "Brief History of the United States Botanic Garden," United States Botanic Garden [database on-line] (Washington D.C., 2001), accessed on June 7, 2011, <http://www.usbg.gov/history/history.cfm>.

⁶⁵ Klose, America's Crop Heritage, 28.

seed from Valparaiso Chile to the U.S.⁶⁶ In 1830 the House of Representatives passed a Resolution making the Navy's involvement in plant introduction official.⁶⁷ The government requested the assistance of the Navy and their officials in order to secure, "new varieties of sugar cane and other plants suitable to the American soil and climate."⁶⁸ Specimens were shipped back to gardens for observation and care.

Some of the first vital trade commodities were studied and developed at garden sites including rubber, quinine and coffee.⁶⁹ The United States acquired new territories opening up regions with new climates and soils intensifying the search for economically viable plants.⁷⁰ In 1838 the House of Representatives and Senate put aside 23,040 acres for cultivating useful tropical plants.⁷¹ Congress made provisions for collecting and distributing seeds and exempted tariff duties on foreign garden seeds to encourage plant introduction.⁷² Botanists studied the acclimatization process, seasonal changes and growth patterns of native and exotic species by climate zones at emerging botanical gardens across the country.⁷³ By the close of the 19th century, botanists no longer simply classified newly "discovered" plant varieties, but studied how the plants could be

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ Michael J. Balick, ed., "Botanical Gardens and Arboreta: Future Directions," *A Report of the International Working Meeting Held at The New York Botanical Garden, October 6-8, 1980* (New York: The New York Botanical Garden and American Association of Botanical Gardens and Arboreta, Inc., April 1986), 5.

⁷⁰ Klose, *America's Crop Heritage*, 3.

⁷¹ Klose, *America's Crop Heritage*, 39-42.

⁷² Ibid.

⁷³ Ewan, 135.

propagated at different locations and be taught to grow in American soils for economic profit.⁷⁴

The practice of studying plants, first in the Enlightenment, then through the establishment of university and naturalist gardens during the imperialist expansion, led to the formal science of botany. This important phase in history brought universities and government bodies into the gardens as they pursued knowledge about plants that was important to their continued expansion, financial growth and independence.

⁷⁴ U.P. Hedrick, "Botanic Explorers and Botanic Gardens," 421-422.

Figure 1. The Botanical Gardens of Padua University 16th century.
"The History of Botanical Gardens." BGCI. <http://bgci.org/usa>.

Figure 2. Chelsea Physic Garden, London founded 1673.
Missouri Botanical Garden Bulletin 10, no. 4 (April 1922): Plate 8.

Figure 3. Drawing of cell structures. Onion, garden pepper, orchid bulb, fruit, carrot and petal of a wild pansy, 1916. Henry Kraemer, "Frontispiece," in *Applied and Economic Botany for Students in Technical and Agricultural and Medical Colleges, For Chemists, Food Analysts and For Those Engaged in The Morphological and Physiological Study of Plants* 2 ed. (London: Chapman & Hall, John Wiley & Sons, Inc., 1914), 1-2.

CHAPTER 3: THE TRANSITION TO PUBLIC GARDENS

Throughout the 18th and 19th centuries, botanical gardens continued to develop in Europe and the United States for scientific study. These gardens were either part of universities where a handful of wealthy men studied, or private estate gardens used for botanical study and pleasure. However, beginning in the first half of the 20th century, gardens began to transition from private show gardens and scientific places used exclusively by botanists and private estate owners, to public places like the ones we know today. This movement was driven by a few important shifts. First, botany evolved away from a study of just plant biology and towards larger agricultural plant experiments, shifting funding away from gardens and towards large-scale agriculture. Second, a series of historical events in the early 1900s created demand for public open spaces. Third, economic hardships influenced many botanical gardens that were once private or funded by the government to proactively change how they used garden space to draw in public visitors and benefactors as a source of funding.

The Influence of Agriculture

From the time the first British ships came to the American colonies, colonial gardens became an important part of survival. When America gained her independence, the early country leaders knew the importance of agricultural and horticultural discoveries and advancements, leading to the emphasis on plant biology taught in universities, as discussed earlier in this paper. The advancements made in studying plants within university gardens, along with the

technological innovations of the 19th century Industrial Revolution made farming more scientific and kick-started the agricultural industry. One illustration of this more informed method of farming is the emergence of magazines like, *The Magazine of Horticulture, Botany, and All Useful Discoveries and Improvements in Rural Affairs* from the later half of the 19th century. These publications circulated details of new plant and vegetable varieties and vanguard cultivation techniques for landowners and farmers.⁷⁵ A plethora of material was readily available such as the *Gardeners' Chronicle of America published from 1905-1950*, giving gardeners information about the latest pesticides, plant introductions, tractor upgrades, irrigation techniques, plant supplements, fencing technology etc.⁷⁶ Clearly, the advancements made in botanical gardens were changing the way the entire agricultural industry worked.

Seeing an opportunity to strengthen the country's economy, the US government began to fund a wide variety of experimental and educational initiatives beyond just botanical gardens, to help accelerate the production of agricultural goods that could help drive market growth. Eventually, this initiative changed the role of botanical gardens and funding was lost to other efforts the government deemed more crucial to agriculture.

One of the first major efforts to promote agricultural growth was in 1862 when the United States took control of pioneering experimentation, botanical research and plant introduction and formed the United States Department of

⁷⁵ See C.M. Hovey ed., *The Magazine of Horticulture, Botany, and All Useful Discoveries and Improvements in Rural Affairs* 34, (Boston: Hovey & Co., 1868).

⁷⁶ *Gardeners' Chronicle of America*, (New York: Chronicle Press, 1905-1950).

Agriculture.⁷⁷ The USDA, “devoted large sums of money to securing economic plants, trees, and woody shrubs or herbarium material from the tropics and other parts of the world which suited their particular needs.”⁷⁸ The USDA created their own experimental stations at university sites and bought large land plots across the US to start horticultural and agricultural experimentation on a large scale. Experimental stations focused research on a small number of crop experiments as opposed to botanical gardens that collected thousands of varieties for study.⁷⁹ Eventually, the USDA created the “Experimental Gardens and Ground Division” in 1900 to encourage, “new horticultural industries and the advancement of knowledge,” start their own agricultural experimentation and push to see states establish experimental stations.⁸⁰

Food production had become a nation-wide goal and large-scale farms and tests sites became commonplace (See Figures 4 and 5).⁸¹ As the experimental stations advanced and learned more about crop sciences, the

⁷⁷ Edward B. Risley, Assistant Horticulturist New Hampshire Agricultural Experiment Station, “A Positive Program for the Future,” *American Association of Botanical Gardens and Arboreturns Newsletter* no. 24, ed. Katherine K. Muller, Santa Barbara Botanical Garden (October 1955): 11; “Proceedings Annual Meeting of American Association of Botanical Gardens and Arboreturns,” *American Association of Botanical Gardens and Arboreturns Newsletter* no. 34 (March 1958): 8-11.

⁷⁸ George T. Moore, “Thirty-Third Annual Report of the Director,” *Missouri Botanical Garden Bulletin* 10, no. 1(January 1922): 3.

⁷⁹ Daniel R. Headrick, “Botany, Chemistry, and Tropical Development,” *Journal of World History* 7, no. 1 (Spring, 1996): 5-6.

⁸⁰ “Experimental Gardens and Grounds,” *Annual Reports of the Department of Agriculture For the Fiscal Year Ended June 30, 1900: Report of the Secretary of Agriculture Departmental Reports* (Washington: Government Printing Office, 1900; exchange, Library of the New York Botanical Garden, 1903): XLII; F. Lamson-Scribner, Hon. James Wilson, “Report of the Agrostologist: Plants for the Future,” *Annual Reports of the Department of Agriculture For the Fiscal Year Ended June 30, 1900: Report of the Secretary of Agriculture Departmental Reports* (Washington: Government Printing Office, 1900; exchange, Library of the New York Botanical Garden, 1903): 90.

⁸¹ V.H. Heywood, “The Changing Role of the Botanic Garden,” in *Botanic Gardens and the World Conservation Strategy: Proceeding of an International Conference 26-30 November 1985*, eds. D. Bramwell, O. Hamann, V. Heywood and H. Synge (London: Academic Press, 1987), 8-16.

USDA made information available to the public. Beginning in 1902 the USDA published annual reports on new horticulture and agricultural discoveries and operations occurring across the country at state experimental stations.⁸² The federal government also created farmers institutions, and financed vocational and university agricultural education (See Figures 6 and 7).⁸³ By 1905, “farmer’s institutes” were thriving across the United States where agriculture education was being taught to men, women and children.⁸⁴ By providing grant funding, building experimental stations and writing agricultural curriculum for primary and secondary schools, the USDA was able to propagate and popularize horticulture and farming in the United States (See Figures 8-11).⁸⁵

As the USDA’s government-funded efforts expanded, botanical gardens struggled to remain relevant for a few reasons. First, government regulations on plant imports and seed distribution made it difficult for explorers and botanist to obtain live specimens from abroad for continual scientific development.⁸⁶ Botanical gardens relied heavily on plant exploration to fill their constant need for

⁸² *U.S. Department of Agriculture The Annual Report of the Office of Experimental Stations* (Washington: Government Printing Office, 1902-1912; exchange, Library of the New York Botanical Garden, 1907).

⁸³ A.C. True, “Progress in Agricultural Education, Educational Work of the Department of Agriculture,” *U.S. Department of Agriculture Annual Report of the Office of Experimental Stations For the Year Ended June 30, 1905* (Washington: Government Printing Office 1906; exchange, Library of the New York Botanical Garden, 1907): 303-306.

⁸⁴ A.C. True and Dick J. Crosby, “Summary, The Farmer’s Institutes,” *U.S. Department of Agriculture, Annual Report of the Office of Experimental Stations For the Year Ended June 30, 1905* (Washington: Government Printing Office 1906; exchange, Library of the New York Botanical Garden 1907): 20-21.

⁸⁵ “Progress in Agriculture Education,” *U.S. Department of Agriculture Annual report of the Office of Experimental Stations For the Year Ended June 30, 1903* (Washington: Government Printing Office, 1904; exchange, Library of the New York Botanical Garden 1907): 622-634; John C. Wister, “Encroachments-Continued,” *American Association of Botanic Gardens and Arboretums Newsletter*, no. 20, ed. Robert L. Woerner, John A. Finch Arboretum (October 1954): 13.

⁸⁶ George T. Moore, “Thirty-Third Annual Report of the Director,” *Missouri Botanical Garden Bulletin* 10 no. 1 (January 1922): 7.

live specimens when older varieties died or weather conditions stunted growth or killed plants. In 1912 the Federal Horticultural Board passed the Quarantine Act regulating imports of plant specimens in order to reduce diseases and pests that could be potentially harmful to the agricultural industry. It became, “more difficult and expensive” for garden researchers to leave the country and obtain specimens for research.⁸⁷

Another reason gardens were unable to compete with the newly formed USDA and the large experimental stations was because botanical gardens that were already in existence were either part of private estates or university plots. The private gardens often did not have the space to expand into experimental stations.⁸⁸ University education and scientific practice was concerned with research of cultivated plant species, the manipulation and production of plants on massive scales while the majority of botanical gardens were concerned with naturally occurring plant groups and the necessary functions of unexplored and new plant species.⁸⁹ In 1887 the Hatch Act was passed granting money to states that built agricultural experimental stations at colleges and universities.⁹⁰ Universities were more apt to go outside the garden space and set aside large tracts of land for experimentation, rather than try to launch new projects in the garden.

⁸⁷ George T. Moore, “Thirty-Third Annual Report of the Director,” *Missouri Botanical Garden Bulletin* 10 no. 1 (January 1922): 7; George T. Moore, “Thirty-Fourth Annual Report of the Director,” *Missouri Botanical Garden Bulletin* 11 no. 1 (January 1923): 3.

⁸⁸ Daniel R. Headrick, “Botany, Chemistry, and Tropical Development,” 5-6.

⁸⁹ “Proceedings: Annual Meeting of American Association of Botanical Gardens and Arboretums,” *American Association of Botanical Gardens and Arboretums Newsletter*, no. 34 (March 1958): 27.

⁹⁰ Sonya Neilson, Heather Moraru, “Hatch Act of 1887,” accessed on November 7, 2011, <http://jschell.myweb.uga.edu/history/legis/hatch.htm>.

The large-scale crop experimentation and the movement of botanical science and research to university labs moved the majority of advanced scientific research and funding out of the botanical garden space in the 20th century. The boom in the agricultural industry with the efforts and funding of the USDA made the botanical garden seem quaint and outdated. This made it difficult for botanical gardens to maintain valuable collections and compete with larger facilities, which had federally-backed funds. Scientists who focused in horticulture, or agriculture preferred experimental stations and botanists preferred university labs at universities where disciplines focused on refining crop cultivation and food production techniques.⁹¹ Botanists, taxonomist and plant breeders were more or less forced into specialties, often of little significance to botanical gardens.⁹² By the 1930s the gap between educational research facilities dedicated to horticultural experimentation and botanical gardens was undeniable.⁹³

As botanical gardens became less relevant to agricultural research, many gardens searched for new ways to incorporate scientific experimentation into their agendas. Some were able to stay open and gain some scientific funding by conducting small-scale research in ornamental horticulture.⁹⁴ Existing botanical gardens and arboretums propagated ornamental plants, shrubs, trees and

⁹¹ Christopher Wright, *The Prospective Role of An Arboretum: A Report, Prepared under the Auspices of The Institute for the Study of Science in Human Affairs Columbia University* (Mentor Ohio: The Holden Arboretum, June, 1972), 4-5.

⁹² R. J. Seibert, "Arboreta and Botanical Gardens in the Field of Plant Sciences and Human Welfare," *American Journal of Botany* 43, no. 9 (November 1956): 737.

⁹³ Michael Claffey, "The Responsibilities of Botanical Gardens and Arboreta in the Urban Environment," in *A Report of the International Working Meeting Held at the New York Botanical Garden, October 6-8, 1980*, ed. Michael J. Balick, (New York: The New York Botanical Garden and American Association of Botanical Gardens and Arboreta, Inc., April 1986), 25-32.

⁹⁴ "Early Collections in the Garden Herbarium," *Missouri Botanical Garden Bulletin* 7 no. 3 (March 1919): 34; "Washington," *American Association of Botanical Gardens and Arboretums Newsletter*, no. 3 (July 1950).

flowers known for their decorative and aesthetic value.⁹⁵ Plant explorers working for the US Department of Plant Introduction finding economic plant varieties, also began sending ornamental varieties to botanical gardens to be researched.⁹⁶ This action was often not financed by congress, but done on the part of individual plant explorers and botanists who could not help but see ornamental varieties.⁹⁷

The introduction of ornamental horticulture into gardens during this time period started the shift towards making gardens open to the public. As the development of ornamental horticulture programs evolved, botanical gardens across the country started participating in garden and flower shows to display the new advances in ornamental horticulture. Garden shows were largely geared towards a wider, new audience, the home gardener, to showcase the beautiful varieties that could be purchased and added to their home gardens. Flower and garden shows became ways for gardens to raise money through plant sales, as well as an easy way to increase awareness amongst the public.⁹⁸ One example is The Missouri Botanical Gardens, which hosted annual poinsettia and chrysanthemum shows and a variety of spring floral exhibits on their grounds (See Figure 12).⁹⁹ In 1929 the chrysanthemum displays were the most popular

⁹⁵ Sarah Hayden Reichard and Peter White, "Horticulture as a Pathway of Invasive Plant Introductions in the United States," *BioScience* 51, no. 2 (February 2001): 105.

⁹⁶ "How Shaw's Garden, in Seven years, Has Changed Gray Summit Woods Into 1,625-Acre Beauty Spot," *Missouri Botanical Garden Bulletin* 22, 1 (January 1934): 20; Sarah Hayden Reichard and Peter White, "Horticulture as a Pathway of Invasive Plant Introductions in the United States," 105.

⁹⁷ "Proceedings: Annual Meeting of American Association of Botanical Gardens and Arboretums." *American Association of Botanical Gardens and Arboretums Newsletter*, no. 34 (March 1958): 11.

⁹⁸ George T. Moore, "Thirty-Fourth Annual Report of the Director," *Missouri Botanical Garden Bulletin* 11, no 1 (January 1923): 2.

⁹⁹ George T. Moore, "Fifty-Seventh Annual Report of the Director," *Missouri Botanical Garden Bulletin* 34 no. 1 (January 1946): 16, Biodiversity Heritage Library, last modified May 4, 2011, <http://biodiversitylibrary.org/item/19103>.

show of the year attracting over 70,000 visitors.¹⁰⁰ The first garden shows were a milestone for gardens as they opened their doors to the public and started experimenting with new ways of fundraising.

Historical Events that Affected the Garden Space

Botanical garden leaders, boards and directors found that by conducting research and experiments in ornamental horticulture they were able to keep operating and still incorporate a scientific agenda within the gardens. However, botanical gardens still received very little federal and scientific funding and needed to find additional revenues elsewhere. Fortunately, American's growing pastime of gardening made the botanical gardens perfect spots to learn about new horticultural advancements and plant varieties for the home.¹⁰¹ The shifting focus of gardens on ornamental horticulture, a growing public interest in gardening and other historical factors taking place in the first half of the twentieth century, further nudged botanical garden directors to focus on the public audience.

At the turn of the 20th century, the public demand for open space and parks began to grow. The 19th century industrial revolution had caused the overcrowding of cities and a conservationist movement began. In response, the federal government set aside wild spaces to be preserved as national parks for

¹⁰⁰ George T Moore, "Fortieth Annual Report of the Director: Chrysanthemum Show," *Missouri Botanical Garden Bulletin* 17, no 1 (January 1929): 9.

¹⁰¹ John C. Wister, "Excerpts from the President's Report," American Association of Botanical Gardens and Arboretums Newsletter no. 24, edited by Katherine K. Muller (October 1955); 5.

public leisure.¹⁰² In 1916 Congress passed the National Parks Service Act, which focused on reclamation of wild and natural areas for public use.¹⁰³ Because the movement to preserve large tracts of land was federally funded, “there was little room left for federal endorsement of botanical gardens.”¹⁰⁴ This left the funding of gardens up to individual cities, which started making existing botanical gardens part of the city landscape and creating garden spaces that imitated nature for the city dweller to escape to.¹⁰⁵

Around this same time, wealthy proprietors began donating some of the great gardens of America, to cities for public use. As these original owners died, new owners and relatives of estate gardens often had no desire or lacked the resources to maintain live collections. In one example, the New York Botanical garden was a private garden that was set aside by the state legislature as land for the public in 1891.¹⁰⁶ The garden managers added a museum with three

¹⁰² Charles S. Sargent, “A Park Association,” *Garden and Forest: A Journal of Horticulture, Landscape Art and Forestry* 2, (New York: The Garden and Forest Publishing Co., October 1890): 497; Charles S. Sargent, “Periodical Literature,” *Garden and Forest: A Journal of Horticulture, Landscape Art and Forestry* 3, (New York: The Garden and Forest Publishing Co., July, 1890): 338.

¹⁰³ See “Documentary Chronology of Selected Events in the Development of the American Conservation Movement, 1947-1920,” *The Evolution of the Conservation Movement*, Library of Congress, (May 2002), accessed on August 1, 2011.
<http://memory.loc.gov/ammem/amrvhtml/cncron6.html>.

¹⁰⁴ *The Evolution of the Conservation Movement, 1850-1920*, From the Several Divisions of the Library of Congress, (May 2002), accessed on February 2, 2012,
<http://memory.loc.gov/ammem/amrvhtml/conshome.html>.

¹⁰⁵ Harriot Jordan, “Public Parks, 1885-1914,” *Garden History* 22, no. 1 (Summer 1994): 85; Frank Clark, “Nineteenth-Century Public Parks from 1830,” *The Garden History Society* 1, no. 3 (Summer 1973): 31-41.

¹⁰⁶ “Mission and History,” The New York Botanical Garden,
http://www.nybg.org/about/mission_and_history.php.

floors for educational exhibits, a greenhouse and a glasshouse.¹⁰⁷ They also hired a landscape architect to help design the grounds to attract visitors.¹⁰⁸

One of the earliest examples of a city funding a garden used primarily for public enjoyment was in 1907 when the New York Botanical Garden received city funding of over \$1,250,000 for ground maintenance.¹⁰⁹ Eventually, the parks department of New York incorporated the New York Botanical Garden into the department by making a charter with the garden's administration in 1920 outlining the city's involvement.¹¹⁰ In another example, the park commission of the city of Buffalo New York created the Buffalo Botanic Garden in 1909.¹¹¹ The parks department of the City of Boston helped the Arnold Arboretum in 1936 by installing 300 feet of wire, 150 feet of fencing completed, painting fences, creating roads, paths and repairing benches.¹¹² In 1938 a report from the Arnold Arboretum stated, "We enjoy the full cooperation of the city authorities in the fulfillment of the city's duty to the Arboretum through the Park, Police and Fire Departments." ¹¹³

¹⁰⁷ Peter Mickulas, "Designing the Garden," *Britton's Botanical Empire: The New York Botanical Garden and American Botany, 1888-1929, Memoirs of The New York Botanical Garden*, vol. 94 (Bronx, New York: The New York Botanical Garden Press, 2007), 79-83.

¹⁰⁸ Ibid.

¹⁰⁹ Addison Brown, "Need of Additional Funds," *Journal of the New York Botanical Garden* 8, no. 89, ed. William Alphonso Murrill, (May 1907): 98; William J. Roberts, Director the New York Botanical Garden, "The New York Botanical Garden-Some Major Improvements," *American Association of Botanical Gardens and Arboretums Newsletter*, no. 16, ed. Dorothy Ebel Hansell, The New York Botanical Garden, (October 1953): 8.

¹¹⁰ Henry Allan Gleason, ed., "Administrative, Act of Incorporation," *Journal of the New York Botanical Garden* 21 no. 252 (December 1920): 213-214.

¹¹¹ C. Stuart Gager, "The Brooklyn Botanic Garden," *Journal of the New York Botanic Garden* 11 no. 128, ed. Percy Wilson, (August 1910): 190-191.

¹¹² Alfred Rehder, ed., "The Arnold Arboretum During the Fiscal Year Ended June 30, 1936," *Journal of the Arnold Arboretum* 17, no. 4 (October 20, 1936): 358.

¹¹³ Alfred Rehder, ed., "The Arnold Arboretum During the Fiscal Year Ended June 30, 1938," *Journal of the Arnold Arboretum* 19, no. 4 (October 28, 1938): 447.

As gardens became more frequented by the public, and because gardens were free of charge and did not provide any sort of major scientific breakthroughs, they were put into the category of museums. In 1913 gardens received some indirect federal support through federal income tax deductions for charitable contributions for institutions such as zoos, museums and gardens.¹¹⁴ This further solidified the fact that gardens were separated from major scientific innovation and categorized as public institutions.

During the Great Depression, Franklin Roosevelt created the Works Progress Administration (WPA) and the Civilian Conservation Corps (CCC) to support job creation and the economy. The WPA and CCC worked at botanical gardens to add art installations and displays designed specifically to attract the public.¹¹⁵ The Norfolk Botanical Garden in Virginia was created in 1938 when U.S. Representative Norman R. Hamilton planned a WPA project granting \$76,278 for the garden's creation.¹¹⁶ Overall, gardens throughout the country, including in San Francisco and New Orleans, ended up receiving support from

¹¹⁴ Mrs. Lee Kimche McGrath, "Government Support For Botanical Gardens: Past, Present and Future," in "Botanical Gardens and Arboreta: Future Directions," *A Report of the International Working Meeting Held at The New York Botanical Garden, October 6-8, 1980*, ed., Michael J. Balick (New York: The New York Botanical Garden and American Association of Botanical Gardens and Arboreta, Inc., April 1986), 70; "The Concept of Charity," Anti-Tax Law Evasion Schemes, Facts, IRS, <http://www.irs.gov/pub/irs-tege/eotopicb80.pdf>, reviewed on January 25, 2012, <http://www.irs.gov/businesses/small/article/0,,id=106500,00.html>.

¹¹⁵ George T. Moore, "Thirty-First Annual Report of the Director," *Missouri Botanical Garden Bulletin* 8, no.1 (January 1920): 1 and 2.

¹¹⁶ "Home, Our Garden and Horticulture, All Gardens, WPA Memorial Garden," *Norfolk Botanical Garden* (Norfolk Botanical Garden, A Natural Beauty: 2009-2011), accessed on January 12, 2012, <http://www.norfolkbotanicalgarden.org>.

Roosevelt's New Deal programs in an effort to employ workers and turn gardens into great spaces to be enjoyed.¹¹⁷

World War I and II were two additional major events in the first half of the twentieth century that further disconnected the botanical garden from scientific endeavors and federal funding. The federal government financed scientific innovation to create wartime products and further financed chemical and pesticide production that would go towards producing massive quantities of food for allies and troops. This reinforced the position that the government was not particularly interested in the activities occurring within gardens, prompting many gardens to reach out to the public in order to finance the research projects that were conducted at gardens to maintain a level of scientific relevance.¹¹⁸

Urban sprawl after WWII and the creation of suburban America created another boom in the creation of botanical gardens. According to Howard Irwin, Director of the New York Botanical Gardens in 1973, 40% of botanical gardens were created between World War I and World War II, and 30% of gardens after World War II adding educational and plant exploration programs to advance

¹¹⁷ "History of Boerner Botanical Gardens," Friends of Boerner Botanical Gardens Milwaukee County's Living Museum, accessed on January 12, 2012, <http://www.boernerbotanicalgardens.org>; "Welcome to the New Orleans Botanical Garden," New Orleans Botanical Garden, City Park New Orleans, (2009), accessed on January 12, 2012 <http://garde.neworleanscitypark.com>; "Deciduous Forest, Educator Resources, Kids and Schools," *Atlanta Botanical Garden*, (2010), accessed on January 12, 2012; <http://www.atlantabotanicagarden.org>; "Strybing Arboretum & Botanical Garden in San Francisco's Golden Gate Park," Home, *San Francisco, Golden Gate Park, Tour San Francisco*, (2001-2012), accessed on January 12 2012, http://www.inetours.com/pages/SFNbrhds/GGP_Strybing.html; George T. Moore, "Fifty-Second Annual Report of the Director: City Garden Construction and Maintenance," *Missouri Botanical Garden Bulletin* 29, no. 1 (January 1929): 6.

¹¹⁸ George T. Moore, "Thirty-First Annual Report of the Director," *Missouri Botanical Garden Bulletin* 8, no.1 (January 1920): 1 and 2.

research and the comfort of visitors.¹¹⁹ The public audience was integrated into the garden space and by 1927 visitors were, “beginning to feel the need of the happy influence of the peaceful beauty of a botanical garden.”¹²⁰

The combination of many of these historical events caused directors and garden leaders to increasingly view the public as a source of funding. Botanical gardens across the US began changing the garden space in order to attract a public audience and fund the live collections and ornamental research projects done at gardens and arboretums. Eventually, as you will read in the next section, a fundamental transition occurred in the first half of the 20th century when pleasure and leisure took precedence over scientific endeavors.

The Garden’s Major Shift

In the early 1900s, as gardens first started to experience a shift in federal funds away from scientific research, most gardens still focused the majority of their efforts on research, albeit research that was increasingly subsidized by public and city funding. As federal funding continued to wane and the public interest surged, garden directors gradually made a shift to focus on bringing public interests to the forefront. This changed the way gardens fundraised and ultimately altered the use of garden space.

¹¹⁹ Howard S. Irwin, Director the NYBG, “Botanical Gardens in the Decades Ahead,” *Curator* 16, no. 1 (1973): 49.

¹²⁰ George T. Moore, “Thirty-Eighth Annual Report of the Director,” *Missouri Botanical Garden Bulletin* 15, no. 1 (January 1927): 1-2.

The proactive focus on creating gardens that served the broader public first was driven by one thing – a lack of money. Even early on in the 20th century, as the concept of public gardens was just emerging, botanical garden directors and boards were not afraid to ask the public for money and argued that gardens improved social welfare.¹²¹ The financial support asked for was used to keep up the live collections, grounds maintenance, research facilities, public educational tours, shows, and exhibits etc.¹²² In one example from 1907, Addison Brown, the chief of the executive committee of the New York Botanical Garden, wrote to the *Journal* about a need for funds. Brown mentioned that the city of New York had contributed to the garden by providing over \$1,250,000 for buildings, grounds and roads for the instruction and enjoyment of the people, “but for support of the life and soul of the Garden, as a valuable and progressive scientific institution, we must look mainly to the public-spirited citizen of New York” for the upkeep and funding of the garden.¹²³ Brown pleaded to the public, “Will you not help in this endowment for educational and scientific work?”¹²⁴ Brown went as far as publishing the name to which a gift could be made out to along with the address to where the gift could be sent at the garden.¹²⁵

Over time, garden directors realized the need to entice visitors to attend the gardens and add value to the broader public’s lives, rather than just asking

¹²¹ George T. Moore, “Fifty-Seventh Annual Report of the Director,” *Missouri Botanical Garden Bulletin* 34, no. 1 (January 1946): 1-2.

¹²² Donald Wyman, “The Arboretums and Botanical Gardens of North America,” *Chronica Botanica, An International Collection of Studies in the Method and History of Biology and Agriculture* 10, No. 5/6, ed. Frans Verdoorn (1947), 40.

¹²³ Addison Brown, “Need of Additional Funds,” *Journal of the New York Botanical Garden* 8, no. 89, ed. William Alphonso Murrill (May 1907): 95-99.

¹²⁴ *Ibid.*

¹²⁵ *Ibid.*

for donations. This led to the development of educational and recreational exhibits, public facilities, publication sales, room rentals, tours, special plant sales, gardening courses, picnic areas, and gift shops and restaurants to attract the public and raise revenue.¹²⁶ It also led to the development of infrastructure to support large groups of visitors and as early as 1910 gardens put in comprehensive systems of paths and driveways.¹²⁷ In 1927 the director of the Missouri Botanical Garden said more people were attracted to the garden and thus there was need to build roads to make parts of the grounds previously inaccessible, accessible.¹²⁸ In a later example from 1955 a Washington botanical garden opened new trails that were better suited for families and children.¹²⁹ In 1957 the Denver Botanic Garden set up graded parking areas and created trails accessible for “people of all ages.”¹³⁰ The increased services and ease of access at botanical gardens attracted large crowds and increased popularity among private individuals, nurserymen, arborist, city and town dwellers, foresters and landscape architects.¹³¹

¹²⁶ J. Popenoe, “Financial Structure of Botanical Gardens,” *AABGA Bulletin* 3 (1968): 3-9, F.B. Widmoyer, “Size and Funding Characteristics of American Arboreta and Botanical Gardens,” *Longwood Program Seminars* 2 (1970): 1-2 and M.E. Mathias, “The Diversity of Botanical Gardens,” *AABGA Bulletin* 17 (1983): 125-128, in “North American Botanic Gardens,” *Horticultural Reviews*, eds. Watson, W., Vernon Heywood, Webster Crowley (2010): 46.

¹²⁷ N.L. Britton, “Relations of the Botanical Gardens to the Public,” *Journal of the New York Botanical Garden* 11 no. 122, ed. Percy Wilson, (February 1910): 28.

¹²⁸ George T. Moore, “Thirty-Eighth Annual Report of the Director,” *The Missouri Botanical Garden Bulletin* 15, no. 1 (January 1927): 4.

¹²⁹ B.O. Mulligan, Director University of Washington Arboretum Seattle, Washington, “Regional Meeting of American Association of Botanic Gardens and Arboreta,” *American Association of Botanical Gardens and Arboreta Newsletter*, no. 24, ed. Katherine K Muller Santa Barbara Botanic Garden (October 1955): 3.

¹³⁰ Percy C. Everett, Rancho Santa Ana Botanic Garden, ed., “The Denver Botanic Garden,” *American Association of Botanical Gardens and Arboreta Newsletter*, no. 30 (April 1957): 4.

¹³¹ George T. Moore, “Forty-Fourth Annual Report of the Director,” *The Missouri Botanical Garden Bulletin* 21, no. 1 (January 1933): 1; Joseph H. Faull, Ph.D. Professor of Forest

In an additional effort to cater to the public, exhibits, gardens displays and tours were developed that focused on horticulture, gardening and landscape design topics that appealed to citizens.¹³² For example, in 1914 the Missouri Botanical Garden included a variety of different exhibit gardens for the public, such as, “the backyard vegetable garden,” “unusual economic plants,” “collections of farm crops,” “a grandmother’s garden,” “border plants,” “annual climbers,” “window boxes,” “savory and medicinal herbs,” and “hardy perennials for private place planting.”¹³³ In another example, the Los Angeles State and County Arboretum developed a “Plant Lore Club” that was a series of experimental classes offered to scouts and middle school students on Saturdays.¹³⁴ In 1932 the New York Botanical Garden offered a course in “Practical Gardening” where seed flats, soils and fertilizers were discussed in an exhibit titled “House Plants.”¹³⁵ Monthly public lectures were also offered on various subjects like, “State Flowers,” “Mushrooms as a Hobby,” “Crops and Civilization,” and “Where Rubber Comes From.”¹³⁶ In 1955 the Los Angeles State and County Arboretum planned to develop guided educational tours based around special interest in the

Pathology, “The Arnold Arboretum During The Fiscal Year Ended June 30, 1935,” *Journal of the Arnold Arboretum* 16, no. 4, ed., Alfred Rehder, (October 25, 1935): 456.

¹³² Richard A. Howard, Director, “The Arnold Arboretum and the Decision of the Massachusetts Supreme Court,” *American Association of Botanic Gardens and Arboretums Newsletter*, no. 22, ed. Clarence E. Lewis Long Island Agricultural and Technical Institute Farmingdale, New York (April 1955): 2.

¹³³ George T. Moore, “Twenty-Fifth Annual Report of the Director: Herbaceous Grounds,” *Missouri Botanical Garden Bulletin* 2, no. 1 (January 1914): 6-7.

¹³⁴ Louis B. Martin, Public Education at LASCA,” *American Association of Botanical Gardens and Arboretums Newsletter*, no. 27, ed. George H. Spalding Los Angeles State and County Arboretum (July 1956): 11.

¹³⁵ Forman T. McLean, Supervisor of Public Education, “Practical Gardening,” *Journal of The New York Botanical Garden* 33 no. 388, eds. Marshall A. Howe and Carol H. Woodward (April 1932): 81-84.

¹³⁶ “Public Lectures During June, July and August,” *Journal of The New York Botanical Garden* 33 no. 390, eds. Marshall A. Howe and Carol H. Woodward (June 1932): 137.

historical buildings and grounds of the Hugo-Reid Adobe built in 1839 on the garden site.¹³⁷ Some gardens provided landscaping tours showing visitors options for their home gardens and educational tips on how to sustain well manicured lawns and vibrant flowers.¹³⁸ The modern incorporation of educational and interactive exhibits, tours and gardens in the twentieth century differentiated them from typical museums or parks, making them all the more valuable and unique.¹³⁹

To further personalize the garden experience for visitors and to optimize the educational components, gardens started to provide informative leaflets, guidebooks, maps and labels to help direct and educate the public through the garden space (See Figure 13). For example, in 1955 the University of Washington Botanical Garden created an information leaflet that included a map to assist tours of the gardens to make it easier for groups such as boy scouts and youth groups to travel through the manicured landscape.¹⁴⁰ Labels were educational tools, providing scientific information about plant varieties and enticing visitors to interact with the natural world. Correctly labeled gardens had

¹³⁷ Russel J. Seibert, Director, "Los Angeles State and County Arboretum: Open to the Public On Sundays," *American Association of Botanical Gardens and Arboreta Newsletter*, no. 21, ed. Dorothy E. Hansell, The New York Botanical Garden (January 1955): 15-16.

¹³⁸ B.O. Mulligan, Director University of Washington Arboretum Seattle, Washington, "Regional Meeting of American Association of Botanic Gardens and Arboreta," *American Association of Botanical Gardens and Arboreta Newsletter*, no. 24, ed. Katherine K Muller Santa Barbara Botanic Garden (October 1955): 3.

¹³⁹ Richard A. Howard, Director, "The Arnold Arboretum and the Decision of the Massachusetts Supreme Court," *American Association of Botanic Gardens and Arboreta Newsletter*, no. 22, ed. Clarence E. Lewis Long Island Agricultural and Technical Institute Farmingdale, New York (April 1955): 2; Arthur W. Hill, "The History and Function of Botanical Gardens," *Annals of the Missouri Botanical Garden* 2 no. 1/2 (Feb.-April, 1915): 223.

¹⁴⁰ John M. Fogg Jr., Morris Arboretum of the University of Pennsylvania, Philadelphia, ed., "Notes From Seattle," *American Association of Botanical Gardens and Arboreta Newsletter* no. 23 (July 1955): 5.

¹⁹⁸ George T. Moore, "Thirty-Fourth Annual Report of the Director," *Missouri Botanical Garden Bulletin* 11, no. 1 (January 1923): 1-15.

the power to direct audiences throughout the grounds and keep visitors' curiosities satisfied.¹⁴¹ Those involved in botanical gardens constantly discussed how to improve the design of labels for the most optimal aesthetic experience and to decrease instances of vandalism of signs and labels throughout the garden space.¹⁴² In 1951 the John J. Tyler Arboretum, in Media Pennsylvania set up labels in Braille for the blind.¹⁴³ Many gardens in the states did the same.

Aesthetics played a very important role in attracting the public to the garden. To make the experience more appealing for public visitors, the botanical garden at the John Hopkins University in Baltimore, Maryland, had their botanical laboratories and experimental greenhouses set in the midst of a "beautiful formal garden."¹⁴⁴ The purpose of botanical gardens was to, "imitate nature as far as possible in a limited space and offer to the general public and the special student of botany an epitome of the vegetation of the world."¹⁴⁵ The aesthetics and recreational aspects of the garden space were crucial to drawing visitors to the garden as "the public is more immediately interested in landscape effects and in plants from the standpoint of beauty than in most other features of botanical

¹⁴¹ Percy C. Everett, "Plant Labels Again," *American Association of Botanical Gardens and Arboreturns Newsletter* 2, no. 1 (January 1951): 4.

¹⁴² Henry Teuscher, "The Botanical Garden of the Future," *Journal of the New York Botanical Garden* 34 no. 399, eds. Marshall A. Howe and Carol H. Woodward (March 1933): 55, 58.

¹⁴³ "Notes and Comments: Garden for the Blind," *American Association of Botanical Gardens and Arboreturns Newsletter* 2 no.1, (January 1951): 7-8.

¹⁴⁴ *Gardeners' Chronicle of America* 16-17 (1912-1914) (New York: Chronicle Press, 1905-1950) Contributing Library: New York Botanical Garden.

¹⁴⁵ Dr. William G. Farlow, "Anniversary Celebration-Banquet," *Annals of the Missouri Botanical Garden* 2 (1915): 21.

gardens. Well-built and well-kept grounds appeal to people as attractive places to visit.”¹⁴⁶

As gardens grew more valuable to the public, so did the cost of operations.¹⁴⁷ Developing custom educational programs, advertising to attract new audiences, investing in infrastructure to support large crowds and maintaining the actual grounds all became new costs that the gardens had not previously dealt with. In response, gardens developed formal programs for soliciting donations from “Friends” of the garden, the terms used to describe benefactors. The small and large gifts received from donors or friends helped garden staff to accomplish the much-needed improvements that were impossible to finance on the basis of an institution’s regular income.¹⁴⁸ Friends of these institutions were given priority, status and recognition. For example, the New York Botanical Garden named benefactors, friends and members in their Journal. After 1923, a ranking system was developed to differentiate the friendship with the garden based on the amount of money donated to the garden. Included were: Benefactors, Patrons, Fellows of Life, Fellowship Members, Sustaining Members, Annual Members, and Life Members (See Figure 14).¹⁴⁹ In 1940 the Missouri

¹⁴⁶ N.L. Britton, “Relations of the Botanical Gardens to the Public,” *Journal of the New York Botanical Garden* 11 no. 122, ed. Percy Wilson, (February 1910): 28.

¹⁴⁷ George T. Moore, “Square Deal From Henry Shaw,” *Missouri Botanical Garden Bulletin* 14, no. 1(January 1926): 7.

¹⁴⁸ E.D. Merrill, “The Arnold Arboretum During the Fiscal Year Ended June 30, 1937,” *Journal of The Arnold Arboretum* 18 no. 4, ed. Alfred Rehder (1937): 349.

¹⁴⁹ Henry Allan Gleason, ed., “Provisions for Benefactor, Patrons, Fellows, Fellowship Members, Sustaining Members, Annual Members and Life Members,” *Journal of the New York Botanical Garden* 24, no. 286 (October 1923).

Botanical Garden began a fund titled, "Friends of the Garden."¹⁵⁰ By 1945 the Missouri Botanical Garden Bulletin devoted an entire section to benefactors titled, "Friends of the Garden" that continued for several years.¹⁵¹ Some gardens offered special exhibits, tours and classes only for the friends of the garden and made certain garden classes and exhibit days free to members while non-members had to pay.¹⁵²

Despite the donations received from friends of the gardens, gardens were still strapped for funds as the costs of trying to maintain elaborate ornamental collections, research projects, educational exhibits and public attractions rose over the years.¹⁵³ Botanical garden administration and executive boards cut staff and staff budgets when money was scarce in order to keep a garden from closing its doors.¹⁵⁴ In 1938 the Missouri Botanical Garden kept a small staff, reduced staff income, and asked the public to help in order to make necessary improvements in order to accommodate fluctuations in income (See Figure 15).¹⁵⁵ In 1944 The Arnold Arboretum, "greatly curtailed" certain types of work and projects, keeping meticulous tracking of endowment and grand funds in order to balance loss of staff members and money of those who went to work in

¹⁵⁰ George T. Moore, "Fifty-First Annual Report of the Director," *Missouri Botanical Garden Bulletin* 28, no. 1 (January 1940): 2.

¹⁵¹ George T. Moore, "Fifty-Sixth Annual Report of the Director," *Missouri Botanical Garden Bulletin* 33, no. 1, (January 1945): 8.

¹⁵² "Horticultural Courses Offered By the Garden," *Missouri Botanical Garden Bulletin* 46, no. 1 (February 1958): 8,9.

¹⁵³ Addison Brown, "Need of Additional Funds," *Journal of the New York Botanical Garden* 8, no. 89, ed. William Alphonso Murrill (May 1907): 95-99.

¹⁵⁴ George T. Moore, "Fifty-Seventh Annual Report of the Director," *Missouri Botanical Garden Bulletin* 34, no. 1 (January 1946): 2.

¹⁵⁵ George T. Moore, "Fiftieth Annual Report of the Director," *Missouri Botanical Garden Bulletin* 27, no. 1 (January 1939): 18.

military services.¹⁵⁶ At the Whitnall Park Botanical Gardens in Hales Corners, Wisconsin, self-guided tours replaced the paid role of a naturalist in 1956.¹⁵⁷ In 1958 the Missouri Botanical Garden was forced to cut their staff to fewer members than ever before and look for ways to upkeep the grounds.¹⁵⁸

In response to the lack of funding and staff, volunteers took the place of employees. The concept of a docent began in gardens around 1910 as volunteers were put in charge of educational programs and tours.¹⁵⁹ By the 1930s and 40s, it was common for gardens to rely on public volunteers to donate their time and skills to maintain the space of the botanical garden.¹⁶⁰ Volunteers hosted events, planned garden shows and fundraisers, were trained to participate in the cultivation of different plant species and were taught how to repair and maintain garden grounds.¹⁶¹ Beginning in 1956 a Women's Committee made up of female volunteers at the Missouri Botanical Garden raised funds for the gardens, searched for more volunteers and helped the garden gain more members and "Friends."¹⁶²

¹⁵⁶ A.C. Smith, ed., "The Arnold Arboretum During the Fiscal Year Ended June 30, 1944," *Journal of the Arnold Arboretum* 25, (1944): 488.

¹⁵⁷ John E. Voight, Botanical Supervisor, "Whitnall Park Botanical Gardens: Hales Corners, Wisconsin," *American Association of Botanical Gardens and Arboreturns Newsletter*, no. 28, ed. Richard A. Howard The Arnold Arboretum (October 1956): 9.

¹⁵⁸ Hugh C. Cutler, "The Garden Report for 1957," *Missouri Botanical Garden Bulletin*, 46 no. 1 and 2 (February and March 1958): 15-16, 27.

¹⁵⁹ Stuart C. Gager, "The Educational Work of Botanic Gardens," *Journal of the New York Botanical Garden* 12, no. 136, ed., Fred J. Seaver (April 1911): 74, 77.

¹⁶⁰ George T. Moore, "Fifty-Seventh Annual Report of the Director," *Missouri Botanical Garden Bulletin* 34, no. 1 (January 1946): 2.

¹⁶¹ Hugh C. Culter, "The Garden Report for 1957: Publicity," *Missouri Botanical Garden Bulletin* 46, no. 2 (March 1958): 27, Biodiversity Heritage Library, last modified May 4, 2011, <http://biodiveristylibrary.org/item/19179>.

¹⁶² Hugh C. Cutler, "The Garden Report For 1956," *Missouri Botanical Garden Bulletin* 45, no. 2 (March 1957): 43.

As garden directors and boards invested more resources into transforming the gardens to become public places, the role of science and research within the gardens consistently decreased. This gradually took gardens out of any clear category for federal funding.¹⁶³ By the mid-1950's gardens proactively targeted public audiences, became dependent on "Friends" of the garden for funding and relied on public volunteers to maintain the grounds. Gardens were heading down a path of being defined primarily as places that primarily served the general public.

¹⁶³ W.M. Klein, "The Case for Federal Support of Botanical Gardens and Arboretums," *AABGA Bulletin* 13 (1970): 111-116, and L.K. McGrath, "Government Support for Botanical Gardens: Past Present and Future," in *Botanical Gardens and Arboreta: Future Directions*, (Swathmore, P.A., New York Botanical Garden and American Association of Botanical Gardens and Arboreta, 1980): 69-73, in "North American Botanic Gardens." *Horticultural Reviews*, eds. Watson, W. Vernon Heywood, Webster Crowley (2010): 46.

FIG. 2.—EXPERIMENTAL GREENHOUSE AT SOUTH CAROLINA STATION.

Figure 4. Experimental Greenhouse at the South Carolina Experimental Station, 1906. *US Department of Agriculture, Annual Report of the Office of Experimental Stations For the Year Ended June 30, 1906* (Washington DC: Government Printing Office, 1907; exchange Library of the New York Botanical Garden, 1907): Plate V.

FIG. 1.—OKLAHOMA STATION LOTS FOR STEER-FEEDING EXPERIMENTS.

Figure 5. Lots for Steer-Feeding Experiments, 1905. *U.S. Department of Agriculture Annual report of the Office of Experimental Stations For the Year Ended June 30, 1905* (Washington: Government Printing Office, 1906; exchange, Library of the New York Botanical Garden 1907): Plate VI.

Figure 6. Michigan College and Experimental Station, 1903. *US Department of Agriculture, Annual Report of the Office of Experimental Stations For the Year Ended June 30, 1903* (Washington DC: Government Printing Office, 1904; exchange Library of the New York Botanical Garden, 1907): Plate IV,

Figure 7. Federal Vocational Training In School for Gardening, (classroom), *n.d. Missouri Botanical Garden Bulletin* 10, no. 1(January 1922): Plate 3.

Figure 8. Students Taking Notes on Field Crops, County Agricultural High School, Dunn County Wisconsin School of Agriculture, 1902. *U.S. Department of Agriculture Annual report of the Office of Experimental Stations For the Year Ended June 30, 1903* (Washington: Government Printing Office, 1904; exchange, Library of the New York Botanical Garden 1907): LI.

Figure 9. New York City School Garden, 1903. *U.S. Department of Agriculture Annual report of the Office of Experimental Stations For the Year Ended June 30, 1903* (Washington: Government Printing Office, 1904; exchange, Library of the New York Botanical Garden 1907): XXXIII.

Figure 10. George Putnam Grammar School Garden, Boston, 1903. *US Department of Agriculture, Annual Report of the Office of Experimental Stations For the Year Ended June 30, 1903* (Washington DC: Government Printing Office, 1904; exchange Library of the New York Botanical Garden, 1907): Plate XXXI.

Figure 11. School of Horticulture and Landscape Gardening For Women, Hartford School, Connecticut, 1903. *US Department of Agriculture, Annual Report of the Office of Experimental Stations For the Year Ended June 30, 1903* (Washington DC: Government Printing Office, 1904; exchange Library of the New York Botanical Garden, 1907): Plate XXXI.

Figure 12. Chrysanthemum Show, Missouri Botanical Gardens, 1932. *Missouri Botanical Garden Bulletin* 21, no. 1 (January 1933) Plate 2.

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Figure 13. List of printed materials for sale at the Missouri Botanical Gardens, 1956. *Missouri Botanical Garden Bulletin* 44, no. 4(April 1956), last page (text).

Provisions for
Benefactors, Patrons, Fellows, Fellowship Members,
Sustaining Members, Annual Members
and Life Members

1. Benefactors

The contribution of \$25,000.00 or more to the funds of the Garden by gift or by bequest shall entitle the contributor to be a benefactor of the Garden.

2. Patrons

The contribution of \$5000.00 or more to the funds of the Garden by gift or by bequest shall entitle the contributor to be a patron of the Garden.

3. Fellows for Life

The contribution of \$1000.00 or more to the funds of the Garden at any one time shall entitle the contributor to be a fellow for life of the Garden.

4. Fellowship Members

Fellowship members pay \$100.00 or more annually and become fellows for life when their payments aggregate \$1000.00

5. Sustaining Members

Sustaining members pay from \$25.00 to \$100.00 annually and become fellows for life when their payments aggregate \$1000.00.

6. Annual Members

Annual members pay an annual fee of \$10.00.

All members are entitled to the following privileges:

1. Tickets to all lectures given under the auspices of the Board of Managers.
2. Invitations to all exhibitions given under the auspices of the Board of Managers.
3. A copy of all handbooks published by the Garden.
4. A copy of all annual reports and bulletins.
5. A copy of the monthly Journal.
6. Privileges of the Board Room.

7. Life Members

Annual members may become Life Members by the payment of a fee of \$250.00.

Information

Members are invited to ask any questions they desire to have answered on botanical or horticultural subjects. Docents will accompany any members through the grounds and buildings any week day, leaving Museum Building at 3 o'clock.

Form of Bequest

I hereby bequeath to The New York Botanical Garden incorporated under the Laws of New York, Chapter 285 of 1891, the sum of

Figure 14. Page describing member benefits in Journal of the New York Botanical Garden. Henry Allan Gleason, ed., "Provisions for Benefactor, Patrons, Fellows, Fellowship Members, Sustaining Members, Annual Members and Life Members," *Journal of the New York Botanical Garden* 24, no. 286 (October 1923).

Fig. 1

Figure 15. Graph describing fluctuations in revenue at Missouri Botanical Garden. George T. Moore, "Forty-Sixth Annual Report of the Director," *Missouri Botanical Garden Bulletin* 23, no. 1 (January 1935): 2.

CHAPTER 4: THE REINTRODUCTION OF SCIENCE INTO PUBLIC SPACES

Just as it seemed that gardens were going to become places focused on leisure and entertainment for the public, yet another substantial shift occurred in the use of garden spaces in the latter half of the 20th century. This time, the scientists who had emigrated away from the gardens in favor of university gardens, laboratories and agricultural testing grounds, once again returned to gardens as their interest turned to plant conservation and habitat preservation. The unique intersection of scientific and public interests, and the model of cooperation towards promoting conservation that resulted from this shift, became the starting point for how gardens are utilized today.

The first public awareness of the importance of conservation of plant species began in the early twentieth century. In fact, one of the first references to conservation efforts inside a garden was in 1904 at the New York Botanical Garden, when the garden set up an endowment fund for the protection of wild flowers.¹⁶⁴ A 1920 article from the *Missouri Botanical Garden Bulletin* described the importance of native plants and questioned the belief that transplanting native species did not have any consequences, but rather caused, “ruthless destruction” of desirable and valuable native plants that became scarcer each year.¹⁶⁵ The article stated that native plants needed to be carefully studied and even included a list of plants that were not to be removed from their habitats because of their rarity

¹⁶⁴ G. Gordon Copp., “Protection of the Wild Flowers,” *Journal of the New York Botanical Garden* 5, no. 54, ed. Daniel Trembly MacDougal (June 1904): 112-118.

¹⁶⁵ “Collecting Native Plants For the Garden,” *Missouri Botanical Garden Bulletin* 8 no. 3 (March 1920): 33-35.

and closeness to extermination (See Figure 16).¹⁶⁶ In a 1936 article in *The Scientific Monthly*, by John G. Jack, an assistant professor of Dendrology at Harvard University, wrote that there were several plant species that were becoming rare and disappearing and these plants should be studied at gardens.¹⁶⁷

Despite this early interest in conservation, there was very little dialogue amongst garden directors, researchers or scientists on utilizing gardens to foster plant conservation efforts. This is likely due to the fact that during that time plant science was being studied more at the molecular level within university laboratories, not at a macro-level in the actual garden settings. Instead of focusing on conservation, by the 1950s the majority of municipal and public botanical gardens became heavily focused on catering to the public audiences, while scientific research remained at universities.¹⁶⁸

By the mid-twentieth century this all started to change. Scientists' began to have an interest in natural systems and whole organisms, as opposed to studying plants just at the molecular level. One reason for this was that as suburban homes, strip malls and interstate highways were developed after World War II, scientists observed the need to preserve entire plant systems and

¹⁶⁶ Collecting Native Plants For the Garden," *Missouri Botanical Garden Bulletin* 8 no. 3 (March 1920): 34-35.

¹⁶⁷ John G. Jack, "Arboreta, Old and New," *The Scientific Monthly* 43, no. 6 (Dec., 1936): 550.

¹⁶⁸ Christopher Wright, *The Prospective Role of An Arboretum: A Report, Prepared under the Auspices of The Institute for the Study of Science in Human Affairs Columbia University, The Holden Arboretum, Mentor Ohio*, (June 1972), 5.

ecosystems. This catalyst generated new interest in the live collections of botanical gardens among botanical researchers.¹⁶⁹

The resurgence of interest in gardens as places to study conservation was amplified by published research about the rate of destruction of plant species and a need for preservation of native and exotic plants, which became more common among botanical researchers starting in the late 50s. For example, in 1956, a botanical collector and botanist named R.J. Seibert wrote, “Arboreta and Botanical Gardens in the Field of Plant Sciences and Human Welfare.” In it Seibert showed how industrial and civic pollution was on the rise and how botanical gardens could help prove that polluted air was damaging plants, then publicize specific damage reports to the gardening public.¹⁷⁰ Later, in 1969 the director of the Missouri Botanical Garden, Dr. David M. Gates wrote, “the earth is a very limited piece of real estate and its soil surface, its water, and its sky are not boundless voids.”¹⁷¹ Gates stated that legislation concerned with pollution and the environment was being introduced to congress and that gardens had the potential to play a significant role in the world’s environmental crisis.¹⁷² Botanical gardens were spaces where scientists believed research could be monitored and documented so experiments being done on plants would not be duplicated and

¹⁶⁹ Christopher Wright, *The Prospective Role of An Arboretum: A Report, Prepared under the Auspices of The Institute for the Study of Science in Human Affairs Columbia University*, The Holden Arboretum, Mentor Ohio, (June 1972): 1-5.

¹⁷⁰ R. J. Seibert, “Arboreta and Botanical Gardens in the Field of Plant Sciences and Human Welfare,” *American Journal of Botany* 43, no. 9 (November 1956): 738.

¹⁷¹ David M. Gates, “From the Director,” *Missouri Botanical Garden Bulletin* 57 no. 6 (November-December, 1969): 1.

¹⁷² David M. Gates, “From the Director,” 2.

vital findings could be publicized and shared inside the scientific world.¹⁷³ They could exhibit thousands of plant species and show plant diversity and species richness similar to what was found in the natural ecosystem.¹⁷⁴

Throughout the 1950s and 1960s the effort to reintroduce science as an important part of gardens grew steadily. As Vietnam, the Cold War and skyrocketing energy costs made environmental conservation a top public issue in the late 1960s through the 1980s, the effort to advance gardens increased dramatically. In fact, a NATO conference was held in September 1975 to discuss the potential role of gardens in the efforts to preserve plants and global conservation.¹⁷⁵ Botanical garden directors, plant researchers and conservation scientists gathered to discuss how botanical gardens could be used to safeguard plant diversity for the future.¹⁷⁶ One conference member suggested because of the rate of man's impact on natural resources and the plant world, plants should be sent to botanical gardens regardless of their present importance in science, and that conservation at botanical gardens should be given high priority.¹⁷⁷ A presentation titled, "Present: The Resource Potential of Existing Living Plant Collections," stated the need for improved observation, experiment and recording

¹⁷³ Micahel Sean Dosmann, "Research in the Garden: Averting the Collections Crisis," *The Botanical Review* 72, no. 3 (New York: New York Botanical Garden Press, 2006): 225.

¹⁷⁴ Marco Pautasso and Ingrid Parmentier, "Are the Living Collections of the World's Botanical Gardens Following Species-Richness Patterns Observed in Natural Ecosystems?" *Botanica Helvetica* 117 (2007): 116, DOI 10.1007/s00035-007-0786-y.

¹⁷⁵ J. Heslop-Harrison, Royal Botanic Gardens Kew, Surrey, England, "Introduction," to *Conservation of Threatened Plants*, eds. J.B. Simmons, R.I. Beyer, P.E. Brandham, G. L.I. Lucas, and V.T. H. Parry (New York: NATO Scientific Affairs Division By Plenum Press, 1975), 4.

¹⁷⁶ Sir Peter Scott, Vice President and Chairman, World Wildlife Fund Chairman, Survival Service Commission of I.U.C.N., Forward in *Conservation of Threatened Plants*, vii, viii.

¹⁷⁷ G. Budowski, Director General, IUCN Switzerland, "The Global Problems of Conservation and the Potential Role of Living Collections," in *Conservation of Threatened Plants*, 9-13

of living plant collections at botanical gardens.¹⁷⁸ R.L. Shaw of the Royal Botanic Garden in Edinburgh, Scotland, suggested that in order to limit replication of conservation efforts of certain plant species, gardens needed to develop a network of communication and international policy that will provide information to scientists about the plant specimens at individual gardens.¹⁷⁹

As scientists caught on to the value of gardens, some of them criticized the role botanical gardens took in serving the public, stating they were “passive” institutions that no longer taught the average citizen the true importance of plants or provided true educational exhibits, but were recreational parks concerned only with aesthetics.¹⁸⁰ Gardens were compared to theme parks where exhibits, shows, restaurants and gifts shops on garden grounds catered to public interests in gardening, history and art. Even the gardens at universities were used to enhance the beauty of the educational setting and were little used by colleges except for a few field trips or for student recreation.¹⁸¹ In 1973 the director of the New York Botanical Gardens, Howard Irwin, wrote that botanical gardens suffered from lack of identity and were regarded by the public as ornamental parks.¹⁸² Many botanical scientists and garden directors agreed that there was a

¹⁷⁸ John B. Simmons, “Present: The Resource Potential of Existing Living Plant Collections,” in *Conservation of Threatened Plants*, 9-13.

¹⁷⁹ R.L. Shaw, Royal Botanic Garden, Edinburgh, Scotland, “Future: Integrated International Policies,” in *Conservation of Threatened Plants*, 39-47.

¹⁸⁰ George S. Avery, Jr., “What Role Today” An ‘Operation Bootstraps’ Opportunity for Botanists,” *American Journal of Botany* 44 no. 2 (Mar., 1957): 269-271; Christopher Wright, *The Prospective Role of An Arboretum: A Report, Prepared under the Auspices of The Institute for the Study of Science in Human Affairs Columbia University*, The Holden Arboretum, Mentor Ohio, (June 1972): 1-5.

¹⁸¹ George S. Avery, Jr., “What Role Today” An ‘Operation Bootstraps’ Opportunity for Botanists,” *American Journal of Botany* 44 no. 2 (Mar., 1957): 269.

¹⁸² Howard S. Irwin, Director the NYBG, “Botanical Gardens in the Decades Ahead,” *Curator* 16 no.1 (1973): 6-7.

need to reevaluate the role to the community, develop action plans, and teach the public about stewardship responsibilities.¹⁸³ This burst in interest amongst conservation scientists within gardens in engaging with the broader public was an important step towards a much larger conservation movement, which involved the entire public.

One of the first major pushes to engage the public in the current scientific conservation movement by a prominent garden director came in 1950 when the director of the New York Botanical Garden, William J. Robbins, said the garden had two objectives: to be like a “pleasant resort for the entertainment, recreation and instruction of the general public,” and to be, “an institution to preserve, disseminate and extend” knowledge about plants.¹⁸⁴ In 1972 a botanical researcher from the Royal Botanic Garden in Kew, Surrey, England, suggested that botanical gardens were already well equipped to advance research in the protection of the environment and had many opportunities to instruct on conservation, but were often restricted by the needs and desires of those in charge of gardens.”¹⁸⁵ By 1976 botanical garden leaders and directors viewed the conservation initiatives as part of their obligation and their responsibility was to increase the function of education, research and conservation at gardens.¹⁸⁶

In response to the calls to better integrate the public and scientific conservation agendas, botanical garden leaders came together on the issue of

¹⁸³ Howard S. Irwin, Director the NYBG, “Botanical Gardens in the Decades Ahead,” 9.

¹⁸⁴ William J. Robbins, “The New York Botanical Garden,” *Journal of the New York Botanical Garden* 51, no. 607, ed. Dorothy Ebel Hansell (July 1950): 158-159.

¹⁸⁵ P.A. Thompson, “The Role of the Botanic Garden,” *Taxon* 21, no. 1 (February 1972): 116-117.

¹⁸⁶ C.C. Moss, “Current Design Policies of Botanical Gardens and Arboreta in the United States,” *The Longwood Program Seminars*, vol. 8 (1976): 9.

conservation to develop large community, state, national and international organizations. Large organizations helped support the conservation initiative, get more gardens and people involved in saving plants and better organized each garden to meet the needs and challenges of plant conservation.¹⁸⁷ Gardens came to the realization that they would have to develop new organizational infrastructures and conservation orientated staff training in order to integrate conservation science initiatives into the garden space.¹⁸⁸

Gardens also made major changes to their mission statements and core elements of their garden charters, to better focus on conservation and integrate science and public initiatives. The Tennessee Botanical Gardens held a conference in New York in the early 60s where they discussed how exhibits could be used as tools for conservation education.¹⁸⁹ From 1963-1968 the Missouri Botanical Gardens gradually refocused its role to include research in botany and education of the importance of plants to human well-being and mankind.¹⁹⁰ In 1972 the Missouri Botanical Garden changed their logo to include conservation and hired an international landscape architect firm, Environmental Planning and Design, to conduct a yearlong survey to help assess the effectiveness of the garden's physical space to meet the needs of the

¹⁸⁷ John B. Simmons, "Present: The Resource Potential of Existing Living Plant Collections," in *Conservation of Threatened Plants*, 37.

¹⁸⁸ Ibid.

¹⁸⁹ Gordon Scott, Director of Botanical Gardens, "Tennessee Botanical Gardens and Fine Arts Center," *American Association of Botanical Gardens and Arboreturns Quarterly Newsletter*, no. 50, ed. Carl W. Fenninger (January 1962): 13.

¹⁹⁰ Frits W. Went, "Missouri Botanical Garden Report of the Director for 1962," *Missouri Botanical Garden Bulletin* 51, no. 3, ed. Ranlet Lincoln (March 1963): 1-8; David M. Gates, "Why a Botanical Garden?" *Missouri Botanical Garden Bulletin* 53 no. 10, ed. Edgar Anderson (December 1965): 1; David M. Gates, "From the Director," *Missouri Botanical Garden Bulletin* 56, no. 2, ed. Barbara P. Lawton (March/April, 1968): 2.

community, state and nation.¹⁹¹ Gardens across the United States began changing the garden mission, design and space in order to fit new standard of conservation and environmental education.¹⁹² Gardens today are following suit to streamline their missions, conduct surveys on their environmental outreach to the public and redesign the garden space to incorporate environmental education (See Appendix B).¹⁹³

The broader effort within gardens to appeal to and educate consumers, helped to create a sense of camaraderie and connection between gardens worldwide. Networking among gardens helped scientific and botanical garden professionals to access important information about plants and formulate plans for better research facilities, greenhouses, seed storage facilities, nurseries and natural space for the conservation and protection of plants.¹⁹⁴ It also has led to the sharing of ideas for ways gardens can engage with the public and raise awareness of global conservation issues together. The National Garden Association was created in the 1970s “to sustain the essential connection between people, plants, and the environment.”¹⁹⁵ The National Center for Plant

¹⁹¹ “William McKinley Klein, Jr. Appointed Assistant Director,” *Missouri Botanical Garden Bulletin* 61 no. 1 (July 1972): 1-2.

¹⁹² Roger A. Norman. Vandiver. “Integration of Education With Research and Collections Programs In North American Botanic Gardens: A Thesis Submitted to the Graduate Faculty in partial fulfillment of the requirements of the degree of Master in Liberal Arts,” The University of Oklahoma Graduate College, Oklahoma, (1988), 15.

¹⁹³ Carmia Feldman, Assistant Director UC Davis Arboretum, “Botanical Garden Director Interview,” interviewed by Terra Colburn, phone interview, January 22, 2010.

¹⁹⁴ “Plant Conservation,” Plant Conservation Section, eCommunities, *American Public Garden Association*, accessed on February 22, 2012. <http://www.publicgardens.org>.

¹⁹⁵ “About NGA,” *National Gardening Association, When You Garden, You Grow*, accessed on February 22, 2012, <http://assoc.garden.org>.

Conservation founded in 1984 was created to coordinate a national program for rare plant material and works with gardens to monitor plant material.¹⁹⁶

Today's botanical gardens are a powerful example of effective conservation programs designed to reach a public audience. The conservation agenda set forth by botanical scientists has fueled those in the botanical garden communities to collaborate, create seed storage facilities, gene banks and promote environmental education for their public audiences.¹⁹⁷ At the same time, interested and concerned citizens are excited by the opportunity to use garden spaces to learn about plants and conservation through educational, relaxing or fun garden programs. In the last 50 years, both the scientific community and broader public have come together for the first time in realization that there are finite resources and gardens can become places crucial to our own education and survival, much like the gardens of the past.

¹⁹⁶ "The Mission," About CPC, *Center for Plant Conservation, Conserving and Restoring America's Native Plants*, accessed on February 22, 2012, <http://www.centerforplantconservation.org>; Edward L. Schneider, Ph.D. President/CEO, The Santa Barbara Botanic Garden, "Botanical Garden Director Interview," interviewed by Terra Colburn, interview by email, February 11, 2010.

¹⁹⁷ Vernon H. Heywood, "The Role of Botanic Gardens as Resource and Introduction Centres in the Face of Global Change," *Biodiversity Conservation*, 20 (2011): 243, DOI10.1007/s10531-010-9781-5.

BOTANICAL NAME	COMMON NAME
<i>Amelanchier canadensis</i>	June-berry
<i>Aquilegia canadensis</i>	Columbine
<i>Aster Novae-Angliae</i>	New England aster
<i>Camassia Fraseri</i>	Wild hyacinth
<i>Ceanothus americanus</i>	New Jersey tea
<i>Cornus florida</i>	Flowering dogwood
<i>Cornus paniculata</i>	Panicle dogwood
<i>Cypripedium candidum</i>	Small white lady's slipper
<i>Cypripedium parviflorum</i>	Small yellow lady's slipper
<i>Cypripedium pubescens</i>	Yellow lady's slipper
<i>Dodecatheon Meadia</i>	Shooting-star
<i>Erythronium albidum</i>	White dog's tooth violet
<i>Erythronium americanum</i>	Yellow dog's tooth violet
<i>Euonymus atropurpurea</i>	Strawberry bush
<i>Filices</i> , all species.....	Ferns
<i>Gentiana</i> , all species.....	Gentians
<i>Hepatica acutiloba</i>	Sharp-lobed liver-leaf
<i>Hepatica triloba</i>	Round-lobed liver-leaf
<i>Ilex decidua</i>	Winterberry
<i>Iris hexagona</i>	Southern blue flag
<i>Iris versicolor</i>	Large blue flag
<i>Lilium canadense</i>	Wild yellow lily
<i>Lilium philadelphicum</i>	Wood lily
<i>Lilium superbum</i>	Turk's-cap lily
<i>Lobelia cardinalis</i>	Cardinal flower

Figure 16. List of rare plants not to be removed from their natural habitat. Collecting Native Plants For the Garden," *Missouri Botanical Garden Bulletin* 8 no. 3 (March 1920): 34-35.

CONCLUSION

“Botanic gardens are an ancient institution, which, like every creation of man, have evolved through the years adapting to the demands made upon them by each culture and by each generation.”

Carmel Artiles Bolanos

President, Cabildo Insular de Gran Canaria

Modern botanical gardens are unique because they are places of importance to scientists and conservationists, but are also accessible to and enjoyed by the general public. The majority of the recorded histories of gardens, from the first ancient subsistence gardens to today's modern botanical gardens, describe the role these spaces played in society during one particular time. The research that has been done describing the evolution of garden spaces over time has not bridged the gap between the unique usage of modern botanical gardens, to ancient and historical uses. In looking at the broader history of gardens within this thesis, a clear connection emerges between historical uses of gardens and the factors that led scientists and the public to come together in garden spaces today with the common agenda of promoting conservation.

The very first gardens were important to the survival of ancient societies. Their reliance on them for meeting basic needs and providing subsistence eventually made gardens places and symbols of religious significance. Over time, as large communities were established in confined areas and ancient empires developed, rulers took control of gardens as a means of controlling the food supply. This power and access created prestige and wealth, but also

changed the role of some garden spaces, reserving them for the privileged few. The deep connection between ancient societies and gardens illustrates the first example of gardens playing an important role in the survival of individuals, communities and even governments. This same purpose is reflected in gardens today, which are highly valued as places to discover ways to protect the natural environment and educate large groups of people about plants, food and conservation.

With the introduction of scientific interests in gardens during the Western Renaissance and Enlightenment periods, gardens became places of research and discovery. As research continued and the role of Naturalists emerged, scientific thinking within the garden setting led to the official classification of the first botanical gardens. This dedicated focus on plant science legitimized gardens, prompting universities to start their own gardens and governments to begin funding scientific research. As colonialism introduced new species of plants and later, when America sought economic freedom through cash crops, leaders in government were heavily invested in funding research within gardens in the areas of agriculture and cultivation methods. The shift during which gardens and botanical science were unified was important because it was the first time scientists saw the value that gardens offered, a realization that re-emerged in the 1950s and helped lead to the modern gardens.

Another important phase in garden history was the shift of gardens from places funded by state or educational bodies, accessible to a limited few, to public gardens open to all. A major driver of this shift was the migration of

government funding and university research towards new areas of testing and study deemed more useful for agricultural science. At the same time, there was a demand by the public for open space and interest by many city governments to create gardens open to anyone. As garden directors and boards saw an opportunity to continue to fund some garden research by creating enhanced garden experiences desirable to the public, botanical gardens made the transition to being primarily public places in the first half of the 20th century.

Finally, in the 1950s, at the onset of the environmental movement, scientists once again renewed their role in the gardens, only this time with a focus on scientific conservation. Because members of the public had already become active participants within botanical gardens, scientists and garden directors capitalized on a unique opportunity to help make gardens relevant to all people, while also accomplishing important research in conservation. Through the gardens scientists and botanists have been able to amplify their own efforts by teaching the public about the necessity of sustainability and the survival of plants to human kind. Modern gardens are unique spaces because for the first time scientists are not simply conducting research for government advancement, but are asking the public to take up the initiative to preserve plants for their own future, the future of the natural world and the survival of human beings.

This study has demonstrated how botanical gardens and the space of the gardens have evolved and how these unique institutions adapted to societal changes in order to stay open and operating in the 20th century. Despite popular belief that gardens are staged venues of beautiful plants, they have been

purposefully constructed and formed by historical, financial and political factors since the very first ancient gardens. As a result, today's gardens are differentiated spaces utilized by the public and scientific audiences for enjoyment, discovery, preservation and education.

APPENDIX A: BOTANICAL GARDEN DIRECTOR INTERVIEWS

Cover Letter

3 January 2010

Office of the Director
Institution
Address
City, State, Zip

Dear Director,

My name is Terra Colburn. I am a graduate student in the History Department at Cal Poly, San Luis Obispo. My thesis project is focused on the history of public gardens in general and specifically about the direction gardens are headed in today. I would like to include information about your garden, and hope to gather accurate and compressive data by conducting an interview with you through email, phone or in a face-to-face meeting. I have attached the interview questions so that you may reply to me by email. If you would prefer to conduct a brief interview by phone or in person please reply to me with a time when it would be convenient for me to contact you. Thank you for your time and consideration in supporting my thesis and my goal to provide an accurate and up to date account of where public gardens are headed.

Thank you for your time.

Terra Colburn

Interview Questionnaire

1. How long have you been the director of your botanical garden?
2. How do you think this botanical garden has changed over the time in which you have been involved with it?
3. What is the purpose of your botanical garden?
4. How does this botanical garden organize its space?
5. Do you collaborate or associate with any other botanical gardens? If so, how, explain, in funding, plant collection, etc.
6. What are some of the outreach programs your garden provides, describe their purpose.
7. What direction would you like to see this botanical garden take in the future?
8. How is this botanical garden viewed by the public, in your community or beyond?
9. What types of people generally visit your botanical garden?
10. Does your botanical garden have any role to play in environmental protection?
11. Why are you involved with your botanical garden? What do you like about it?
12. Is there anything else you would like to add?

**Interview: William McNamara
Quarryhill Botanical Garden
12841 Sonoma Hwy
Glen Ellen, CA 95442**

**Date: 1/8/10
Phone interview by author**

1. How long have you been the director of your botanical garden?

I was made Director in 1994. In 2007 I was made Executive Director. When I was made director the founder was still alive, she died in 2000 and they decided my title should be changed to Executive.

2. How do you think this botanical garden has changed over the time in which you have been involved with it?

I've been involved since the beginning in 1987 since then we have had dramatic change. It started out very exclusive, you were allowed in by appointment only. The founder did not encourage general public to come, horticulturalists and botanists were allowed in. In 1991 the Garden became a nonprofit. She funded the whole garden by herself, when she died she left an endowment, but it wasn't enough. We started newsletters, lectures, the first 13 years of the Garden was completely different from the last 10. In 2007 we had the 20th Anniversary in late May, now we call it our spring celebration. All the things we do now they weren't being done under the founder. After her death is when all the changes happened.

3. What is the purpose of your botanical garden?

Mission Statement-to advance the conservation study of Asia. The Garden is purely a collection from Asia, primarily East Asia; also seed that has been collected in the wild. Since 1997 we have gone on annual expeditions to Asia to collect seed.

4. How does this botanical garden organize its space?

In the very beginning certain areas represent certain parts of Asia, there were only 21 acres, today it's different. We have enough acreage to have microclimates so we plant wherever. We have different gardens that represent Asian plants; Sino-Japanese Flora, Japan, Korea, Eastern China; Himalaya and Western China, these two floras merge in Central China, and Quarryhill is a merging of those two.

5. Do you collaborate or associate with any other botanical gardens? If so, how, explain, in funding, plant collection, etc.

We have a long history with several gardens. We partner with Northern England, Howick Hall Gardens to go on expeditions. Their director has gone on expeditions with us. Kew gardens and representatives have been on several expeditions. Morris Arboretums, Eastern Hills, Royal Botanical Gardens at Attenborough; University of British Columbia Botanical Garden, Vancouver, UC Berkeley and Strybing Arboretum and Botanical Gardens in the city of San Francisco. We exchange plant materials with Strybing Arboretum and Berkeley. We never worked in the field with them, but from Berkeley we take a lot of their plant material. We provide lots of plant material to researchers because they are documented and from the wild.

6. What are some of the outreach programs your gardens provides, describe their purposes.

We have an education program for 4th and 5th graders. It is important and valuable. We use gardens as outdoor science resources. If you come in the spring and fall you can go on field trips; go through with trained volunteers and learn about biology, conservation and plants in our lives. We have a Spring Celebration which 300 people attend, a quarterly newsletter and we give garden tours in the fall. We also find nice gardens nearby and we arrange tours to go to private gardens in the area.

7. What direction would you like to see this botanical garden take in the future?

I hope the garden will become more involved in conservation and get the message out about the importance of plants. We are experiencing a mass extinction of plants and animals since the dinosaurs, and usually only the animals are talked about. We don't think we can save plants in botanical gardens, but we can bring people in and show people the importance of plants. We are leaving the world with only half of the population of plants than when we were born into. The best way to preserve plants is in wild habitats. The habitats' need to be wild so plants can exist. In botanical gardens like zoos only a small number of individuals can survive. There is no practical way to introduce species going extinct back into the wild. Seed banking is much more viable, we collect hundreds of seeds, and then store the seed. We store enough seed to produce, but there is not enough genetic diversity in a few plants at botanical gardens. But, botanical gardens do play a huge role in education. Botanical gardens can show how we treat our wild areas, the few we have left.

8. How is this botanical garden viewed by the public, in your community or beyond?

For years we have been better known internationally, rather than locally. Horticulturalists and botanists found out about us. We are working with some key people at our Botanical Garden. It was not known by the local community for a long time, the founder kept it quite. The local image of the Garden is known as being a beautiful magical place, planted like a wild mountainside in China. There are no roses, but it is a magical place to come and walk, peaceful and serene.

9. What types of people generally visit your botanical garden?

Three types. One, horticulturalists and botanists; there is no opportunity to see several of the plants species anywhere else. The second group is garden clubs who are group of ladies interested in plants the frequent the garden by seeing what gardens have and socializing. And third, is the local community who go for long walks in a beautiful place.

10. Does your botanical garden have any role to play in environmental protection?

We are working with several groups in China to protect plants in China. There is a maple; there are less than 200 in China. We grow it. We are planting it so we can produce seed, in a seed bank. We have 300 trees. If we can get trees to produce seed; it is viable to produce and return to China for repatriation. It is found in Tibet; we are very involved with certain species.

11. Why are you involved with your botanical garden? What do you like about it?

I like plants. I like being outdoors. I am lucky because I travel to Asia and I go a couple times a year. The people that work in botanical garden are really nice people and I like being around them. It is important to make people aware of conservation. This job gives me the opportunity to make people aware.

12. Is there anything else you would like to add?

I would like to see more awareness to our natural world and what is happening. Usually awareness is about charismatic mega fauna. People identify with large animals not with plants. This needs to be talked about. The population is too large, with this size the habitats are being destroyed everywhere. When I was born in 1950 there were three billion people since 1950 it has doubled. Now the population is doubling in less amount of time, it is not sustainable. Your generation is going to have to fix it. There isn't enough stuff on this planet. The projection is 9 billion people, and everyone wants to live like Americans, it is a precarious situation that we are entering.

**Interview: Julian Duval, President/CEO
San Diego Botanic Garden, formerly Quail Botanic Gardens
230 Quail Gardens Drive, Encinitas, CA 92024**

**Date: 1/6/2010
Phone interview by author**

1. How long have you been the director of your botanical garden?

15 years

2. How do you think this botanical garden has changed over the time in which you have been involved with it?

Biggest change, to become more of a visitor center. What this means, during the time that I have been there, a year and a half after I started, we became self-supported. The garden was under the county when it began; it was first called Quail Park. North San Diego used to support a prominent horticulture industry, a series of transitions took place over time; the county wanted it to be a botanical garden, not simply a park. Government when they support things when the economy goes down parks and culture isn't as important. In the 1980's the garden was impacted. Orange County was bankrupt, and the San Diego County support for the botanical garden went down. Privatization of the garden happened suddenly; and the nest egg happened to be dwindling. The garden had strong assets; east of the I5, an ocean view, 10 minutes off of the 5, signs off the 5. Good marketing took place and it was cared for very well. The community maybe didn't have much confidence, so a goal was set. We thought it smart to make money by improving visitor experience. These visitors would become members, donors, etc. Gradually we made it better; the cost of admission was \$2 and now \$12; generate income by increasing admissions. Price, still elasticity- value for admissions; it allows for a series of upgrades. In June significant 4 .5 acres will be made into the Hamilton Children's garden, costing 4.5 million dollars. We rent the land from the city, we have a lot of community support and the best concept for attracting visitor and donor support is families with children. This is a somewhat new phenomenon; lots of institutions take to this. The garden is a place kids can be outdoors and related to nature.

3. What is the purpose of your botanical garden?

Mission Statement. To inspire people of all ages; to connect people to part of nature; and to get this idea across to the general public. There are a lot of outcomes; we want people to become better stewards. There is a growing body of knowledge about the human impact on the environment. If we don't address this over time we will be in a whole heap of problems. The goal of our mission and purpose is to show young people growing up what they are going to find, the problems with living in (the environment) the way we do and our impact on the environment. We want them to find a love, especially children for the environment.

4. How does this botanical garden organize its space?

There are 26 individual places in the garden. We attempt to organize in phytogeographically, showing how plants are organized around the world. The majority of the area represented has a Mediterranean climate zone. This had a lot to do with how the collection was organized. But we also have themed gardens. One of the original gardens started by the American Bamboo Society- began in the early 1980's, now the group is national. The Southern California Chapter references collection in the San Diego Botanical Garden because it has the most diverse collection of Bamboo. We have a subtropic fruit garden; we want to show people the range of things that can be grown in this climate. Now we show where the food comes from, people aren't exposed to where their food comes from, this affects children, and we want to show that food is not from the supermarket. Fire safety is big in Southern California; we landscape to show water conservation organization and encourage people to landscape in this way; to make space more defensible from fires that come through. Water conservation is shown in a number of different gardens, 17 different places give examples of landscapes and their water requirements. We also have a walled gardens used for functions that we host here, like weddings and a lawn for larger functions.

5. Do you collaborate or associate with any other botanical gardens? If so, how, explain, in funding, plant collection, etc.

We share plant material with other botanical gardens, share from wild Animal Park and San Diego Zoo. We attend national conferences and hosted regional conferences. South of the border we do collaborate and are in pretty good connection with gardens and people in Mexico. We have a 1.6 million annual budget; we focus on getting people in the door; would like to see more.

The economic downturn is not a great significance here, we don't have a sizable endowment, like larger establishments, income is generated off of the endowment. We are a medium size garden. Those institutions have taken hits; large endowments have been hit; we lucked out and had money raised before our expansion and before the stock market crashed. The September before the last, still wet behind the ears.

6. What are some of the outreach programs your garden provides, describe their purpose.

More for promotional activities, we will try to get a booth at events. Most is inward. Lot of programs onsite are entertainment based. An example is the "Garden of Light", we invite people at night, have entertainment and food; they can enjoy the garden in a different environment. Children's gardens are focused on preschool kids, nature, and crafts, to help them understand the wonder and beauty of nature. If you watch children it can renew your faith in humanity; there is opportunity outdoors.

7. What direction would you like to see this botanical garden take in the future?

More of the same, pursue our mission, help people be inspired and connect to plants, this grows importance more and more as time goes on. What we hope to build through this connection is the awareness that we need to become better stewards (of the environment). The ideas and trends in my lifetime have changed. I am 62 years old, it was punishment to send a kid to their room, now it is almost a reward. The book, "Last Child in the Woods" by Richard Louv, a popular read, shows what is going on today, kids are staying in doors more. If we do more things like what we are doing we are going to help. As the world urbanizes more, it is actually good for our business, sad though (for the environment). As the area becomes more urban, people find solace in nature, especially if exposed to it as children. Exposure to nature is good for you; studies show it is good for your physiological health. I think it is a good business to be in.

8. How is this botanical garden viewed by the public, in your community or beyond?

Viewed as a public resource, asset to community, tourist region is Southern California. We are in the neighborhood of the San Diego Zoo and Lego Land we are often perceived as that. There are a lot of businesses in Encinitas and we are just a stop off the freeway. People perceive that we are mindful of sustainability. We use recyclable water; walk the talk. Part of the image we want to show the public is to become a resource to other businesses and to the public.

9. What types of people generally visit your botanical garden?

We have been doing a survey that studies the visitor population. Six to seven years ago 30-40% were outside of California tourists; a huge number are from Orange County and Los Angeles. The gardens are highly desirable for people of other countries; in Canada gardens are valued more than here. However the majority are still local visitors that come for different events, 220 thousand for this year's attendance. The majority (of visitors) are from this San Diego region.

10. Does your botanical garden have any role to play in environmental protection?

We are walking the talk. We are writing resources for plant material and landscapes, we need to do more to interpret them. Lots of people like the way they look, not knowing the benefits. Lot of our classes relate to the welfare of the environment; respect for the environment.

11. Why are you involved with your botanical garden? What do you like about it?

I am a nature nut, I've always worked in zoos, and it is an opportunity to express my personal like. I work in the places where the public wants to see, its like sharing.

12. Is there anything else you would like to add? No comment.

**Interview: Paul Licht, Director
University of California Botanical Garden at Berkeley
200 Centennial Drive, Berkeley CA 94720-5045**

**Date: 1/12/10
Email response**

1. How long have you been the director of your botanical garden?

6.5 years

2. How do you think this botanical garden has changed over the time in which you have been involved with it?

It has become much more public-friendly through extensive infrastructure projects, such as a new entrance and exhibits, and the introduction of extensive interpretative signage. We have also reached out more with the electronic media.

3. What is the purpose of your botanical garden?

Our purpose is summed up in our mission statement

(http://botanicalgarden.berkeley.edu/about_us/about_us.shtml). The main purpose is to maintain a scientific plant collection; we are officially a museum of the UC.

4. How does this botanical garden organize its space?

I'm not sure what you mean. We have 34 acres and about 28 are cultivated besides the buildings. We were among the first gardens to organize the collection geographically. There are 9 sections including some special collections like a garden of old roses and herb gardens.

5. Do you collaborate or associate with any other botanical gardens? If so, how, explain, in funding, plant collection, etc.

We collaborate extensively through sharing of plants and techniques. In the greater bay area, an informal organization (BAGNET: Bay Area Garden Network) brings about 3 dozen gardens together. We also belong to the national American Public Garden Association (APGA).

6. What are some of the outreach programs your garden provides, describe their purpose.

We have the second largest outreach program on campus, including extensive teacher training, working with school gardens and bring children to the Garden.

7. What direction would you like to see this botanical garden take in the future?

Increased use for research as well as public education.

8. How is this botanical garden viewed by the public, in your community or beyond?

I believe we are respected and becoming recognized for what we are: one of the most diverse plant collections in the country.

9. What types of people generally visit your botanical garden?

Mostly adults (adults outnumber seniors about 5:1), but we have a large number of students ranging from K-12 to college, including Berkeley and other local colleges.

10. Does your botanical garden have any role to play in environmental protection?

We are heavily involved in conservation efforts through organized seed collection (e.g., under the auspices of the Millennium seed bank and Center for Plant Conservation). We are also a species rescue center for confiscated, illegally imported plants.

11. Why are you involved with your botanical garden? What do you like about it?

I'm involved because I was invited to be an administrator but I love every aspect of it. I am a zoologist by background (not a botanist) but am an avid gardener.

12. Is there anything else you would like to add?

No comment.

**Interview: Carmia Feldman, Assistant Director
UC Davis Arboretum
One Shields Ave
Davis, CA 95616**

**Date: 1/22/10
Phone interview by author**

1. How long have you been the associate director of your botanical garden?

I started in 2006. We do have a director. Previously I was the education director starting in 2001 as a graduate student. I have a Masters in Plant Ecology, and PhD in science education and an undergraduate in Biology from Berkeley. Kathleen Socolofsky has been director since 1998 previous to that she for 13 years the Education director at Phoenix Botanical garden. She has a degree in educational leadership and a teacher before.

2. How do you think this botanical garden has changed over the time in which you have been involved with it?

A great deal. The garden started in 1937 by faculty who planted their collection around the north fork of Putah creek. UC Davis Arboretum water way, used to be Putah Creek-indigenous work, live creek in 1800's damned creek because it flooded town, but part of storm water of campus, professors plant research collections there. History-garden had very limited budget, usually part time faculty directory, 1971 the Arboretum completely out of UC Davis, community rose up and became "Friends" of the Garden, raised plants, plant sales to buy hoses, then after a year Davis reinstated garden into the budget. In 1990's more funding was added to raise visibility, the campus grew up around the garden. The funding was noticed by the university and hired the first full time directory in 1998. This showed a commitment from the campus of the growth of the arboretum. Her, Kathleen created organizational change and strategic planning for arboretum 2001-2002, The Peter Drukker Foundation campaign. A business management that then took theories and strategies to a non-profit. This plan has a self-assessment process that an organization can go through. We hired an independent person to do assessment; go out to customers and figure out who customers are and talk to them about what the organization should be doing. In depth interviews with community members, business leaders took place over 4, 000 people total. All the different stakeholders in the garden were interviewed and we start getting a direction of where the organization should go. We asked, how well do you think we are doing and we received a summary of them. From these interviews and the Peter Drukker campaign process we came out of this with a vision, mission and a ten-year plan. Ex-An example is we asked in the interview if the garden was well designed, a very important aspect of the garden, 95% said it was important and, only 65% said we were doing a good job. In 2002 we started the 10-year plan. The Arboretum is a long and thin garden following the old creek bed. It includes all banks along the water way and in the bare areas we planted and made beautiful. Our ten-year plan looks at visible ways: beauty, how important is it to have signage and exhibits. We worked hard on plant labels. The garden is interpretive and ungated, so people vandalized. So now we substantially invested in these things from all our continuants, so many things changed, it is open seven days a week.

3. What is the purpose of your botanical garden?

We really align with the mission of UC Davis-Teaching Research and Public Outreach. Our own mission of beauty and value of plants. Come to UC Davis and learn about the Top-notch work that is going on here. Drukker process shows that it is hard to come to the campus and know what is going on, you don't get to interact with people, so the arboretum is to be link, be welcoming to visitors and help translate what is going on at UC Davis in the Arboretum. The ten-year plan turned into gateways project, concept guides such as Gardens arts and Environment-Transforming in Physical and Programmatic gateway. We work with lot of academic departments. We touch on many academic units: arts, sciences and health. They work in these areas, physical spaces have students come out, programs come and meet visitors and have interaction in the garden. Take academic learning to the garden to interact with public and create life long learning for the public.

4. How does this botanical garden organize its space?

It has an unusual shape. It is in the middle of campus and is long. It really has become an asset. You can go to the website and plan your visit. The collections are taxonomic collections: Oaks-Western oaks, Redwood grove, Conifer, and others that are geographic, South American, Southwest U.S., Australian and New Zealand. We also have demonstration gardens, home gardener exhibits, a terrace garden, store garden, value wise garden (most drought tolerant garden) also a home demonstration garden.

5. Do you collaborate or associate with any other botanical gardens? If so, how, explain, in funding, plant collection, etc.

Lots of collaboration, the oak grove is active in American Public Garden Association. The garden is part of first national plant collection as part of the NAPCC North American Plant Collection Consortium program of APGA. Our assistant director is the first director of that national oak collection. She leads projects for the whole group, 13-15 gardens. Also our director is part of APGA. The APGA gave us a National Leadership project, we are leading gardens to use GIS to help track collection facilities, anything conservation issues anything you might want to track and use for planning, our group is developing a Data model, to get data from Zoos and Botanical Gardens so directors can use it for conservation, management, all different levels. We've gotten major federal funding so Missouri Botanical Garden, Harvard, San Diego Zoo and the Wild Animal Park are a part. We are partnered with EZR-organization that developed GIS software. They donated and offered copies and training to every botanical garden in the country. We are working out how to get this information to all other gardens. APGA partnered with EZR to get this out to botanical gardens. We got a grant to spend time for those who are less familiar with GIS, an open source so it is a donation of software and Mary Birk, Bryan Morgan are our GIS counterparts, so it is free to all botanical gardens. Often had smaller projects.

6. What are some of the outreach programs your garden provides, describe their purpose. Docent Program-free weekend tours, garden fee based, school tours-fee based. Going on over 30 years so docent naturalist school program formed. Plant sales is major outreach 5-6 public outreach all about regional appropriate, sustainable-get most word out in least time, Central Valley Plants-sell, Specialize in plants grow well here, Arboretum All-stars, a list of 100 top recommended plants for us and California-California Center for Urban Horticulture-Academic Center and Urban Horticulture-have partnership with several retail nursery's get tons of information on website.

7. What direction would you like to see this botanical garden take in the future?

We are on this gateway track-Portal for Davis, We have 1 ½ garden Native American Contemplative Garden-with Native American Studies Department-Recognized local Patwin tribe that still live here and in the past. The Native 2nd garden is associated with the Earth and Physical Science Department so geography garden-thought about the landscape of the building, to face the Arboretum rather than in the back. Have a garden on the east side of the building that we helped develop. We worked with and architect to plant gardens, a phase 1 garden. Worked with faculty from landscape architecture to develop a future geology garden. We work with geology professors to build true gateway gardens and showcase themes of geology. Themes faculty thinks most important to public and students to use, geologic principles, go back in time, what were most important themes. The designer-we have to fundraise for that. Work on that, build our bases for the public. Geology department has given us some money, we collaborate with them to do funding, and it's a joint effort. Gateways-academic plus Arboretum.

8. How is this botanical garden viewed by the public, in you community or beyond?

The garden is greatly loved in the community came out in the Drukker process. Davis is a small community not that many things to do here, so it was voted the "Best" of the County, a favorite place to take a date. We have lots of out of town visitors who have stories of the Arboretum, got married in the Arboretum, studies in the Arboretum, a well loved resource. Beyond the community, the garden is well respected in the botanical garden world. We have an amazing staff. Before Kathleen we were limited, the same people are still here, the same staff, well known members in the community Ron Roberts a Nomenclature expert. We were cited as one of the top

ten botanical gardens in the country with the Chicago and Missouri gardens. Especially for a University garden we have lots of visionary work doing with Gateway Project, more people find out, word of mouth and representative of UC Davis. The Environmental Sciences are good for garden.

10. What types of people generally visit your botanical garden?

Campus community, faculty, staff, lunch time walks, study students, recreation, jogging, play music, parents visit children, baby strollers, walk their dogs 3.5 mile loop, lot of out of town visitors. Get away from stress of everyday life, flowers. 100acres.

11. Does your botanical garden have any role to play in environmental protection?

Yes. There is a big emphasis on sustainable horticulture. Help people use less water, fewer resources, and fewer pesticides, plant fewer lawns. We talk about run off from gardens. The waterways are damned so we may have to take them out, we have the problem that a lot of ponds have, so working with faculty on how to clean up ponds, tie into environmental protection. Provide habitat for animals, wildlife management plan, plant for how managing wildlife, and enhancing arboretum for wildlife. With GIS project to help with conservation work. Sell plants.

12. Why are you involved with your botanical garden? What do you like about it?

I've always enjoyed informal gardens and have been drawn to museums, botanical gardens give direct exposure to those experiences. Worked at UC Berkeley to develop and teach programs and to become an Educational director at a botanical garden. I am fulfilling the goal of teaching other people of botanical gardens, California natural history and habitats. Also it helps people want to conserve natural areas. As an Assistant Director I help move and change organization, more efficiently, and the actual projects are exciting. The director has great vision and a strategic planer, helping to make vision a reality.

13. Is there anything else you would like to add?

Management Plan on Website=Plant your visit-Wildlife link and Enhancement Plant. The last 5 years a huge number of herons nest in the oak grove and started damaging trees. To manage herons, damaging the oak grove we scientifically studies the oak grove and now manage the colonies and they moved on and didn't nest in them this year. Lot of other parks contacted us; it is a common problem in gardens.

**Interview: Edward L. Schneider, Ph.D. President/CEO
The Santa Barbara Botanic Garden
1212 Mission Canyon Road, Santa Barbara, CA 93105**

**Date: 2/11/10
Email response**

1. How long have you been the director of your botanical garden?

I have had the privilege of serving as the Garden Director since 1992. Prior to my current position, I earned a Ph.D. in Botany at UC Santa Barbara and served as a faculty member and administrator in higher education for 18 years.

2. How do you think this botanical garden has changed over the time in which you have been involved with it?

The core mission (display, education, research) areas have remained the same as they have over the past 84 years since the founding of the Garden. Each of the core areas has been strengthened. A number of FTE and accreditation standards have been implemented. Plant Conservation programs, including seed banks and affiliation with the national Center for Plant Conservation have been added. Also, several new displays/exhibits have been added to the grounds, Fiber Arts display, the Children's Discovery Garden, a native orchid display, a conservation garden, a historic Japanese Tea House, to name a few. A number of earned income operations at the Garden have grown including membership, admissions, development, grant writing, marketing, renovation and enhancement to the gift shop and retail nursery have taken place. The Garden has also expanded from 65 acres to the 160+ acres today.

3. What is the purpose of your botanical garden?

As noted above the Garden was founded in 1926 with a mission to display the California vegetation in a manner consistent with California plant communities. Therefore, the Garden has a California desert display, oak-woodland display, chaparral display, island display, redwood display, a wildflower meadow, and a beautiful riparian corridor with Mission Creek.

4. How does this botanical garden organize its space?

The ground displays are arranged as noted above to reflect the plant communities represented in the California flora. Five and one-half miles of trails are available for visitor exploration. In 2003 the Garden signed a landmark agreement with the County of Santa Barbara to keep 23 acres of the Garden dedicated in perpetuity to its historic vision.

5. Do you collaborate or associate with any other botanical gardens? If so, how, explain, in funding, plant collection, etc.

The Garden is an institutional member of both APGA (American Public Garden Association) and AAM (American Association of Museums). Garden staff frequently attends the annual meeting/conference of these organizations and make presentations of their activities. Regular interactions among staff and their peers at other gardens across the USA are frequent in all areas of finance, development, marketing, horticulture, education, conservation, and research.

6. What are some of the outreach programs your garden provides, describe their purpose.

Outreach programs include:

1. A Master Gardener program, jointly sponsored by SBBG (Santa Barbara Botanic Garden) and UCCE (University of California Cooperative Extension). Master Gardeners conduct many community-based projects.
2. Education outreach. Our staff and volunteers take programs to the local schools.
3. Our researchers (several with Ph.D.'s) conduct endangered species monitoring, phenology and life cycle studies throughout the Central Coast and especially on the Channel Islands.

7. What direction would you like to see this botanical garden take in the future?

The Santa Barbara Botanic Garden will always adhere to its historic mission and landmark

agreement. We will strengthen our displays, extend our reach to the community, grow customer service, and continue professional development opportunities for our staff and volunteers. A major commitment is being made to replace aging facilities with modern facilities so our staff and volunteers have improved work space and our irreplaceable collections (herbarium, library, etc) can meet the environmental controls required of accredited museums.

8. How is this botanical garden viewed by the public, in your community and beyond?

The Garden is valued as a local, state, national, and international treasure based on surveys conducted of the 110,000 visitors per year and its 2,500 members. The Santa Barbara Botanic Garden is a member of the Directors of Large Garden Group. This means the Garden is recognized by our garden peers as one of the top gardens in the nation. Our reputation is based on aesthetic displays of California flora, inspired education, and quality research and conservations based on peer reviewed publications and grant funding.

9. What types of people generally visit your botanical garden?

A diverse, international visitor base frequents the Garden. Japanese and German (European) visitor probably dominate. The typical visit is a 50+ year-old female, but in recent years a growing number of families are frequent visitors. Probably related to the installation of the Children's Discovery Garden.

10. Does your botanical garden have any role to play in environmental protection?

We have very active programs in sustainability and plant conservation, the latter associated with the Center for Plant Conservation. Also, we are the largest landowner in Mission Canyon, preserving more open space than others.

11. Why are you involved with your botanical garden? What do you like about it?

Because the founding of the Garden was based on science and education, a mission that continues today, it was natural for me, as a botanist, to work in this environment. There are several active Ph.D. scientists who work at the Garden and the Garden provides research space, facilities, and equipment that make for a nice and fun place to work.

12. Is there anything else you would like to add?

Thanks for including the Santa Barbara Botanic Garden. Please read the article that I referenced in an earlier email.

Garden for all Time. The Santa Barbara Botanic Garden (1926-2005). 2005. Noticias. Vol. 50(4)/51(1): 1- 58.

**Interview: Brett Hall-Assistant Director,
Horticulture and Living Collections
The Arboretum at the University of California Santa Cruz
1156 High Street, University of California, Santa Cruz, CA 95064**

**Date: 2/26/10
Phone interview by author**

1. How long have you been the director of your botanical garden?

I am not the director. I am 34 years old and the manager in charge of collection. We have had a functional directorship and had to lay off the executive director; won't give me the title; had money yanked out so we had to survive. The administration laid off a few of the administration. Effectively I am the director facilities manager, on the management leadership team.

2. How do you think this botanical garden has changed over the time in which you have been involved with it?

I started when we didn't have any of the geographic gardens, 1975. I've seen it completely change and grow, started with topographic land, geographic substrates, geographic based gardens, California, South African and specific gardens. We have the largest collection of Australian and New Zealand plants outside of these countries along with Central Western and Northern California native plant exhibits. (Our) funding is not good and always has been a grass roots organization relying on grant writing, proposals and fund raisers. (We) don't get a lot of state funding; have friends (providing donations). This hugely affects our approach, we have to be resourceful, but have huge freedoms because we don't get any particular funding from any particular department; so get to build gardens how we want.

3. What is the purpose of your botanical garden?

There are different kinds of purposes; conservation orientation, well documented research collections of native collections that display floras from around the Pacific. (The) South African and Australian gardens give people opportunities to see appropriate plants for California landscaping based on similar climates; for outreach and research to teach people of all ages plant biology etc.

4. How does this botanical garden organize its space?

It's a large geographic garden: Australian=10 acres, Eucalyptus=10 acres, New Zealand=8-10 acres, South Africa=10 acres, Entrance California=1 acre and developing a 55 acre California Province garden built around different ecosystem, lots of horticulture built into it; well documented maritime chaparral. From Santa Barbara to Sonoma will be represented by county, including Santa Cruz and San Luis Obispo. Seven acres are dedicated to Laurasia, supercontinent including; north temperate coast, South East Asia, South Eastern United States, north temperate zone, Mexico, and warm temperate conifers from the southern hemisphere. The Chilean garden is five to six acres. Some success varies with drainage and soil type, have marine deposit with sandy loam; slightly acidic so can grow plants with success.

5. Do you collaborate or associate with any other botanical gardens? If so, how, explain, in funding, plant collection, etc.

We share collections, don't have as much mutual funding in California; there is no UC wide plan overseeing different things. Private gardens each are independent, don't collaborate with the San Luis Obispo Botanical Garden, but we do with the people. We are known for important connection of conifers in world on an international level, DNA research from back in the 70's. When working on plant genome, plant Amborella in 1975 this species angiosperm evolutionary to phylogeny. All plants have to relate to it in some way or another, it is a branch when anyone does a phylogeny the reference point for the Amborella came from the Santa Cruz Garden; data base of phylogeny; ancient flowering plant on earth only garden in world, so we became well known, distributed to researchers all over the world. Traveled a lot, built collections, former director, laid off in October. Botanical conservation program in Vietnam-still may be able to collaborate with Dan Harder.

6. What are some of the outreach programs your garden provides, describe their purpose.

We have an ongoing lecture series; public or symposia, colloquia. We are open 7 days a week 360 days a year. We do work with school children, local community colleges, outreach interpretive projects, horticulture, and rare plant communities. We have native plant society work close with us; have interns, UCSC students; volunteer class to train people to work in the arboretum, and a bulletin.

7. What direction would you like to see this botanical garden take in the future?

We want to expand our collections, build on directions already set; we have enough cornerstone and frame work. We especially want to work on native plant program, not just through collecting, but documenting, local introductions, enhance native regional plants, restoration, for plant landscaping and introduction. Continue to safeguard rare collections-conifers, and rare plants.

8. How is this botanical garden viewed by the public, in your community or beyond?

We are viewed as adventurous in terms of collections, a source for getting interesting plants; see only if travel to other lands. A wonderful place to visit, interesting wildlife and birds.

9. What types of people generally visit your botanical garden?

All types of people, overrun by photographers, people interested in plants, families, students, botanists, horticulturalists, artists come and paint, people come for a walk.

10. Does your botanical garden have any role to play in environmental protection?

We are working with different rare plants in California; closely aligned with the Native Plant Society to promote environmental protection, habitats and ecosystems, but not an advocacy group-nonpolitical. But like a friend of mine said, "we are like the united nations of the plant world" break it down into small areas so we can provide people a good understanding of floras from around the world, encourage environmental conservation, and make people better voters.

11. Why are you involved with your botanical garden? What do you like about it?

I love working with plants, people and students; love the place, I think what we are doing is important, building collections from around the world; it is interesting and exciting. Raising money is hard; no state funding; don't pay rent, don't pay water; self-sustaining. We have a huge challenge before us to become self-sustaining. We grew with the expectation that the university would start supporting us better.

Inserted Question: How are you affiliated with University?

On the campus we are association with a broad spectrum of the faculty, under the chancellor. We are not in any particular department; in association with the arts, all the plant sciences; student work-study programs. Now we are short on money; twenty to forty students plus nonpaid student volunteers who get credit.

12. Is there anything else you would like to add?

No Comment.

APPENDIX B: NON-PUBLISHED SOURCES FROM DIRECTOR INTERVIEWS

Arboretum at UCSC Master Plan Outline

- I. Executive Summary
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 - a. Brief History
 - b. Institutional and Intellectual Origins
 - c. The Site
 - d. The Arboretum Associates
- IV. The Mission, “The Arboretum is dedicated to forwarding the understanding, appreciation, and conservation of the evolutionary diversity of plants and their environments to sustain high quality of Life on earth”
 - a. Conservation as operational theme
 - b. Impact of people on plants and environments
 - c. Empowerment and Stewardship of people to conserve plants
 - d. Highlight links between Plants, People and Quality of Life
- V. Arboretum Staff – Organizational Chart
 - a. Administrative
 - b. Horticultural
 - c. Students
 - d. Volunteers
- VI. The Collections
 - a. Collection and Acquisition Policy
 - b. Australian including the Elvenia J. Slosson Garden
 - c. California Native Plant
 - d. Edward D. Landels New Zealand
 - e. South Africa
 - f. Chilean
 - g. Special Collections
 - i. Bulbs
 - ii. Cacti and Succulent
 - iii. Conifers
 - iv. Dudleya Research
 - v. Erica
 - vi. Laurasian Forest
 - vii. Primitive Angiosperms

- viii. Protea
 - ix. Rare Fruit
 - h. The Jean and Bill Lane Library
 - i. Accession Records
 - j. Mapping
 - k. Labeling
 - l. Koala Blooms Plant Introduction Program
- VII. The Realm of Influence of the Arboretum at UCSC
 - a. Arboretum at UCSC within the UC system
 - i. Mandates of the UC of Education, Research and Public Service
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 - 2. UC Davis Arboretum,
 - 3. UC Santa Barbara Botanical Garden
 - 4. others....
 - b. The Arboretum within the UCSC
 - c. The Arboretum within the Santa Cruz community
 - d. The Arboretum within the Monterey Bay Region
 - e. The Arboretum within the Central California Coast
 - f. The Arboretum within the US
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- VIII. Educational Programs
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 - g. Patrick Elvander Taxonomy Trail
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 - i. Labeling
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 - k. Use of the Arboretum by College and University classes (UCSC and Non-UCSC)
 - l. Educational Themes
 - i. Conservation
 - ii. Origin and Evolution of Plants

- iii. Rare and endangered plants and animals
 - iv. Plants from Mediterranean Climates
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 - vi. Natural History
 - vii. Hummingbirds
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- IX. Research; on-site and in partnerships
 - a. Dudleya
 - b. Pacific Rim Floras
 - c. Collaborative Research Programs (ie. Flora of Indochina, Flora of Zambia, STEP, with Campus Natural Reserve, etc...)
 - d. Research expeditions for collections enhancement
 - e. Within the Jointly-Managed Area with the Campus Natural Reserve
 - f. Bud and Bloom project
 - g. Propagation techniques project
 - h. Arboretum-based research projects
 - i. Bird projects
 - ii. Red-legged frog/Ohlone Tiger beetle
 - iii. GIS mapping
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 - 1. California Native Plants
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 - i. Art in the Arboretum
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 - i. Greenhouses
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 - iii. New gate and sign
 - iv. Upper patio behind Hort I and II
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 - vi. New Joint Visitor's Center with Farm and Campus Natural Reserve
 - o. New Facilities development
 - i. Educational Resource Center
 - ii. Amphitheatre Sound Stage
 - iii. Outback Pavilion
 - iv. New Zealand Overlook Pavilion
 - v. Conservatory (to support the cultivation of plants requiring special conditions from within collections of interest)
 - 1. Cloud Forest Collection

- 2. Alpine Collection
 - 3. Fern Collection
 - 4. Others
 - vi. Cacti and Succulent greenhouses for surety and public visitation
 - vii. Eucalyptus Grove Sound Stage/Meeting Area
 - viii. Horticulture offices
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- XXI. Financial Plan
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 - g. Membership Drives

A Brief History of the Gardens

Between the years 1964-1999 UCSC has seen 7 different Chancellors. During the period between 1976 and 1994, while the Arboretum was under the administration of the Division of Natural Sciences, the position of Dean of Natural Sciences changed 7 times. Between 1994 and 1998 while the Arboretum was under the Vice Chancellor of Business and Administrative Services, the Vice Chancellorship turned over three times. The Arboretum is only now under its 2nd Director, Ron Enomoto. The Founding Director of the Arboretum, Dr. Ray Collett, served from 1964 through 1997, a period of 33 years. This may be the longest service as Director in any UC Botanical Garden.

1964-1974

The Arboretum was officially started in 1964 with a gift of 80 species of *Eucalyptus*. In 1967, founding Chancellor Dean E. McHenry formed an Arboretum and Plantations Committee to advance the project. With the interest and enthusiasm from Chancellor McHenry and the contributions of countless friends and supporters, founding Director Dr. Ray Collett began to expand the Arboretum collections. Between 1964 and 1971 conifers were acquired and planted, along with examples of families and taxonomic groups from around the world. In the fall of 1972, only months before the "Great Freeze of December 1972", Dr. Collett began an extensive planting of South African Proteas, which he carefully protected from freezing. For nearly two decades the Arboretum South African Protea Collection was considered among the richest and broadest in the world. The Arboretum developed strong ties with Ruth and Walter Middlemann (world renowned Protea growers), Stellenbosch University, and Kirstenbosch Botanic Garden in the Cape Province. Also in 1972, the area now across from Norrie's Giftshop was landscaped with showy and fragrant members of the mint family. To this day the mint garden has held the aroma theme and is now officially designated the Aroma Garden.

1974-1975

In 1974-1975 minor capital State funds enabled the development of the three geodesic dome greenhouses, the lath house, and the lower office. During this time, the Arboretum was the responsibility of the Chancellor's office. Its budget was comprised of 1 FTE which was split among a part-time groundskeeper and a handful of part-time UCSC students. Dr. Collett received a small stipend as Director and also maintained his full teaching load as professor in the Natural Sciences while teaching courses in several academic divisions including Art, Natural Science, and Earth Sciences. Brett Hall was hired half-time in September 1975 while working on a degree in Biology and Natural History.

From September 1974 - June 1975 Todd and Virginia Keeler-Wolf, who had recently graduated in Natural History from UCSC, traveled to the South Pacific, and with the guidance of Dr. Collett, obtained the proper permits, located, collected and shipped an extensive collection of primitive angiosperms and South Pacific conifers back to the Arboretum (Winteraceae, Amborellaceae, Austrobaileyaceae, *Dacrydium*, *Decussocarpus*, *Phyllocladus* etc.). Dr. Collett's plan was to develop a unique collection of primitive and unusual plants for teaching and research in evolutionary botany. Many questions surrounding the evolution of flowering plants were unanswered, and Dr. Collett felt that Santa Cruz should make a contribution in this area. [Note: During the summer of 1999 *Amborella trichopoda*, a New Caledonian endemic, was announced as the oldest extant flowering plant species in the world. DNA analysis has positioned it at the base

of the evolutionary tree of angiosperms and as a direct descendant of the forerunner to all angiosperms. UCSC was the only garden in the Western Hemisphere to grow it.]

Also during this time, Dr. Collett and Dick Hildreth, who was then Director of the Saratoga Horticultural Foundation, began importing plants from Rodger and Gwen Elliot of Melbourne, Australia. Since these early years, the Elliots have become increasingly renowned for their work on the cultivation of Australian plants. After shipping the first few installments through the Saratoga Horticulture Foundation, where cultivation results were poor, the Elliots began sending directly to the UCSC Arboretum (January 1976), where cultivation results proved to be highly successful.

The Arboretum transferred from the Chancellor's Office to the Division of Natural Sciences during fiscal year 1975-1976. The Arboretum budget remained at the Director's stipend, plus 1 FTE which continued to be shared among a part-time groundskeeper and work-study students.

January 1976 - December 1980

The Arboretum Associates was formed in 1976 and held its first of 25 annual fall plant sales to benefit the Arboretum. The development of the Australian collection intensified. Many student crews were involved. Dr. Collett made his first trip to Australia in February 1977. Rodger Elliot made his first trip to California in July 1977 and was impressed with the progress the UC Santa Cruz Arboretum was making with cultivating Australian species. The shipments continued to arrive with increasing frequency. The South Pacific Collection previously sent by the Keeler-Wolfs flourished. (Australia, New Zealand, New Caledonia, etc.). The Arboretum received its first Slosson Foundation Grant to establish the Elvenia J. Slosson Research Gardens for Australian plants in July 1977, and work commenced on its development. The South African Protea collection increased. The California Native Collection was initiated through cooperative work with local native plant enthusiasts and a concerted effort in field collecting. Brett Hall was promoted to Manager full-time in July 1977. The Arboretum continued under the Division of Natural Sciences. Modest adjustments were made for the one FTE change from Groundskeeper to Botanical Garden Manager. Dr. Ray Collett continued as Director with a \$ 2,400 per year stipend.

1978— Ginny Hunt was hired on soft funds as Nursery Technician. All collections increased. Additional Slosson Funds became available for the expansion of the Slosson Research Gardens. The Stanley Smith Horticultural Trust provided 3 years funding to support Stanley Smith Fellows. Tim Ledwith was the first of these and completed research on the frost tolerances of Australian plants, utilizing the Arboretum Frost Hollow.

1979— All collections increased. California native collections from Santa Cruz Island, the Central and South Coast Ranges, North Coast and Klamath Ranges were made.

1979—The Nature Conservancy and UC Natural Reserve System (NRS), through cooperative efforts with land owners, secured 5,000 acres of land located in the heart of the central Santa Lucia Mountains of Monterey County. It is now named the Landels Hill-Big Creek Reserve. The NRS, the UCSC Natural Reserves unit, and the Arboretum began collaborative work on conservation management in the reserve and development of teaching and research collections based on the reserve flora. Ed Landels, a primary land owner, was an important member of the Big Creek management team for several years. Through meetings and frequent trips to UCSC he became increasingly familiar with the Arboretum and its operations, and especially with Ray Collett. He had been a long time friend of Dean McHenry. He also had a long-standing love and fascination with New Zealand, and made regular trips there to explore and go fishing.

1980— The Arboretum received an award from the Institute of Museum Services (IMS, now IMLS) for the conservation of the endangered flora of New Caledonia. Ginny Hunt's, Nursery Tech Position was funded for one year. Ray Collett and Brett Hall traveled to New Caledonia to collect plants with field botanist Gordon McPherson of the Missouri Botanic Gardens. Collecting in New Zealand and Australia was also accomplished enroute. Lasting contacts were made with several botanic gardens and nurseries in New Zealand and Australia, and a large shipment was sent from Rodger and Gwen Elliot's nursery in Melbourne.

July 1980-June 1984.

The Growing Area and original hoop-house greenhouses were installed with student know-how and labor.

1981—Tom Saucedo was hired on as a student assistant in October.

Ed Landels made his first of many major gifts for the development of the New Zealand Garden and the NZ Garden was begun (many trees and shrubs were well along to planting size from the Keeler-Wolf South Pacific Collection). All Arboretum collections, especially Australian, South African, Californian and New Zealand increased. Ray Collett conducted hybridization in *Correa*, *Leptospermum*, and *Alyogyne*. Many choice selections among each group emerged and are still being released. Ray Collett and Brett Hall made an extensive collecting trip to Australia and New Zealand—mid October 1983 - mid January 1984.

Spring 1984—Harry O. Warren visits the annual Spring Festival to attend Ray Collett's Lecture on The South Pacific and Southern Hemisphere collections.

June 1984—the New Zealand Garden is officially named as The Edward D. Landels New Zealand Garden by the President of the University of California.

July 1984 - June 1986

Tom Saucedo was hired as part-time groundskeeper (January 1986).

Ginny Hunt leaves the Arboretum to work in Western Hill's Rare Plant Nursery following the death of Lester Hawkin's, owner/ proprietor of Western Hills Nursery with business and life partner Marshall Olbrich. Melinda Johnson began volunteering in the Arboretum. Helen Engelsberg began her studies at UCSC and joined the Arboretum student gardeners in Fall 1985. Stephen McCabe was hired as half-time Education Coordinator in March 1985.

The Arboretum received funding from Institute of Museum Sciences to develop the Entrance Native Garden. Collections and Gardens continued to grow. The Australian gardens continued to expand beyond the Slosson Research Gardens into the fields towards the eastern boundary of the Arboretum. This section of the Australian garden was dubbed, "The Banksia Field", since initially we were planting large numbers of banksias. The Arboretum remained under the Division of Natural Sciences. Frank Drake became Dean of Natural Science and increased the Arboretum FTE from 1 to 4 in January 1985, but it was short-lived, and the FTE amount dropped to 2 in July 1985. Three employees were laid off. Stephen McCabe was retained on soft funds.

July 1986-June 1989

Harry O. Warren bequeathed the South Pacific/New Zealand Endowment. Tom Saucedo was named Harry O. Warren Curator of New Zealand Plants, August 1986. Steve McCabe named Curator of Succulents. Carla Reiter, wife of the late and famous Victor Reiter, funded the start up of the succulent collection and the Succulent Garden was installed.

Rare Fruit Collection was initiated by the Monterey Chapter of the California Rare Fruit Growers. Gardens and Collections continued to grow. Horticulture I building is

completed and dedicated in June 1988. The California Native Bulb Collection surged forward. The Arboretum presented the first Harry O. Warren Symposium on Australian Plants in March 1988 with several overseas speakers and participants. Arboretum hosted Regional AABGA meeting with Pacific Rim theme in February in 1989. Tom Saucedo, Curator of the New Zealand Collection made his first trip to New Zealand in February 1989 as well. Ray Lufkin, Alameda, California resident, proposed to will his Queensland Ranch to the Arboretum and sent the Arboretum Manager, Brett Hall to the site to gather information. A report was delivered documenting the available resources on site and collaborative resources available with the DSIRO in Australia. Plans were drawn up to build a field station. Additional collecting occurred in New Zealand and a large shipment was sent back in June 1989. Sadly, Ray Lufkin died the next year in May of 1990. His will, which he referred to many times, was never seen.

The Arboretum remained under the Natural Sciences Administration which provided the Arboretum with 2.0 FTE and the Director's Stipend. Slosson Grants and IMS Grants enabled the Arboretum to hire Helen Englesberg and Melinda Johnson part-time as nursery technicians to work in the nursery and garden, respectively, spring 1989. The Arboretum presented its third Harry O. Warren Symposium on South Pacific Plants in April 1991. Approximately 50 acres in the lands along the Arboretum's northwestern boundary were reallocated for joint management between the Arboretum and the Natural Areas Reserve to develop a Central Western Plant Community Native Garden featuring plant communities primarily of San Mateo, Santa Cruz, Monterey, San Benito, and San Luis Obispo Counties.

July 1989 -June 1994

The Arboretum sponsored its first overseas horticultural/botanical tour to Australia. The first Arboretum External Review committee met in May 1990 and submitted their report in October 1991. Differences in perspectives and recommendations among the reviewers led to the submission of two separate reports. Maggie Fusari, Natural Reserve Coordinator for the Natural Areas Reserve, was appointed Administrative Coordinator in January 1993. The freeze of December 1990 created major havoc. IMS and Slosson Grants throughout this time enabled the Arboretum to maintain and expand its collections and programs. Stanely Smith support also assisted the Arboretum. Fund raising and planning for the construction of Hort II Building was intensified, and Hort II, The Jean and Bill Lane Library, and Norrie's Gift Shop were completed in early spring 1994. Tom Saucedo was reclassified to the Botanical Garden Manager series. Several important grants were awarded and collecting trips were made during this period. Brett Hall and Ray Collett made several trips to Western and Eastern Australia to collect plants with Rodger Elliot. The USDA allowed the Arboretum a permit to import members of the Citrus Family, Rutaceae, from Australia (*Correa*, *Boronia*, *Crowea*, *Flindersia*, *Zieria*, etc). Many more shipments came in from Australia. Helen Englesberg was sent to Australia on an exchange to study propagation techniques in 1992 and traveled again with Ray Collett and volunteer staff in 1993. A series of small grants were awarded for native plants including one to enhance the Native Bulb Collection. An Educational Opportunity Grant was awarded to begin development of the jointly managed area for Central Western California Plants. The Wallis Foundation made significant support to the Arboretum's Plant Introduction Program.

Major Budgetary constraints UC-wide in 1993-1994 led to the separation of the Arboretum from the Natural Sciences Division. State Funding for the Arboretum was discontinued. Maggie Fusari's duties as Administrative Coordinator were also

discontinued, but she remained with the Natural Areas Reserve System as Reserve Coordinator.

July 1994 - June 1996

The Arboretum was returned to the Chancellor's office and administered under the Vice Chancellor of Business and Administrative Services along with Physical Planning and Construction, the Fire Department, Police Department, Internal Audit, Printing Services and others. The Arboretum Manager, Brett Hall, was appointed temporary Unit Head and reported to both Director Ray Collett and to the Vice Chancellor of Business and Administrative Services. Hundreds of letters and direct appeals were made to the University on behalf of the Arboretum to the Chancellor. Chancellor's discretionary funds became available. A plan was made to phase the Arboretum off University support over 5 years, such that: for fiscal 1994-1995 the Arboretum would receive \$100,000; for fiscal '95-'96 \$80,000, until the Arboretum received its last UCSC direct support of \$20,000 in fiscal '98-'99. Business planning became a high priority, and a Business Plan was developed during late 1994 and early 1995. A quiet endowment campaign was initiated and efforts were made to initiate a major campaign. An already long association with UCSC Extension was developed into a program to accomplish public outreach education and create revenue. The rate of plant collection development slowed and the percentage of time required to maintain the collections increased. The Arboretum sponsored its second overseas botanical fund-raising tour to Australia, September 1994. Melinda Johnson made her first education, training, and collecting trip to Australia and sent back a large shipment of plants. Stephen McCabe, Helen Englesberg, and Melinda Johnson were reclassified into the Botanical Manager Series. (The Director continued to receive a \$2,400 per year stipend) Ron Arruda was hired as a student gardener in October 1994.

July 1996- December 1997

The Arboretum focused predominantly on maintaining its collections during this time. Fundraising was a priority, but was made difficult by unclear support and funding from the University. The Packard Foundation awarded the Arboretum with bridge money (\$300,000) over a three year period, to enable the Arboretum to survive, as University funding phased out. Several other donors and foundations made awards. Professor of Biology, Lynda Goff was appointed as Liaison to the Chancellor on behalf of the Arboretum. The Arboretum's second outside Advisory committee was formed and met in October 1997. Ray Collett resigned as Director of the Arboretum on December 31, 1997. Major Gifts were awarded the Arboretum to honor Dr. Collett's 33 years of creative leadership and service to the Arboretum. Rick Flores was hired as student gardener in fall 1996 and as temporary staff in 1997.

January 1998 - February 2000

Ron Enomoto was appointed interim Director of the Arboretum. An administrative support position was also added—Elain Darrah was hired in March 1999—and both positions were supported from the Chancellor's discretionary funds [although the administrative support position will soon no longer receive Chancellor's discretionary support]. The Arboretum was transferred out of the Business and Administrative Services to the Chancellor's office under the Vice Chancellor of Academic Affairs. Brett Hall traveled to Australia in early January 1998 to ensure one more shipment of Rutaceae before the special importation permit expired. Ron Arruda and Rick Flores were hired as Gardener/Horticulturists in the fall 1998. The Arboretum underwent internal reorganization and prioritization of operations during this period, and continues now to assess its direction. The Horticultural Staff have been conducting an

assessment of the Arboretum collections, horticultural operations, physical site, and educational programs. This is an ongoing strategic planning group which will continue to meet regularly. Several grant applications were submitted and three were recently awarded for the Native Plant Program from the Slosson Foundation, Stanley Smith Horticultural Trust, and the Santa Cruz Community Foundation. An application was submitted to the Institute of Museum and Library Services (IMLS) Conservation Assessment Program (CAP) to conduct a conservation assessment of the Arboretum. Major gifts have also come in during this period. Several minor capital projects are awaiting final approval and additional funding in order to be built.

The Freeze of December 1998 hurt some collections very badly. Thankfully, this winter, 1999-2000, was very mild and with ample rain, especially during February. With the emergence of spring, the Arboretum Collections are in great shape.

Carmia Feldman, Assistant Director. "Long-Range Planning at the Arboretum." Power-point presentation.

UC Davis Arboretum

- Founded in 1937
- 96 acres on the UC Davis campus
- Limited support/slow development
- Dependent on community for survival
- Increased campus support 1998

Long-Range Planning at the Arboretum

We used a highly structured process that helped us:

- Build on our strengths
- Focused staff efforts
- Transformed our thinking about our future
- Prepared us for a giant leap forward for our garden and visitors

Drucker Foundation for Nonprofit Management

- Founded by Peter F. Drucker, the father of modern management (www.pfdff.org)
- Developed a Self-Assessment Process for organizations to measure nonprofit bottom line -

Drucker Foundation Self-Assessment Tool

- Involves your staff, board, and customers in a discussion of five essential questions:
 - Who is your customer?
 - What does your customer value?
 - What is your mission?
 - What are our

Identifying our Customers

- **Customers-** those who must be satisfied in order to achieve results
- **Primary Customer-** the person whose life is changed by the work
- **Supporting Customers-** members, volunteers, donors, and others who must be satisfied in order to achieve results

First Public Meeting – The Voice of the “Customer”

- Participant Workbook
is used to guide the meeting
- Customer Groups
 - ✓ Faculty
 - ✓ Staff
 - ✓ Administrators
 - ✓ Students
 - ✓ Volunteers
 - ✓ Members
 - ✓ Donors
 - ✓ Community members

Organizational Research

- Internal Scan-
summary of history,
present status, and
performance
- Environmental Scan-
analysis of facts and
trends in the working
environment that are
likely to affect work

Customer Research

- Survey- 4,000 +
responses
- In-depth Interviews-
60+
- Focus Groups

The Voice of the Customer- What we Learned

- All customer groups

- Customers see great
potential for the
Arboretum

Performance Gap Chart

Clear Customer Expectations

- Improve the
appearance of the
Arboretum
- Strengthen its value as
a learning resource
- Enhance visitor
access and amenities
- Maintain and improve
the health of the
ecosystem

Second Public Meeting

- All-day Retreat
- Reviewed Findings Report
- Began formulation of priorities and goals for long-range plan

Ten-Year Plan: Arboretum Mission

- *To be a living museum connecting people with the beauty and value of plants.*

Ten-Year Plan: Four Mission-related Goals

- Provide an exemplary place of beauty, learning, and environmental stewardship as a UC Davis campus emblem.
- Inspire and educate visitors about the natural world and appropriate horticulture in California's Central Valley.
- Strengthen the Arboretum's museum

Ten-Year Plan: Two Resource-related Goals

- Fund capital and operating needs through extensive partnerships within and beyond the university.
- Build a high-performance staff and volunteer corps dedicated to leadership, teamwork, and service.

Putting the Plan into Action

- Leadership Team
- Cost-analysis (capital and operating)
- Short-term Plans and Work Groups
- Leadership Training
- Marketing the Plan

Year 1: Momentum and Results Increase Dramatically

- Focus on performance gaps
- Clear outcomes and priorities
- Better information for decision-making
- System for Accountability

Year 1: Support for Change Increases

- Orientation toward Future vs. Past
- Clear mandate from all customer groups (4,000+ people)
- Barriers to change minimized

Year 1: Tremendous Growth in Staff Leadership

- Increased motivation
- Increased confidence
- Set up for success
- Support for team work

Year 1: Increased Support from all Customer Groups

- Clear story to tell
- Increased level of visibility
- New level of trust
- Participation in process sparked new levels of interest, understanding, and commitment

Year 1: Major Increases in Customer Support

- **Students:** *Proposed Fundraiser for Arboretum*
- **Faculty:** *Center for Urban Horticulture, Partnership with School of Education*
- **University Administration:** *UCD Comprehensive Campaign, Campus Plan*
- **Volunteers:**

Year 2: Improvement in the Beauty of the Arboretum

- Focused improvements in "core" Arboretum near central campus
- Redwood Grove Renovation
- 14,000 new plants in core area
- New paths and irrigation systems

Year 2: New Exhibits and Interpretation

- Two team "exhibit weeks" to design new signs tested with visitors
- All new collection signs orientation *"Red Clover?"*
- 500 new interpretive signs
- Film began interpretation gardens
- Clear horticultural messages

Year 2: Improve Museum Standards for Collection Care

- Taxonomic oak collection target of major conservation project
- Curatorial Team checks nomenclature on every plant in Arboretum, begins verification of accession information

Increased National Visibility

Years 3-6 and beyond: Master Planning

- New Arboretum Master Plan Concept grows out of new successes.
- UC Davis GATEways Proposal launched! (Gardens, Arts, and The Environment)

Features Arboretum as Visitor Portal to

UC Davis Arboretum GATEways: A Transformative Vision for Learning

- Inspiring innovative educational programs
- A new kind of learning environment that fosters student engagement with the natural world
- Reinvigorate students with experiential learning beyond the classroom
- Access to life-long learning

An accessible campus, a place for life-long learning...

Recent Successes

- National and International Leadership
 - GIS data model project
 - Nature's Gallery mosaic at the U.S. Botanic Garden in Washington, DC
- More Federal Grants
 - UC Davis Arboretum All-Stars Program
 - Peter J. Shields Oak Grove Interpretation, Oak Discovery Trail
- New Teaching Nursery
- Administrative transition

Welcome to Our Team

UC DAVIS ARBORETUM TEN-YEAR PLAN 2002-2012

Much of the work of the Arboretum during 2001-02 was focused on planning for future growth and development. We began with an extensive self-assessment process, surveyed more than 4,000 customers, and worked with a group of campus and community leaders to identify long-range goals and objectives. We then developed a draft Ten-Year Plan, which is presented for the first time in this report. We think it creates an exciting vision for the future, in which the Arboretum serves the campus, the region and beyond as a living museum.

DRUCKER PROCESS

We used a planning process developed by Peter F. Drucker, a prominent management theorist, which applies business principles to non-profit organizations. Gary Stern, an international consultant and author of The Drucker Foundation Self-Assessment Tool Process Guide, led us through the process.

The Arboretum's long-range planning began with a meeting in June, 2001 attended by more than 70 campus and community leaders, representing a range of groups with an interest in the future of the Arboretum. The group discussed some of the Arboretum's most significant challenges and opportunities, and identified "customer groups" that should be included in the assessment process.

ENVIRONMENTAL SCAN

Following the June meeting, a team of Arboretum staff and volunteers was convened to lead the self-assessment process. This group collected information about internal and external conditions and trends that may affect future growth, such as changing demographics, environmental issues, plans

for major campus growth, facilities issues, and economic conditions.

CUSTOMER RESEARCH

To learn what our visitors really want and expect from the Arboretum, and how they feel about our current performance, we conducted more than 60 in-depth interviews and ten focus groups, and surveyed more than 4,000 people through the mail, in person, and on the internet. Respondents included UC Davis faculty, students and staff, members of the Friends of the Davis Arboretum, horticulture professionals, and residents of the region. Respondents were asked how they used the Arboretum (for relaxation, for exercise, to learn about plants, for a class assignment, etc.) They were asked to rate the importance of ten Arboretum program areas, and then to rate our current performance in the same areas. We also collected demographic data on the respondents.

RESEARCH RESULTS: WHAT WE LEARNED FROM OUR CUSTOMERS

- Our campus and community are passionate about the UC Davis Arboretum: we received more than 4,000 responses to our customer survey and more than 100 campus and community representatives were active planning participants.
- Our customers are deeply appreciative of our work and their support crosses "customer group" lines: it includes students, faculty, staff, townspeople, and business and political leaders.
- The Arboretum is important to all customer groups as a place to connect with and learn about nature. It is highly valued as a place to reflect or exercise to balance the stress of a high-performance, fast-paced University environment.

- The Arboretum's problems are clearly visible to our visitors: along with the plants, they see and worry about the eroding banks, the waterway, the run-down appearance of some areas, the lack of interpretive signs in the collection.

Grounds Supervisor Robert Bohn, Garden Manager Ellen Zagory, and Director Kathleen Socolofsky at a staff planning retreat.

- There are clear and compelling expectations for the Arboretum across all customer groups: improve the appearance of the Arboretum, strengthen its value as a learning resource with interpretive labels, signs and exhibits; enhance visitor access and amenities; maintain and improve the health of the ecosystem.
- Our customers enthusiastically believe the UC Davis Arboretum has the potential to be a truly great University garden and teaching facility.

GAP ANALYSIS

One of the most useful results of the customer research was the "gap"—the difference between ratings of the importance of a program area and ratings of our current

performance. This gap analysis points to the areas with the greatest perceived need for improvement. The program areas with the largest gaps—those where performance falls most short of expectations—are "design, open views, water quality, general beauty", followed by "directional and educational signs, exhibits, and interpretive materials", and "amenities for visitors such as parking, restrooms, shade areas and seating". There was remarkable convergence across all customer groups in identifying these as the top priorities for action.

PLANNING RETREAT

The self-assessment, environmental scan, and customer research provided the basis for an all-day planning retreat on December 1, 2001, attended by many of the same people who had launched the process six months earlier. Participants reviewed the Arboretum's mission statement; determined which programs areas should be strengthened, which should be abandoned, and which need further study; identified key enhancements that would improve customer satisfaction for each customer group; and proposed a series of long-term goals for the Arboretum.

THE TEN-YEAR PLAN

Following the self-assessment process, Director Kathleen Socolofsky convened a Leadership Team of senior staff. The team met weekly over several months to expand the work of the retreat participants into a draft Ten-Year Plan, complete with goals, objectives, and cost estimates. Campus leaders' responses to the draft Ten-Year Plan have been overwhelmingly positive.

On the following pages, the draft Ten-Year Plan is presented to our members and supporters for the first time. We look forward to your response and invite you to help us make this exciting vision a reality.

UC DAVIS ARBORETUM TEN-YEAR PLAN 2002-2012

Vision

In the year 2012, the University of California Davis Arboretum shines as a crown jewel for UC Davis and surrounding Davis and regional communities. The Arboretum joins with UC Davis to draw visitors into deep connections with the natural world, teach the irreplaceable value of plants, and convey a sense of place within the sweeping history of California's Great Central Valley. As a major outreach arm of UC Davis, the Arboretum inspires an ethic of environmental stewardship that is expressed through the work of knowledgeable staff and alumni and through the responsible actions of regional citizens at their homes and in their communities.

Mission

To be a living museum connecting people with the beauty and value of plants.

Goals and Objectives

- 1. Provide an exemplary place of beauty, learning, and environmental stewardship as a UC Davis campus emblem.**
 - A. In partnership with UC Davis Grounds and Facilities, create and maintain beautiful horticultural displays and collections featuring plants native to California and others adapted to our Mediterranean climate.
 - 1) Prioritize areas of the garden that need enhancement and install attractive and appropriate plantings for display and beauty.
 - 2) Establish and maintain high standards of landscape/garden design and collection care.
 - 3) Design and install a comprehensive irrigation system in order to support new and existing plantings.
 - 4) Demonstrate ecologically-sound horticultural practices.
 - B. In partnership with UC Davis Grounds and Facilities, improve water quality and the visual beauty of the Arboretum Waterway.
 - 1) Support implementation of the waterway circulation improvement plans.
 - 2) Create and sustain plantings that achieve ecologically-effective bank stabilization and contribute to improved water quality and general appearance.
 - 3) Take the lead in identifying and addressing factors contributing to poor water quality.
 - C. Integrate Arboretum site planning with the campus Long Range Development Plan (LRDP), campus open space, and city greenbelt system, applying sound development and environmental principles.
 - 1) Confirm Arboretum boundaries, major landscape features, Arboretum headquarters site, visitor welcoming and orientation centers, visitor comfort stations, and sites of core collections.
 - 2) Design linkages to campus and city circulation patterns.
 - 3) Participate in the development of Campus "Garden Walks" that link pedestrians with the Arboretum, as outlined in the LRDP.
 - D. Develop site and infrastructure to support visitor learning, enjoyment, comfort and safety.
 - 1) Establish an Arboretum headquarters with visitor center, classrooms, volunteer and staff offices, proximity to propagation areas and parking.

- 2) Establish at least three major visitor welcoming and orientation centers (one may be linked with Arboretum headquarters) near accessible visitor parking.
- 3) Establish at least five "comfort stations" (may be linked with orientation centers) with restrooms, shaded seating, water fountains, etc.
- 4) Identify needs for event and gathering areas and develop appropriate spaces and facilities.
- 5) Address overall needs for parking and transportation.
- 6) Assess circulation patterns, accessibility, and safety issues and upgrade pedestrian and bike pathways and lighting as needed.

2. Inspire and educate visitors about the natural world and appropriate horticulture in California's Central Valley and beyond.

- A. Develop and interpret collections with a Central Valley regional focus and with plants adapted to or native to Mediterranean-climate regions.
- B. Identify and maintain strengths of existing collections to showcase and interpret plant diversity, biology, and conservation.
- C. Interpret the living collections to enhance the visitor learning experience.
 - 1) Define key educational messages with input from academic programs.
 - 2) Develop and implement a comprehensive collections and interpretive plan that is based on key educational messages.
 - a. Implement a plant accessions policy that reflects and supports the key educational messages.
 - b. Convey educational messages via an integrated program of:
 - (1) Plant identification labels.
 - (2) Interpretive signage and exhibits.
 - (3) Interpretive materials/handouts.
 - (4) Interpretive programs, including docent and school programs.
 - c. Ensure ability to update educational messages to convey most current information and research.
- D. Adopt best practices of museum education, informal science education, and visitor studies.
 - 1) Assess interpretive programs and redesign as needed.
 - 2) Provide volunteer, intern, and staff training in educational best practices.

3. Strengthen the Arboretum's museum function and scientific and academic value.

- A. Build strong partnerships with academic programs at UC Davis and regional educational institutions.
 - 1) Develop and implement an in-depth partnership with the Department of Environmental Horticulture in the arenas of research, teaching, and public service.
 - 2) Explore partnerships between the Arboretum and other academic units to strengthen the campus' teaching and research programs.
 - 3) In collaboration with academic departments, define and provide learning opportunities, from single class visits to in-depth internships and student employment.
 - 3) In collaboration with the College of Agriculture and Environmental Sciences, explore and develop partnerships with its Extension program and with area community colleges.
 - 4) Explore the potential to develop and offer a graduate program in museum studies and botanical garden management.

- B. In collaboration with academic programs, strengthen UC Davis Arboretum collections for scientific and academic purposes.
 - 1) Ensure that existing and future plantings are appropriately accessioned, mapped, and labeled.
 - 2) Develop explicit criteria for acquiring specimens that will enhance the research and academic value of the Arboretum.
 - 3) Identify collections within the Arboretum that have the most importance regionally, nationally and internationally, e.g. Shields Oak Grove collection, and strengthen for research, teaching and conservation purposes.
 - 4) Explore partnerships with the National Plant Collections Consortium, the Center for Plant Conservation, and other collaborative ventures with botanical gardens and museums.
- C. Enhance the curatorial program to support teaching, research, and collections care
 - 1) Meet contemporary standards of excellence in plant identification, nomenclature and taxonomy.
 - 1) Create and maintain an integrated relational plant records database linked to accurate collection maps.
 - 2) In collaboration with UC Davis faculty, identify and develop academic resources to make the Arboretum collections more accessible for teaching and research, e.g. web access to plant catalog, collection maps, etc.
 - 4) Document the Arboretum's curatorial and institutional history and important information regarding key plant specimens and collections.

4. Disseminate the expertise of UC Davis to the regional community and promote environmental responsibility as a major outreach arm of UC Davis.

- A. In partnership with the Dept. of Environmental Horticulture, develop a "UC Davis Center for Urban Horticulture" to advance environmentally-sound approaches to all aspects of horticulture, including gardening, landscaping, restoration, and urban forestry.
- B. Develop and implement a multi-faceted gardening and landscaping education program by partnering with and building on the strengths of other UC Davis and community groups.
 - 1) Programs to reach large regional audience, e.g. gardening column, TV show, books, etc.
 - 2) High-profile projects demonstrating environmental best practices.
 - 3) Public workshops.
 - 4) Plant introduction and sales program with local nurseries.
 - 5) Semi-annual Plant Faire.
 - 6) Marketing partnerships with related businesses.
- C. Collaborate with College of Agricultural and Environmental Sciences to communicate scientific research results related to the Arboretum's key messages to diverse audiences.
- D. Assess and enhance the Friends of the Davis Arboretum membership program as a major "friend-raising" arm to engage the region and UC Davis alumni with the Arboretum and UC Davis.
- E. In collaboration with College of Agricultural and Environmental Sciences, University Outreach, and the UC Davis Division of Education, assess potential integration of Arboretum school programs with overall UC Davis outreach to K-12.
- F. Assess and enhance the Arboretum's educational outreach programs to meet the needs of the region's culturally diverse communities.

- G. Develop and implement a comprehensive plan for Arboretum marketing and visibility.
 - 1) Improve regional signage directing people to the Arboretum.
 - 2) Develop and implement an "Identity" program that clearly positions the Arboretum as an important outreach arm of UC Davis, e.g. logo and graphic standards, key messages, identity materials.
 - 3) Publicize Arboretum programs and events in the regional media.
 - 4) Upgrade and maintain the Arboretum website.
 - 5) Enhance links with campus outreach and marketing departments and initiatives.
 - 6) Co-market the Arboretum with the Davis Convention and Visitors Bureau and other regional marketing organizations.
 - 7) Participate in existing campus and community events.
 - 8) Maintain active relationships with community and civic organizations, e.g., area Chambers of Commerce, service clubs, etc.
 - 9) Assess customer service practices (e.g. phone answering, on-site visitor services, weekend and holiday staffing) and upgrade as warranted.
-
5. Fund capital and operating needs through extensive partnerships within and beyond the university. A. In collaboration with campus administrators, confirm Arboretum capital and operating needs within UC Davis funding priorities. B. Develop a funding strategy for the Arboretum that provides for the operating and capital costs of the ten-year plan implementation. C. Seek additional capital and operating funds within special UC Davis fundraising initiatives, including the Comprehensive Capital Campaign, and through an Arboretum capital campaign if necessary. D. Create a resource development team with volunteers and staff to identify and cultivate individual donors, to ensure effective donor stewardship, and to develop a full list of donor opportunities, including naming opportunities. E. Develop comprehensive resource development program with government, foundations, and corporations. F. Develop fundraising infrastructure that connects with UC Davis financial and development systems.	6. Build a high-performance volunteer and staff corps dedicated to leadership, teamwork, and service. A. Coordinate staff and volunteer work through rolling three-year operating plans, including updates to the long-range plan. B. Phase in new staff positions on an ongoing basis as needed to accomplish objectives. C. Develop short- and long-range plans for office facilities and equipment. D. Assess and enhance the role of the Board of Directors of the Friends of the Davis Arboretum and Arboretum volunteer programs to support the UC Davis Arboretum's mission, goals, and ten-year plan. E. Invest in a comprehensive program to increase the number and impact of volunteers. F. Develop and implement an internal communication plan appropriate to a growing, high-performance staff and volunteer corps. G. Evaluate staff compensation and job classifications and make adjustments as appropriate to retain highly qualified staff. H. Encourage and enhance ongoing training and professional development for staff and volunteers.

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