

PERSISTENCE OF MEMORY: SCENT GARDENS  
FOR THERAPEUTIC LIFE REVIEW IN  
COMMUNITIES FOR THE ELDERLY

by

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ABSTRACT

PERSISTENCE OF MEMORY:  
SCENT GARDENS FOR REMINISCENCE THERAPY  
IN COMMUNITIES FOR THE ELDERLY

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This paper links the study of olfaction and autobiographical memory with the practices of reminiscence therapy and landscape architecture, with the goal of bringing this life-enhancing therapy into the garden. Smells have proven to be powerful stimulators of early, emotional childhood memories due to the structure and evolution of the human brain. Research shows improved self-esteem, less depression and better social integration in older adults who are able to call up autobiographical memories in

the process of reminiscence therapy. Therefore, landscape architects designing gardens for the elderly in long-term care could include aromatic plants and construction materials, chosen either to suit a particular group of residents, or as an expression of the regional plant and materials palette of each home site. Such gardens could be used by horticultural therapists and nursing staff to provide the benefits of reminiscence therapy to elderly residents in long-term care settings.

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## CHAPTER 1

### INTRODUCTION

There's rosemary, that's for remembrance

Shakespeare, *Hamlet*

#### 1.1 Introduction

This paper explores how landscape architects might harness the power of memories evoked by the fragrance of plants to improve the lives of old people in long-term care settings. It seeks to tie several strands of research from medicine, horticultural therapy and reminiscence therapy to landscape architecture. The contribution that memory-stimulating aromas can make to therapeutic efforts is examined, along with the extent to which institutional landscapes can be designed as ideal therapeutic environments to affect medical outcomes. To expand the prospect from the narrow view of just fragrant, blooming plants, the relationships between fragrances in the broader landscape and architecture are briefly explored.

One of the goals of the research was to probe the experiences of landscape architects, medical experts and horticultural therapists involved in designing and working in therapeutic gardens. Combining their insights generates a body of practical information that can be shared among them, leading to an expansion of the opportunities and choices available to older adults living in group long-term care

environments. Their experiences show that building aromas into the fabric of therapeutic gardens *will* stimulate memories, and can be used either passively or actively in a program of reminiscence therapy to improve the mental health of elderly residents. More empirical research is needed to quantify the benefits of conducting reminiscence therapy in gardens, to help convince management and staff of homes for the elderly that this investment of time and money is worth the effort.

### 1.2 Getting Older

Much is at stake, because everyone is getting older. According to a 2005 U.S. Census Bureau report, twenty percent of the population of the United States will be over 65 by 2030. The number of the “oldest old,” those 85 years and above, is projected to double between 2003 and 2030, and double again by 2050 (He et al., 2005). In 1999, 1.5 million people 65 and older were in 17,000 nursing homes nationwide (Brawley, 2006). Facilities to serve the aged are booming. Some 32,000 units of housing in “continuing care retirement communities,” where people can gradually shift to higher levels of care, are currently under construction (*Dallas Morning News*, 27 September 2005). While definitions of “assisted living facilities” and “continuing care retirement communities” vary, it is clear that the number of older people living outside a family home is big, and growing.

The quality of life in nursing homes and other long-term care settings for the elderly also varies. Although blatant abuses and neglect of elderly people were addressed by legislation in the United States Nursing Home Reform Act of 1987,

problems persist, and even the best nursing facilities often fall short of feeling like real homes. Thomas, a doctor and founder of the “Eden Alternative” movement in senior housing, points to loneliness, boredom and helplessness as the prime miseries of older people today. In his opinion, nursing homes concentrate too much on treatment of symptoms, without fixing the underlying sources of illness (Thomas, 1996). Half the people arriving at nursing homes are “in crisis and at increased risk for depression and suicide ideation,” and twelve to eighteen percent of long-term care residents show depressive symptoms (Haight, 1995, Jones and Beck-Little, 2002). Rabig, former project manager of the Mississippi Methodist Green Homes, noted, “In the United States, we continue to consistently institutionalize only two groups of people: convicted felons and our frail elders” (McCarty, 2007). The Eden Alternative, Green Home projects and other initiatives seek to transform the ‘end of the road’ into ‘home at last,’ primarily by changing the environment in which institutionalized elders live.

### 1.3 The Elderly and the Role of Landscape Architects

These advances in healthcare and architecture may be reflected in the field of landscape architecture as well. Some landscape architects are in the forefront of developing ideas and designs to make aging in an institution a more pleasant experience (Bonnell, 2006). Many nursing homes, assisted living centers and other developments for the elderly already include some type of therapeutic gardens. At the same time, they are under intense pressure to reduce or stabilize costs while continuing to attract clients with improved care and new medical technologies.

In 2001, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) recognized therapeutic gardens as a best practice benchmark, after awarding Legacy Health System's gardens an "exemplary" rating. "It is an important step in linking therapeutic gardens with positive patient outcomes in health care settings," according to Epstein, one of the landscape architects involved in the design and implementation of Legacy's many gardens (Epstein, 2002). The United States Department of Veterans Affairs has also decided to incorporate therapeutic gardens into its healthcare system as it renovates aging hospitals across the nation (ASLA Healthcare and Therapeutic Gardens PPN, 2006). Gerlach-Spriggs notes that "this is a critical moment for restorative gardens....Gardens have a mythology, a poetry and a history, strongly linked to life cycles and the processes of healing, renewal and ultimately dying" (Gerlach-Spriggs et al., 1998). Against this backdrop of change and experimentation in the healthcare industry, landscape architects can contribute new insights and advance a new paradigm of elder care.

#### 1.4 Research Questions

The research questions will facilitate the collection of information from a group of experts in the fields of senior healthcare, horticultural therapy and landscape architecture. Analysis of this data may guide the future design and implementation of therapeutic gardens incorporating fragrance for reminiscence therapy.

1. Does the basic hypothesis seem plausible: that landscape architects could include scent for the purpose of reminiscence therapy in gardens in long-term care settings?
2. Is this already being done anywhere? If so, with what results?
3. What plants are recommended for triggering reminiscence in different regions of the country?
4. Are there construction materials that trigger reminiscence as well?
5. Any other comments?

### 1.5 Definitions of Terms

These definitions are included for terms which may be unfamiliar.

**Therapeutic garden:** ‘a consciously designed outdoor setting that evokes, reinforces, and maximizes the number, quality, and intensity of positive interactions a visitor can have with plants’ (Kavanaugh, 2005).

**Memory garden:** ‘special places....designed to create new memories as well as bring back fond memories of days gone by’ (Portland Memory Garden, 2007).

**Reminiscence therapy:** ‘vocal or silent recall of events in a person’s life, either alone, or with another person or group of people’ (Spector et al, cited in Haight and Gibson, 2005).

**Life review therapy:** ‘a process of reviewing, organizing, and evaluating the overall picture of one’s life with the purpose of achieving integrity by seeing one’s own life as a unique story’ (Woods, cited in Burnside and Haight, 1994).



**Horticultural therapy:** ‘the engagement of a person in gardening-related activities, facilitated by a trained therapist, to achieve specific treatment goals’ (American Horticultural Therapy Association, 2007).

**ASLA:** American Society of Landscape Architects.

### 1.6 Summary

Incorporating fragrance into healthcare gardens may be one part of the emerging picture of life in long-term care for the elderly. Memory and cognition are often key concerns for the elderly, their families and their caregivers. The goal of this research is to add to the body of knowledge available to landscape architects, therapists and healthcare workers so that all of us may age more comfortably.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.1 Introduction

A wide range of literature was reviewed to form a foundation for the present study. First, a physiological explanation of the olfactory system is included to give landscape architects a basic understanding of the mechanics of smell. The next section elucidates the scientific basis for the “Proustian syndrome,” which ties autobiographical memory to the emotions and odors of childhood. Reminiscence therapy and its benefits for older adults in long-term care settings are explored, so that designers for the elderly can effectively incorporate this therapeutic practice into horticultural therapy and other garden programs. The various types of gardens developed by landscape architects and horticultural therapists for Alzheimer’s disease facilities are explored. The question of variable sensitivities of older adults to odors must be addressed as well, since this issue is frequently raised by medical personnel.

Brief overviews of historical precedents for using scent in gardens, along with some interesting trends in aromatherapy research, round out the literature review. The goal is to tie together the medical, the social/therapeutic, and the physical use of scent in space to give the reader a thorough understanding of the issues involved in designing gardens to be used for reminiscence therapy.

## 2.2 How We Smell

The landscape of smell is an ancient one. Olfaction evolved, in fact, before the brain, in early ocean-dwelling organisms. Ackerman writes in *A Natural History of the Senses* that “Smell was the first of our senses, and it was so successful that in time the small lump of olfactory tissue atop the nerve cord grew into a brain. Our cerebral hemispheres were originally buds from the olfactory stalks. We *think* because we *smelled*” (Ackerman, 1990).

Smell differs from vision and hearing because it is a chemical sense, like taste. Humans smell something when odorant molecules from volatile compounds float into the nose and dissolve in nasal mucus. There they bind to receptors located on sensory neurons in the olfactory epithelium, in the upper rear part of the nasal cavity, sending a signal to the olfactory bulb. Information goes from the olfactory bulb to the olfactory cortex and on to other parts of the brain (Saltus, 2007).

Since humans have about 10 million receptors in the olfactory epithelium (an average dog has 200 million), scientists have long wondered how the brain handled all that information. In 1991, Axel and Buck discovered that each type of receptor is governed by one of a group of about 1,000 genes (Pines, 2004). The receptors sort the odor molecule signals in various combinations to allow humans to recognize some 10,000 different smells, just as English speakers use the 26 letters of the alphabet to make tens of thousands of words. A small structural change in an odorant molecule can totally alter the perception of a smell, changing it from fragrant to foul (Herz, 2000).

Axel and Buck won the 2004 Nobel Prize for medicine with “their discoveries of odorant receptors and the organization of the olfactory system” (Saltus, 2007). After many years of neglect, research on the sense of smell is experiencing a surge of interest, due to its many potential applications for healing and improving quality of life (Pines, 2004). It is useful for landscape architects designing gardens for the senses to comprehend how large odorant molecules become chemical impulses into the brain, linked to the memory of the time and place of the experience.

### *2.2.1 The difficulty of classifying odors*

Odors defy verbal processing and elude tabulation—smells trigger memories, but one cannot “remember” a smell by force of will. This makes smells difficult to classify and to study. Memory researchers in the tradition of Ebbinghaus require that a person be able to accurately label an odor for the memory to “count,” yet people are often unable to name an odor even if it strongly evokes an incident from childhood or early adulthood (de Wijk, Schab and Cain, 1995).

The best system of arranging plant odors to date is based on the aromatic oils derived from various plant parts (eucalyptol, geraniol, menthol, etc.), but it is incomplete and does not lend itself easily to scientific research. Promising studies of the molecular structures of different odorants are currently underway which may eventually lead to an orderly system of classifying odors and administering defined dosages in scientific studies (Pines, 2004). But as yet there is no organization of odors by words or

by degrees, like the division of light into color wheels for vision, or sound into musical scales for hearing—although the indefatigable Carl von Linnaeus tried (Verey, 1991).

In addition to the technical difficulties, the study of smells has historically been thought distasteful and embarrassing, shunned by philosophers and scientists from Plato’s day up until recently. Psychologist Engen noted that “interest in colors is of course thought by all to be natural, but interest in odors is still considered to be quaint” (Engen, 1991). This attitude seems to have permeated many disciplines. Neutra remarked that “it is characteristic of the contempt in which this sense is unjustly held, that it passes as ill-bred even to discuss smells” (Neutra, 1949). Although garden clubs and popular gardening magazines often talk about fragrance in the garden, professional landscape architects and researchers have largely neglected the sense of smell to focus on visual and auditory effects.

### 2.3 Smell, Memory, and Emotion: The Proust Syndrome

Odors are the nightlight in the bedroom of memory

Gaston Bachelard

Smell, the first sense that evolved and the least subject to our conscious control, has proven to be one of the most powerful stimulators of early, emotional memories (Chu and Downes, 2002). Many writers have eloquently described the poignancy of memories suddenly recalled by a particular odor. Most famously, Proust embarked on a 550-page, six-volume odyssey into his childhood, *Remembrance of Things Past*, all because of the sensation of a madeleine cake dipped in linden tea:

No sooner had the warm liquid mixed with crumbs touched my palate than a shudder ran through my whole body... An exquisite pleasure had invaded my senses...with no suggestion of its origin...Suddenly the memory revealed itself. The taste was of a little piece of madeleine which on Sunday mornings...my Aunt Leonie used to give me, dipping it first into her own cup of tea...Immediately the old gray house on the street, where her room was, rose up like a stage set... and the entire town, with its people and houses, gardens, church and surroundings, taking shape and solidity, sprang into being from my cup of tea (Proust, 1928).

The phenomenon of odor-evoked autobiographical memory was considered abnormal for years; psychological and medical researchers have named it the “Proust syndrome.” Vivid autobiographical memories like Proust’s can leap into consciousness from a whiff of witch hazel, the smell of new-mown grass, even the emanations from sun-warmed brick or cool, damp stone. French philosopher Bachelard found the connection between fragrances and memories of the past fascinating. Odors, he wrote, are “the nightlight in the bedroom of memory,” and he reveled in the dreamlike state engendered by the fragrance of grapes drying in the attic of his own childhood (Bachelard, 1964). More recently, Warhol wrote that “odor is a means of transportation, that sight, hearing, touch and taste are not powerful enough to transport you entirely to another spot...bringing to life absent or even unreal places” (quoted in Barbara and Perliss, 2006).

### *2.3.1 Smell, Evolution and Stress: Why Odor-Evoked Memories Tend to be Emotional*

The tightly bound relationship between smell, memory and emotion results from the structure of the brain itself. The rhinencephalon, where the limbic system and olfaction are located, was the first part of the brain to evolve. What to eat, what to

avoid, who to mate with, which offspring to nurture, were all functions of smell. The amygdala and hippocampus, where emotions are processed, developed later. In modern humans, olfaction is no longer as central to survival as it was to our primitive ancestors. Now “emotions and olfaction have become functionally analogous,” in that they both tell people what to like and dislike in the world around us, according to Herz, a professor of experimental psychology at Brown University (Herz, 2000).

Recent research using PET scans shows heightened activity in the amygdala and hippocampus complex in the right side of the brain when a subject is experiencing an emotional, autobiographical memory. “Odor-evoked memories also tended to make participants feel more ‘brought back’ to the original event” and were far more emotional than memories brought back by other modalities such as vision, taste and hearing” (Herz and Schooler, 2002).

Behavioral neuroscientist McGaugh says that the survival instinct is closely related to smells and memories; if you forget that something is dangerous, it might kill you. He explains:

Two major adrenal stress hormones, epinephrine and cortisol, have a common action in influencing norepinephrine functioning within the amygdala that is critical for modulating memory consolidation. . . . They serve the highly important function of strengthening our memories of the stressful events that caused their release from the adrenal glands. . . . There is nothing like a little stress to help create strong, long-lasting memories of events we have experienced (McGaugh, 2003).

This is why odor-evoked memories last a lifetime and may be accompanied by strong emotions. Herz and her colleagues also noted increased heart rates when an odor

cue was used to prompt memories, as compared to visual or acoustic cues (Herz, 2004). And while visual and auditory memories suffer from the effects of interference—the more times you see or hear something, the more new events confuse the original memory—“odor association is a rigid bond not likely to be broken once established” (Engen, 1991).

In 1987, researchers sponsored by *National Geographic* magazine sent out 1.5 million “Smell Surveys” around the world, which included six different scratch-and-sniff odors on the survey card. 26,200 random samples from the U.S. were analyzed in the initial report; of those, 55 percent of people in their 20s reported having at least one strong memory evoked by one of the smells. This dropped to something over 30 percent in people over the age of 80. But considering the small number of odors (six), the fact that two of the odors (androstenone and galaxolide) were difficult for many people to detect, this is still quite a high response. Very strong unpleasant odors evoked memories as well as the strongly pleasant ones—one respondent wrote “One of my favorite smells is cow manure!” Women were able to detect more smells than men, and reported more memories evoked—perhaps why another person explained, “My wife answered these questions. She’s an expert. She can smell beer over the telephone,” (Gilbert and Wysocki, 1987).

A great deal of memory research focuses on how to help people learn and remember better, so many studies have looked at the role of odors in preserving memories. In medieval times, lavender was known as “the scholar’s herb” because



students would rub it when they were learning and then again when they had to recall the information (Vroon, 1997). Recent research shows they were on to something. The Jorvik Viking Museum in York, England, contains an open-air Viking village, circa 948 A.D., complete with authentic smells (fish market, rope/tar, burnt wood, apples, rubbish/acrid, beef, earthy). Researchers tested visitors on their memory of the displays—with and without the odor cues—an average of six years later, and found that Viking odor prompts matching the displays led to a “highly significant” increase in the ability to remember (Aggleton and Waskett, 1999). The study “strongly supports the notion that odours are effective reminders of autobiographical experience,” (Chu and Downes, 2000).

This exposition of the mechanics of the brain is included because healthcare workers often question the connection between smell and autobiographical memory, dismissing it as merely anecdotal. Landscape architects who wish to make a point of including fragrance for reminiscence therapy will need hard evidence to convince some medical personnel that this memory-odorant link is real.

#### 2.4 Why Old People Need to Reminisce

Memory is life, and forgetting death

Saul Bellow, *The Bellarosa Connection*

Modern industrial society, with its institutionalized elders and far-flung families, has eroded the traditional roles of old people. Many reasons are put forth for this phenomenon. Life expectancy in the United States has risen from forty-eight years

in 1900 to an average of seventy-seven now, resulting in many more people surviving into old age (Brawley, 2006). Sixty percent of adult women who used to care for elders at home are now in the workforce, and adult children often live far away from elderly parents (Marsden, 2005). Western culture puts more value on youth and energy than age and wisdom; technology has changed society so rapidly that what our parents and grandparents grew up knowing seems no longer relevant (Adams, 1979).

Whatever the reasons, the habit of listening to elders fell into disuse; the “wise women and wizards” no longer guide us. Yet “narration confers power,” note life review experts Jeff and Christina Garland. “Social anthropologists have indicated that across a wide range of cultures the status of older people is positively related to the amount of worthwhile information they have to share” (Garland and Garland, 2001). As repositories of family history and witnesses of historical events and bygone culture, the elderly are an invaluable source of information to younger generations. The trend in the 1970s of capturing grandparents’ life histories on tape was an acknowledgment of the value of these cultural transmissions to the young (Adams, 1979).

#### *2.4.1 A Life Story: Achieving Completeness of Being*

Memory recall also has therapeutic benefits for the elderly. Building on the developmental life stages proposed by Erikson, reminiscence and life review in old age can be seen as a way to achieve “ego identity,” integrating all parts of one’s life into a coherent whole. Jung also stressed the need for people to reconcile opposite tendencies in their personalities or past lives in order to reach “completeness of being.” The

construction of a life story “confers a sense of control...Its purpose is not necessarily accurate recall of the facts, but the weaving of edited recollections into a harmonious perspective, constructing an alternate reality compatible with self-esteem” (Garland and Garland, 2001). In other words, it doesn’t really matter if old people recall things exactly as they happened. What matters to their mental health is that they make sense of it all, and find satisfaction in a life well lived.

The change from regarding the reminiscences of old people as senile wanderings of the mind to something more worthwhile began with a paper written by Butler in 1963. “Life review,” he posited, “is a naturally occurring, universal mental process characterized by the progressive return to consciousness of past experiences, and particularly, the resurgence of unresolved conflicts... (which) can be surveyed and reintegrated.” He viewed any life review as a response to crisis; in the case of the aged, physical decay and the nearness of death. Reorganizing one’s history in a coherent, satisfying way can lead to serenity and wisdom. However, he warns that elders who dwell on past slights, feel guilt, or feel as if they have not lived enough yet even as their physical beings are deteriorating, run the risk of depression and even suicide (Butler, 1963).

#### *2.4.2 Transition to Long-Term Care: Life with Strangers*

The stakes for institutionalized seniors are especially high because relocation from a family home to an “elders-only” setting, whether a retirement community, assisted living or nursing home facility, constitutes the type of stress that can lead to

depression. Being cut off from reminders of a previously busy and productive life—frequently due to another event like the death of a spouse, a fall, or serious illness—sets people adrift and can add to a feeling of uselessness. Often there is not enough to do; elders accustomed to caring for themselves and others suddenly have too much time on their hands. Regimented schedules for eating, bathing, and meaningless recreational activities like bingo take away a person’s independence. Boredom and hopelessness lead to despair. “Trying to adapt to life with strangers in a strange environment,” half of the people moving to nursing homes are at risk for depression and suicide ideation (Haight et al., 1998).

Overall in long-term care settings, some eighty percent of residents have some type of psychiatric disorder related to aging, and twelve to eighteen percent have symptoms of depression; these numbers are higher among rural elders. Quite often depression in older people goes undiagnosed, due to the social stigma of mental illness and lack of physical symptoms. Drug treatments for depression increase the risk of polypharmacy—interactions between the depression medications and other medications an elderly patient may take. Depression medications often have their own side effects even if taken alone. For this reason, the National Institute of Nursing Research has made a point of encouraging research on non-pharmacological treatments for cognitive and behavioral problems in long-term care residents (Jones and Beck-Little, 2002).

## 2.5 The Practice of Reminiscence and Life Review Therapy

Memory is like a dog that lies down where it pleases

Cees Nooteboom, *Rituals*

Nurses and geriatric social workers have been experimenting with life review therapy and reminiscence therapy ever since Butler's paper stirred up their imaginations. In her introduction to Kaminsky's book on using the arts in reminiscence therapy, Hunter College social work professor Dobrof sums it up this way:

Butler's writings liberated both the old and the nurses, doctors and social workers; the old were free to remember, to regret, to look reflectively at the past and try to understand it. And we were free to listen and to treat rememberers and remembrances with the respect they deserved, instead of trivializing them by diversion to a bingo game (Kaminsky, 1984).

### *2.5.1 Reminiscence Therapy*

Reminiscence therapy is generally a group exercise, undertaken to improve social interactions and stimulate friendships as well as relieve depression and increase life satisfaction. A trained leader—a nurse, caregiver or visiting social worker—helps select the participants based on factors such as age, interest, and mobility. He or she initiates and guides discussions to keep “the dog from lying down where it pleases,” making sure that one talkative person does not dominate the group, that shy or cognitively impaired members get to speak up, and that reactions to shared stories are supportive and non-judgmental. Group reminiscence among elders of similar age builds a cohort effect; they have lived through the same times and shared many common

experiences. One person's memory may trigger another's, and ties of friendship and attachment to the group and place grow (Adams, 1979).

Benefits have been found in studies conducted around the world. An American study comparing group reminiscence with a "current events" discussion control group showed a significant increase in self-esteem among the reminiscing elders. A bonus side effect was that reminiscing helped establish rapport between the nurses and the clients, "enabling the nurse to see the client as individual with a unique life history and personal set of life experiences" (Lappe, 1987). Similar studies in Japan show increased self-esteem and cognitive function even after relatively short courses (two months) of reminiscence therapy (Nomura and Hashimoto, 2006; Endo, 2003). In England, the Age Exchange charity visits nursing homes to conduct training sessions in long-term care homes. Often they use music to get people up and dancing, and create new memories of the shared workshop experiences "like the time we all danced the Black Bottom at the reminiscence workshop!" The Age Exchange headquarters in London is stuffed with items from the 1930s and 40s; it functions as both a hub for projects throughout England and a museum for visiting schoolchildren to learn about the London Blitz from those who lived through it (Wallis, 2004).

### *2.5.2 Life Review Therapy*

Life review "deals with the self and...covers the life span," according to Burnside and Haight. "A key component of life review is evaluation. Evaluation occurs when an individual examines his/her life as it has been lived and accepts the life as the

only way it could have been...bringing integrity and wisdom” (Burnside and Haight, 1994). Life review is usually a one-on-one interaction between a therapist and an elderly person, with the goals of preventing or alleviating depression and increasing life satisfaction and well-being.

In addition to resolving conflicts of the past, review may make elders happy simply by bringing to mind times when they were strong, involved members of a community or family. It draws on “remembered wellness” to achieve well-being in the present. And it provides positive reinforcement, “if only because to think and talk about ourselves is a fascinating topic” (Garland and Garland, 2001; Ott, 1993). Old age is in some ways an accomplishment in itself (King, 1982). Conversely, Ebersole cautions against enabling the ‘learned helplessness’ of some elderly people: “We do them a disservice...if we accept their conviction that they are inept” (quoted in Adams, 1979). Gibson, Burnside and Haber all mention the need to adequately train staff in both selection of residents—in some cases denial and non-reflective behavior can be adaptive defense mechanisms—and review techniques, so that mental health of older people is not harmed (Gibson and Burnside, 2005; Haber, 2006).

### *2.5.3 Typical Prompts Used in Reminiscence and Life Review*

An interesting facet of all of these studies is the prompt used to begin the reminiscence process. Several therapists found music to be helpful (King, 1982, and Wallis, 2004). Many studies mention use of photographs and personal mementoes; Sherman labels these “Reminiscentia” and notes that lack of such cherished objects

correlates to significantly lower mood scores in older people (Sherman, 1991). Discussion themes include “The Great Depression,” World War II, pets, holidays, school picnics, and so forth; a small industry has grown up to provide photo kits and timelines for therapists and individuals to use (Kim et. al, 2006). The Artists and Elders Project in New York held a number of workshops using plays and poetry with older adults (Kaminsky, 1984).

Ordinary people recognize and acknowledge the sensory nature of reminiscence. A woman in one of Sherman’s groups related, “I can remember my mother in the kitchen baking bread...and it’s not just the bread I can smell. I can smell the starch in her apron. She always wore fresh starched aprons in the kitchen” (Sherman, 1991). Yet among the dozens of studies done by social workers, nurses and psychologists reviewed for this paper, few mentioned intentionally using smells as stimuli. Only one book, an activity book for therapists, has a section on using aromas—or rather, *thinking* about aromas—to stimulate autobiographical memories. The authors, two psychology professors who focus on the health benefits of reminiscence and storytelling, include a list of names of “aroma pump-primers” from *Alfalfa* through *Diesel fuel* and *Lilac* to *Wintergreen* (Thorsheim and Roberts, 2000).

To summarize, life review or reminiscence therapy can be used for the following in older populations: “prevent or reduce depression, increase life satisfaction, improve self-care, and help older adults deal with crises and losses” (Burnside and Haight, 1994). Other effects may include improving social interactions between group



members, passing along history and culture to families and other younger people, and giving staff a new empathy and respect for the seniors in their care (Adams, 1979).

### 2.6 Fragrance Therapy in Practice: Horticultural Therapy

Horticultural therapists do employ fragrant plants in their daily rounds, sometimes even using them to stir up old memories. Several articles in a special issue of the *Journal of Horticultural Therapy* specifically mentioned this use of plant material. “The Paradise Garden: A model for designing for those with dementia and Alzheimer’s disease” describes a garden in Cincinnati, Ohio, which included raised planter areas with fragrant (and edible) plants for use in therapy. The authors found that “the long-term memory of the individual (is) the resource when recent events are no longer registered....providing memories and pleasures of an earlier phase of one’s existence” (Beckwith and Gilster, 1996). A case study of the Walter and Alice Borgeest Garden at Friends Hospital states that the agitation and disorientation suffered by Alzheimer’s patients can sometimes be alleviated by taking people out into the garden and using old-fashioned scented plants like pansies or geraniums to generate recall of pleasant memories (Durham and Kenline, 1996).

Another article mentions the use of plants for memory stimulation and cognitive retraining. The authors include a list of “favorite fragrant plants” and warn against using modern, non-fragrant hybrids (Haas and McCartney, 1996). Eckerling’s “Guidelines for Designing Healing Gardens” also recommend a list of plants drawn from aromatherapy for stimulating, relaxing, or soothing, as well as highly scented “plants from Grandma’s

garden.” Such plants as daphne, hyacinths, lilacs (in the north), or gardenia and jasmine (in the south) remind patients of childhood, when they were not ill and in the hospital. Therapists use fragrant plants to “stimulate long-term memory, trigger reminiscing, and provide reality orientation” (Eckerling, 1996).

Using plants to generate reminiscence also draws on the strengths people had when they were younger. Horticultural therapist Peg Schofield describes therapy with one resident who was a good cook: “As soon as (she) smells the leaves of fresh basil, for instance, she will often start talking about how you would use the herb. This is always great fun to listen to because they are talking about something they really know and were good at doing” (Carman, personal communication, 2007).

In working in long-term care settings, one way to make the experience more home-like would be to interview people about their own past gardening or nature experiences. In order to make it really “Grandma’s backyard” for each person, her family, and other visitors, her own memories could be tapped and represented in some way (Tyson, 1987). At the Presbyterian Home of Ingleside at Rock Creek, landscape designer Henry Ozga interviewed residents to determine what type of landscapes and flowers they had experienced as children. Then he designed a view from each person’s window that reminded them somehow of their youth—a certain plant, a fragrant flower—working them all into the whole plan so that everyone had a personal imprint and connection with the landscape (Hazelrigg, personal communication, 2007).

Vince Healy, an early advocate of therapeutic gardens, tells a story about a visit to his grandmother that clearly demonstrates the power of fragrance to generate recall. She was in her nineties then, and had not recognized him for some time. On the way to the nursing home, he saw bunches of lilacs for sale and decided to take her an armful. Unfortunately, he got stuck in traffic and by the time he arrived, they were sadly wilted. When he walked in with them, she looked at him, looked at the flowers, and said, “They’re wilted! Throw them away!” Unwilling to get rid of them after all his effort, Healy put them right under her nose. “She drew in the fragrance with a deep breath and a sigh and said, “Lilacs....” Then she looked up at him and said, ‘*Vinnie*, how *are* you?’ The fragrance had literally brought her back to reality” (paraphrased from Tyson, 1998). Zeisel relates a similar story: a woman in an Alzheimer’s home hadn’t recognized her son Ned in two years, so he became accustomed to walking right past her. One day as he walked by, she “turned to the woman next to her and said: ‘That’s my son Ned. He’s wearing the same after shave lotion my husband wore every day for as long as we were married’ ” (Zeisel, 2006).

### 2.7 A Brief Overview of Therapeutic ‘Memory’ Gardens

Often, gardens designed for long-term senior care settings do not focus attention on scent. Typically, the primary concerns are safety, accessibility, and aesthetics. Searches for ‘memory gardens’ either turn up memorial gardens which commemorate a person or event (Holocaust, September 11 or AIDS victims, for example), cemeteries, or spaces designed for people with Alzheimer’s disease. While not all elderly people

require as secure a garden as those with Alzheimer's, many do suffer from some form of dementia. Areas for stimulating activity and peaceful contemplation could be designed to serve multiple groups at the same facility.

Hoover addressed the needs of Alzheimer's patients at Sedgewood Commons, an Alzheimer's facility in Falmouth, Maine. He studied the stages of the disease as well as the work of researchers like Healy and Kubler-Ross. Based on his own theory of "remembrance therapy," he designed three different gardens corresponding to three progressive stages of the disease, condensed from Reisberg's seven stages (Hoover, 1995). Living life "in fast forward reverse," from adulthood through adolescence into infancy, patients use different gardens for working, walking, playing or sitting, to fulfill their changing physical and mental needs. The landscape contains sensory cues characteristic of his clients' New England childhoods—including white picket fences, clotheslines, basketball hoops, and a collection of old-fashioned plants like azaleas, rhododendrons, roses, honeysuckle and lilac (Dannenmaier, 1995).

Having useful tasks, such as hanging up clothes or gardening, can benefit elders of all abilities. "There is more to life than...attending those by now routine 3-B activities of bingo, ball toss, and bible study. Activities need to do more than simply occupy a few minutes of time out of an otherwise empty and endless day" (Calkins, 2003). One of the chief complaints about "canned" recreation is its lack of meaning: "wholly diversionary and not worth the time," especially for people who lived through the Depression and value work above leisure (Mooney, 1991). One study found that

53.3 percent of seniors said that gardening was one of their favorite activities; another found 90 percent of residents of one home had been gardeners in the past (Robert and Daubert, 1981). Many people mention missing their old home gardens. Creating something in the nursing or retirement home garden can increase their attachment to the place, as well as giving them a sense of more control over their environment (Mooney, 1991).

To celebrate its centennial in 1999, the American Society of Landscape Architects planned 100 gardens in 100 different cities, in partnerships with local chapters and organizations around the country. Eight of these were dedicated to the use of people with Alzheimer's disease. Gardens were built in public parks in Portland, Oregon and Macon, Georgia, to be used by Alzheimer's patients living at home with caregivers as well as the general public. Others were at a community hospital in Rochester, New York, and five private extended-care homes in New York City, Michigan, Minnesota, Oklahoma and Los Angeles. These gardens support the needs of patients for positive distractions, to help alleviate "catastrophic events," and answer their need for movement (Carman, 2002).

#### *2.7.1 Some Physiological Benefits of Outdoor Spaces*

Canadian landscape architect Mooney compared the incidence of catastrophic reactions in five facilities, two with outdoor areas for patients and three with none. A "catastrophic incident" is a violent outbreak on the part of a dementia patient, often posing a risk to himself or to staff members; frequently staff find it necessary to use

physical or chemical restraints to prevent the patient from injuring himself. Mooney found that patients with access to landscaped outdoor environments had a nineteen percent decrease in the number of these episodes over the course of a year. Those living in facilities with no outdoor space available suffered a 681 percent increase (Mooney, 1992).

Westphal did a similar study at a Michigan nursing home with her students. Nurses measured eight physiological indicators (including aggressive behavior, medication intake, pulse rate, blood pressure and weight change) in two groups of patients, for two years both before and after a therapeutic garden designed by the students was installed. Patients who spent more than ten minutes in the garden stabilized or improved on five of the eight measures. Those who did not go outside, or only went for a few minutes, “continued the downward spiral you would expect for the advanced stages of the disease,” according to Westphal, who is a doctor as well as a landscape architect (Galbraith and Westphal, 2003).

Getting outdoors also improves circadian rhythms and sleeping patterns in the elderly, while 15-20 minutes a day of direct sunshine provides vitamin D needed to prevent loss of bone density (Brawley, 2006). Such gardens also provide families of patients a safe and pleasant place to visit, particularly children who have difficulty sitting indoors with an unresponsive older relative. Staff benefit as well, using the gardens both as respite areas for themselves and as outlets for patients experiencing agitation and distress (Carman, 2002).

### *2.7.2 The 'Paradise Garden' Model*

A model for a 'paradise garden' for Alzheimer's patients proposed by Beckwith and Gilster would work equally well for any long-term elder care setting. They referred to the environmental behavior research of the Kaplans, Ulrich and Wilson to develop spatial configurations that would make people feel secure, relaxed and rejuvenated. This includes small enclosed seating areas and vistas ('refuge' and 'prospect'), as well as mature trees for a sheltering canopy and a small, metaphorical hill. Walls enclosing the entire garden and water features are borrowed from the Islamic paradise garden. The walls provide physical and emotional security, soothing caregivers who must worry about their patients getting lost. The elders themselves worry about getting lost, and may not use a garden if a perceived lack of security makes them too anxious. Water is also an essential feature, lending coolness, sound, and sensory pleasure; a fountain can serve as a node or landmark to aid in orientation (Beckwith and Gilster, 1997).

The three gardens at the Alois Alzheimer Center in Cincinnati, Ohio, were designed to fit the needs of people in progressive stages of the disease, applying this 'paradise garden' model. The Courtyard, an interior court of a former school, contains water, trellises, raised planting beds for the use of residents, and a clearly laid out looping path. Large windows permit views into the garden, to satisfy the need of residents confined indoors to 'escape' visually. Old-fashioned flowers like pansies, peonies, nasturtiums and snapdragons were planted, along with lavender, thyme and mint for olfactory stimulation. Beckwith and Gilster even mention Proust and

‘remembrance therapy,’ although this is a passive effect and not part of reminiscence or life review therapy as practiced by nurses and social workers.

The South Terrace garden is designed for patients who have more cognitive damage but continue to be very active, walking perhaps more than previously but having more trouble finding their way. This garden is smaller, with a pool as a focal point and a simple path leading around a raised planter to an arbor-covered seating area. The West Garden addresses the needs of the later stages of the disease. Plants to touch, like lamb’s ears, dusty miller, and ornamental grasses, are included to provide sensory stimulation, as well as more fragrant and colorful plants. Open paved areas sheltered from the sun by a trellis allow people in wheelchairs and walkers to navigate easily. A walking “track” is no longer needed at this phase of disability, yet it is still critical to meet the patients’ need for fresh air, sunshine and the sounds, smells and feel of nature (Beckwith and Gilster, 1997).

The therapeutic garden of the Veteran’s Affairs Medical Center in Topeka, Kansas, was designed for ‘interaction, rehabilitation and sensory stimulation” for patients with various types of dementia and/or other disabilities (Gray, 1999). A very specific program for stimulation of all the senses included aromatic plants of different intensities: “top” notes, “middle” and “base” notes, just as perfumers use the volatility of plant oils to build a scent. Nicotiana was added for nighttime fragrance, as well as herbs and scented geraniums so that patients could rub the leaves to release the smell (Gray, 1999).



All of these gardens address the needs of elders to have sensory stimulation, fresh air and sunshine in a safe and comforting outdoor environment. As a person ages, his or her world shrinks to a smaller and smaller arena. “Nature is the continuum that offers a restorative relationship. When all else is in turmoil, particularly for individuals with Alzheimer’s disease and their spouses and families, the garden offers peace, tranquility and quiet fascination” (Beckwith and Gilster, 1997).

### *2.7.3 How Well Can The Elderly Really Smell?*

A natural question at this point might be, “How well can the elderly really smell?” Many researchers have been concerned with this issue. Doty of the University of Pennsylvania’s Smell and Taste Center notes that “(i) large individual differences are present in the test scores of older persons (ii) noticeable olfactory dysfunction is most evident after the sixth decade of life; and (iii) men, on average, evidence age-related declines in odor perception at an earlier age than do women” (Doty, 1997). Supporting this variability, Engen states that while in general “there is a decline after age 50, there are very large individual age-related differences...Some very old people perform as well as people younger than 50” (Engen, 1991).

These studies, however, are not designed to stimulate spontaneous autobiographical memory. They are generally tests of short-term memory or odor recognition, where odors are presented and people must name them to ‘succeed’ in the test. Herz, Ackerman and others have shown that smell is not very verbally accessible, so the research format may affect these outcomes. Furthermore, an exhaustive study

funded by the British Foundation for Age Research noted that “We are educated to *see* and *hear*, but few, outside the world of perfumers, are educated to appreciate and describe odours” (Van Toller, Dodd and Billing, 1985). They point out that there are many confounding factors in studying smell in the elderly; chief among them the sense-deadening effects of many medications, but also cognitive and motivational influences.

The *National Geographic* Smell Survey found that “the olfactory system apparently replaces sensory cells regularly...age brought with it little decline in smell ability among respondents,” although “a gradual reduction in intensity of odors is a common feature of aging” (Gilbert and Wysocki, 1987). While only six different scratch-and-sniff odors were included in the Smell Survey, thirty percent of people over the age of eighty reported a strong autobiographical memory associated with at least one of them.

Chu and Downes’ experiments found that *actual* smells produced twice as many memories in old people as the *names* of the smells. While most researchers agree that perception thresholds for many smells get higher with the passing years—perhaps requiring a stronger stimulus—the memory links remain, possibly throughout life (Draaisma, 2001).

Horticultural therapist Bruce reports an interesting difference between seniors who garden and those who do not:

During lectures and horticultural presentations, we noticed that many of the senior citizens who didn’t garden couldn’t detect the aromas of pineapple sage, lemon grass, miniature roses, hyacinths and so many other delightful plants. The gardeners could describe the difference

between lemon verbena and lemon eucalyptus, dianthus and carnations, even the subtle variations among roses. It seems that those of us who play in the garden not only condition our muscles, we exercise our noses as well (Bruce, 1999).

Unfortunately, one symptom of Alzheimer's disease (as well as Parkinson's and several other neurological diseases) is the deterioration of the sense of smell, so patients in the more advanced stages may or may not benefit as much from the fragrance of the garden. Individual symptoms may vary a great deal. Claire Murphy, a researcher at San Diego State University, describes how autopsies of the brains of Alzheimer's patients show tangles of plaques in the areas (hippocampus and amygdala) where smell and memory are processed and stored (Schab and Crowder, 1995). More recently, scientists funded by the Fisher Center for Alzheimer's Research have isolated the beta-amyloid protein as the cause of these plaque buildups in the brain. (Alzheimer's Association, 2007). The medical details may be a bit complicated, yet it is important for the garden designer to be aware of factors that may limit patients' responsiveness to landscapes.

### 2.8 Aromas in Architecture and the Garden: A Brief History

Scent is the food of the spirit, and the spirit is the vehicle for the faculties of man  
the Prophet Muhammad

Inspiration for scented gardens can be found in the annals of history. Gardens of Persia used walls to contain scents generated by roses, jasmine, spring-flowering bulbs and fruit trees. The "four rivers of Paradise," two crossed water rills emanating from a central fountain, symbolized fragrant water, wine, milk and honey (Hobhouse, 2003). The walled and irrigated enclosed gardens of the whole Muslim world boasted fragrant

plants as their chief glory, because their perfumes were considered therapeutic. The well-known physician Avicenna, who lived from 987-1037, recommended aromatic plants to purify the air and improve heart function; his list of forty-four plants includes familiar favorites like iris, delphinium, rose, thyme, basil, peony, apple, pear, mint, myrtle and water lily, as well as more exotic items like frankincense and sandalwood. In the desert climates, night-blooming trees, shrubs and vines were also essential to enjoying the gardens in the cool of the evening (Husain, 2001).

Builders of mosques mixed rosewater, myrrh, cinnamon and musk with the mortar so that the scent of roses would emanate from the building in the noonday sun. In the Ethiopian plateau where the world's best myrrh originates, the eighty mosques of the ancient town of Harar still fill the town with the spicy, slightly bitter odor of myrrh (Barbara and Perliss, 2006; le Guerer, 2007). Battle and McCarthy, writing in the British magazine *Architectural design*, note that "temples and churches still use fragrance to lift the spirit and transform the everyday....early Indian temples were constructed entirely of sandalwood, and to the mortar of their temples the Babylonians added perfume" (Battle and McCarthy, 1996). The famous 2,000-year-old gate of the Hindu temple of Somnath, for example, is constructed entirely of still-fragrant sandalwood.

### *2.8.1 Olfactory Postcards*

The 'genius loci' which landscape architects are trained to study on each site may owe a great deal to the sense of smell. Smells are one of the key factors which help

gives places their identity. Travelers can relate to the concept of “olfactory postcards,” specific scents associated with particular cities and places (Barbara and Perliss, 2006). In the region of Cognac, France, for instance, evaporation from the barrels of spirits fill the air as the sun warms the buildings on summer mornings; locals call it “the angels’ share.” Different cultures in the past have had signature odors, such as resin and sage for Native Americans; patchouli, incense and vetiver for East Indians; laurel, lavender, thyme and rosemary for Cretans; and of course one can’t think of Provence without lavender. A list of vernacular architecture materials compiled by Barbara and Perliss brings up a whole world of odors:

- igloos*, heated by steatite lamps and lined with animal skins,
- Plains Indians *teepees*, made of buffalo hide and impregnated with wood smoke from fires
- Central Asian *yurts* covered in wool
- Masai *krall* made of bent branches covered with dung, clay and plant material
- Laplander *goatte* in wool, fabric, and reindeer skin with a birch-branch floor
- adobes* made of unburned clay and brushwood
- Mexican *pueblos* and their odor of rock
- fairy chimneys* in Cappadocia smelling of tufa (Barbara and Perliss, 2006)

Places smell differently from morning to noon to night, and from one season to the next—not just because of the plant and hardscape materials, but also because the population and activities change with time. A square that features a farmer’s market on

Saturday morning but brings a discotheque crowd at night will be a totally different olfactory environment in the course of one day. Again, people who have different diets and hygiene habits will smell variously: garlic eaters one way, beef eaters another (especially to vegetarians). A pavilion built to represent Switzerland at the Hannover 2000 Expo was made of large, unseasoned larch and pinaster (a type of pine) beams. The open-sided space was as cool as a forest even on hot days, and the woods releasing their resins as the sun warmed them gave visitors “the sensation that they were in a wood-aging shed, an unforgettable atmosphere for mountain dwellers and an apt icon for Switzerland” (Barbara and Perliss, 2006).

### 2.8.2 *Gardens of the Cloister*

Some of the earliest therapeutic gardens were the cloisters and hospices of medieval Europe. These spaces were intensely fragrant, with fruiting trees and shrubs as well as herbs, roses and other flowers adding to the bouquet (Verey, 1981). Stone walls captured the scent; the large, heavy scent molecules lying near the ground in the mornings would become volatile as the sun warmed them and rise through the day to perfume the air. St. Bernard of Clairvaux (1090-1153) describes the cloister hospital garden at his monastery:

Many and various trees, prolific with all sorts of fruit, make a veritable grove...it offers to those who are strolling about a spacious walk, and to those overcome with the heat, a sweet place for repose. The sick man sits upon a green lawn...for the comfort of his pain, all kinds of grass are fragrant in his nostrils. The lovely green of herb and tree nourishes his eyes...The choir of painted birds caresses his ears...the earth breathes with fruitfulness, and the invalid himself with eyes, ears and

nostrils, drinks in the delights of colors, songs and perfumes (quoted in Gerlach-Spriggs, et al., 1998).

The religious wars following the Reformation put an end to many of these monastic healing gardens, but we can still learn from the remnants of the past.

Demented patients in the hospital at Zaragoza, Spain, founded in 1409, were the lucky few. Instead of being subjected to the usual practice of being chained up, beaten and starved, they followed a regular routine of farm work and household chores, with healthy meals, fresh air and sunshine. This hospital provided the precedent for nineteenth-century reformers, including Phillippe Pinel and Florence Nightingale, of bringing mentally ill and infirm patients out into the garden.

This tradition continues today in the Friends Hospital outside of Philadelphia, and at the Hospice at the Texas Medical Center in Houston. The Houston hospice is situated on the grounds of the former Holcombe estate, where terminally ill patients can be wheeled out under the ancient live oaks. A separate children's garden accommodates both young patients and visiting children, while a series of formal ornamental gardens designed for walking complement the Tudor architecture of the manor house. The goal of landscape architect Pickworth (whose father was dying of cancer at the time) was to create "something 'that would make the residents breathe easier,' ...not just visually pleasing but experientially sumptuous" (Gerlach-Spriggs et al., 1998).

These latter-day therapeutic gardens demonstrate the same principles as the earliest walled cloisters and hospices, continuing a centuries-old tradition of bringing comfort to the sick through healing landscapes.

### 2.8.3 Expert Advice on How to Use Fragrance in the Garden

The modern Chelsea Physick Garden descends from the tradition of establishing homes for army and navy veterans in England and France. Minter, the curator, includes a chapter on the use of scented plants in her book on healing gardens. She offers practical advice on placing plants: what fragrances carry and which don't; which can be trod upon to emit perfume, or line a path so passersby brush against them; which plants should be put in raised beds so that a faint but charming fragrance can be enjoyed; which will climb around windows to scent the rooms within. She also lists the chemical compounds that comprise the fragrances of various plants, along with the reported effect of their essential oils on humans (Minter, 1993).

A number of other writers (Loewer, 1993; Lacey, 1991; Verey, 1981) have explained the history and lore of fragrance gardens and how best to use aromatic plants. They provide advice on using sun, wind and walls to contain and intensify scent in the garden, a practice carried over from medieval cloisters. The role of breeze in moving scent was pointed out by French perfume magnate Ricci in an *Architectural Digest* article about his estate in Courances (Styles-McLeod, 1989). "When the wind blows," he says of his garden, "it's like paradise, because you have the scent of the flower, the leaf, the seed and the wind blowing through them." He also follows the ancient French custom of including fruit: raspberry and currant bushes, apple and cherry trees add seasonal fragrances in his garden alongside the roses, peonies and lilacs.



#### 2.8.4 Modern Architecture and the Quest for 'Abstract Odorlessness'

Much as many modern architects have tried to banish all odor from their buildings, something remains. "Modernism achieved an ideal that was at times aseptic, a clinical and medical aesthetic...But in a place without odor the body is lost" (Barbara and Perliss, 2006). A few architects have been aware of the effects of odors in their designs. Some works of Aalto and Asplundh smell "insistently" of thyme. Both Wright and Neutra arranged private residences to enclose scent with courtyards, or take advantage of prevailing breezes blowing fragrances of sage up California coastal canyons. Neutra wrote eloquently about the smells of architectural materials as well:

The hygroscopic cut stone of medieval cathedral masonry has its gaseous exhalations, supported by those of moist microbotic life, which make ancient interiors recognizable to one with blindfolded eyes...it remains questionable whether future designers will, by mere negation, content themselves simply to produce abstract *odorlessness* .... Perhaps they will learn to know the pertinent physiological effects of the exhalations of their structural and finishing materials (Neutra, 1949).

He concludes, "One can achieve a differentiation richer, more pleasant ...than when a design is merely concerned with visual perception and ignores all other potential aims" (Neutra, 1949). "Abstract odorlessness" or antiseptic absence of smell is one factor that makes nursing homes feel more like hospitals than homes.

More recently, landscape architect Haag described his design for the moss garden at the Bloedel Reserve on Bainbridge Island, Washington in these terms:

...the smell of rotten wood, the dampness and the dripping moisture, the absence of anything that is demanding, the absence of flowers or form...produces a universal response, appealing to all of our senses,

smell in particular. Smell is very primitive. It takes you right into the brain stem (Haag, quoted in Saunders, 1998).

A visitor to the Bloedel Reserve described her mystification at the sweet caramel smell that seemed to accompany her everywhere during an autumn visit. Upon inquiry, it turned out to be the odor of fallen leaves of the katsura trees blanketing the paths, releasing their fragrance as she trod over them (Surla, personal communication, 2004).

### 2.9 Possible Lessons from Aromatherapy Research

Many people during the course of this study asked the researcher, “Have you looked into all the aromatherapy research?” If a plant-derived oil has a certain physiological effect, the plant itself in the garden might as well. However, traditional aromatherapy practice tends to invite skepticism. Aromatherapy was once to olfactory research what astrology is to astrophysics: a disreputable stepchild. In fact, the Sense of Smell Institute has created a new term, “aromachology,” to distinguish the scientific study of physiological and mental effects of odorants on human beings from the crystals-and-caverns crowd (SOSI, 2007).

Thus, some scientists are now testing the claims of aromatherapy practitioners, to see if certain smells do lead to measurable physiological reactions. They want to know, as well, if the smells alone are effectual without the massage usually accompanying aromatherapy. At the University of Cardiff, Wales, olfactory researchers Jacob and Fraser have shown that rosemary does in fact stimulate while ylang-ylang relaxes people, as aromatherapy practitioners have long claimed. Their experiment used

EEGs, galvanic skin response, and heart and respiratory monitors to measure reactions to these volatile oils (Fraser and Jacob, 2000).

At the horticultural therapy program at Kansas State University, researchers recently measured skin temperature response, beta brainwave activity, electrodermal activity (EDA), sadness and anger/aggression while students smelled lavender oil or looked at a flower arrangement. They found that the lavender scent significantly lowered beta brainwave activity and EDA, especially in the female students, indicating a reduction in stress. Positive emotions were reflected in reduced sadness and anger. Interestingly, male students were more aroused and less relaxed by the lavender fragrance, while the flower arrangement seemed to soothe them emotionally. Whether this is a function of male preference for odors other than lavender, the threshold setting of the odor diffuser, or some other factor is yet to be determined (Liu, Kim and Matteson, 2003). Lavender fragrance was shown to improve sleeping patterns in dementia patients in another study (Henry et al., 1994).

Although this type of research is relatively new, it may offer avenues for therapeutic garden designers to consider testing. It would be much more difficult to control a study in a real garden, yet aromatherapy research might give us clues about how different plants in the garden affect us physiologically and emotionally.

### *2.9.1 Consumer Behavior and Office Productivity Studies: The Road Not Taken*

Retailers and office managers have long diffused scents into shopping areas and offices to influence consumer behavior and worker productivity. Environmental and

performing artists also use scent to enhance the sensory experience of their works, often with the underwriting and assistance of the fragrance industry. However, these disciplines and their techniques are somewhat removed from using plant essences for memory retrieval or reminiscence therapy, and therefore are not treated here.

#### 2.10 A Few Caveats About Staff, Maintenance and Unbridled Enthusiasm

It is tempting to run out and propose fragrance and horticultural therapy gardens in every elder-care center in the country. However, those who have actually participated in and written about these projects warn of overburdening already-stressed healthcare workers. When designing complex gardens, appropriate budgets and training for maintenance staff are essential. Troxel and others caution that many gardens have been built only to fall into disuse, because nursing staff may lack the knowledge and motivation to use them, or design flaws (glare, uneven surfaces, lack of seating) make the spaces uncomfortable or unsafe (Troxel, 2005; Chapman, Hazen and Noell-Waggoner, 2005).

The Chicago Botanic Garden's Buehler Enabling Garden functions as a model for therapeutic gardens. Its staff offers training and resources on how to build enthusiasm in healthcare staff and surrounding communities, raise funds, solicit pro bono work, and set up successful programming (Shoemaker, 2002). These and other resources should be consulted before diving into a therapeutic garden project, because if the people actually running day-to-day activities do not buy into it, it will not live up to expectations.

### 2.11 Summary

There is a wealth of information available for the landscape architect to draw on when contemplating a therapeutic garden project. While this literature review is by no means comprehensive, it should give practitioners a good start on surveying the medical, historical, and sociological writings that can guide them in designing an effective and beautiful landscape to improve health, safety and well-being in the elderly.

CHAPTER 3  
RESEARCH METHODS

3.1 Introduction

This research hopes to answer the following questions, which were raised by the literature review:

- 1) Does the basic hypothesis seem plausible: that landscape architects could include scent for the purpose of reminiscence therapy in gardens in long-term care settings?
- 2) Is this already being done anywhere? If so, with what results?
- 3) What plants are recommended for triggering reminiscence in different regions of the country?
- 4) Are there construction materials that trigger reminiscence as well?
- 5) Any other comments?

These questions are best answered by qualitative research. An in-depth interview—defined as a “conversation with a purpose”—permits richness in the data, allowing room for expansion of thoughts as the interview progresses (Ritchie and Lewis, 2003). Experiences, processes and plant and materials knowledge are addressed by the specific questions. Yet individual cases and stories may surface in the flow of conversation that may contribute to understanding therapy in an outdoor environment.

The researcher is both a ‘miner,’ seeking nuggets of information buried in the informants’ consciousness, and a ‘traveler,’ co-creating knowledge as interviewer and interviewee tread the path of research together (Kvale, 1996).

### 3.2 Research Design

The subjects in this study were selected across all relevant fields of experience: practicing landscape architects who design therapeutic gardens; horticultural therapists; and gerontology nurses with expertise in therapies for older adults. They were chosen in the process of conducting the literature review, or by recommendation of other experts. Several of the respondents were added to the sample after the initial selection, because it became apparent that the medical perspective was lacking and should be represented (Ritchie and Lewis, 2003). Each respondent has demonstrated interest in the research topic, having published articles or books relating to therapeutic gardens, horticultural therapy, or reminiscence therapy.

Potential subjects were initially contacted by email. Their email addresses were obtained through the American Society of Landscape Architects membership directory, the American Horticultural Therapy Association membership directory, or in the case of academics, through their university department websites. The first email was followed up with a phone call to establish an interview time. All but one interview was by telephone, as most respondents live out-of-state. Most interviews were digitally recorded to ensure accuracy and later transcribed. Interviews were conducted until a theme or pattern of repeated information emerged, and it was felt that data saturation

was achieved. A total of eighteen interviews were conducted, and one long email response was obtained. All took place in April 2007.

### 3.3 Interview Structure

In general, the researcher gained familiarity with the work of the study participants through the literature review. However, some additional research was required to prepare for several of the interviews. The purpose of the interviews was to obtain expert opinion of the research hypothesis: that scent could be intentionally incorporated into therapeutic gardens to stimulate recall of autobiographical memories in the elderly, aiding structured reminiscence or life review therapy. This fundamental question was posed first, and often led to wide-ranging discussions as well as questions from the participants. Questions about specific plants and construction materials came later, followed by any comments or stories the participants wished to offer.

While it is natural for people involved in therapeutic garden design to share a bias about this subject, it is also necessary to interview experts to obtain meaningful results for this study.

### 3.4 Study Participants

*Brian Bainnson, ASLA*

Brian Bainnson is a landscape architect practicing in Oregon, with over 16 years of experience in a variety of private and municipal projects. He was selected for this study because of his involvement with the design and planning of the Portland Memory Garden, a therapeutic garden in a public park created for people with Alzheimer's



disease, their caregivers, and the general public. He also works with the Legacy Health System on their therapeutic gardens, and is working on master planning gardens of the Providence Benedictine continuing care campus for the elderly in Mount Angel, Oregon.

*Elizabeth Brawley, IIDA, AAHID*

Elizabeth Brawley is an expert in environmental design for the aging. Her firm, Design Concepts Unlimited, specializes in creating interiors and whole environments for people with Alzheimer's disease as well as other facilities for older people. Her books, *Designing for Alzheimer's Disease: Strategies for Creating Better Care Environments* and more recently, *Design Innovations for Aging and Alzheimer's: Creating Caring Environments*, have been recognized as essential compendiums of practice in this area.

*Jack Carman, FASLA*

Jack Carman is the president of Design for Generations in New Jersey, and headed up the committee to build eight Alzheimer's gardens across the country as part of the ASLA's centennial garden celebration. He is a leading expert in designing garden facilities for the aging, especially for people with Alzheimer's disease, and has been a landscape architect for over twenty years. He is the author of the section on therapeutic gardens in assisted living communities for the ASLA Technical Information Series (LATIS 2005), as well as other publications related to gardens for the elderly.

*Kenneth Durand*

Ken Durand is the Chief Executive Officer of the C.C. Young Retirement Community in Dallas, Texas, and an adjunct professor of sociology in the Department of Applied Gerontology at the University of North Texas. He has advocated advances in long-term care for the elderly for many years. He serves on the board of directors for the American Association of Homes and Services for the Aging (AAHSA).

*Nancy Easterling, MSW, HTM*

Nancy Easterling is the current president of the American Horticultural Therapy Association. She is the coordinator of horticultural therapy activities at the North Carolina Botanical Garden in Chapel Hill. She leads garden tours, plans the educational programming and consults with area nursing homes interested in building therapeutic gardens. She has written and lectured on horticultural therapy for many years.

*Barbara Haight, PhD, RN, FAAN*

Barbara Haight is a widely recognized writer and researcher on the subject of reminiscence and structured life review therapies as well as gerontology. She is Professor Emeritus at the College of Nursing, Medical University of South Carolina, and a Fellow of the Gerontological Society of North America. Her book credits include *Working with Older Adults: Group Process and Technique* and *Art and Science of Reminiscing: Theory, Research, Methods, and Applications*; she has also published many articles in journals related to gerontological nursing.

*Rebecca Haller, MS, HTM*

Rebecca Haller is the director of the Horticultural Therapy Institute in Denver, Colorado; she has been teaching and practicing horticultural therapy for almost thirty years. She also teaches horticultural therapy classes at Colorado State University, and at the horticultural therapy certificate program she developed at the Denver Botanic Gardens. She is a past president of the American Horticultural Therapy Association and has published various papers on the subject of horticultural therapy.

*Teresia Hazen, MEd, HTR, QMHP*

As head of horticultural therapy for Legacy Health Systems in the Portland/Vancouver area, Hazen uses plants and nature-related activities to assist in the treatment and/or rehabilitation of adult and pediatric patients. She also is the primary instructor for Legacy's horticultural therapy certification program. She was instrumental in the design and implementation of several award-winning healing gardens at Legacy's hospitals and a community garden designed specifically for people with dementia (Portland Memory Garden). She has served on the AHTA Board of Directors and serves on the Therapeutic Garden Design Certificate Advisory Board and faculty at the Chicago Botanic Garden.

*Robert Hoover, ASLA*

Robert Hoover is a landscape architect with over 25 years of experience. He is noted for developing a series of gardens responding to the various stages of Alzheimer's disease for Sedgewood Commons in Maine. He has published and lectured widely

about this and other therapeutic garden projects, and helped establish the Chicago Botanic Garden's Healthcare Design Certificate Program.

*Johanna Leos, MAg, MBA, HTM*

Johanna Leos serves as the Coordinator of Horticultural Therapy Services at the Chicago Botanic Garden. These include the delivery of horticultural therapy educational programs to community agencies that provide special education and early intervention services, mental health treatment, services for the blind, and psychosocial rehabilitation for children, adults, and seniors. Since 1996 Ms. Leos has worked as a horticultural therapist with private and government funded facilities, providing design strategies for successful and sustainable horticultural therapy programs.

*Catherine Mahan, FASLA*

Catherine Mahan has over twenty-five years of experience in landscape architecture and project management. Her firm, Mahan Rykiel Associates, has completed landscape designs for a large University of Maryland hospital campus, and many senior healthcare and retirement living projects around the country. Since founding her own firm in 1983, she has worked on many public projects in urban environments, as well as private commercial and residential developments.

*Patrick Mooney, CSLA*

Patrick Mooney is a professor of landscape architecture at the University of British Columbia in Vancouver. He has published several important studies on the effects of outdoor environments on people with dementia. He has a BMus, an MLA,

and is currently working on a PhD in the School of Natural Resources and the Environment at the University of Michigan. He worked in horticultural therapy in its early days and published a handbook for program developers, *Introduction to Horticultural Therapy*. He also co-authored “Therapeutic Landscapes in the Public Realm: Foundations for Vancouver’s Wellness Walkways,” in the 2005 ASLA *LATIS Forum on Therapeutic Garden Design*.

*Jane Nunnelee, RN, PN, PhD*

Jane Nunnelee is a geriatric nurse practitioner specializing in gerontology at Baylor University Medical Center in Dallas, Texas. She has a PhD in Applied Gerontology and many years of experience working with both well aged and elderly people with dementia, as a consultant and home visit nurse.

*Naomi Sachs, ASLA*

Naomi Sachs operates her own landscape and consulting design firm, specializing in restorative landscapes for private, commercial and public spaces. She is also the founder and executive director of the Therapeutic Landscapes Resource Center, Inc., a non-profit organization that provides information through an award-winning database ([www.healinglandscapes.org](http://www.healinglandscapes.org)). She chairs the ASLA Healthcare and Therapeutic Design Professional Practice Network. Sachs a graduate certificate in historic preservation from the University of New Mexico School of Architecture and Planning, as well as an MLA from the University of California, Berkeley.

*Rosheen Styczinski, FASLA*

Rosheen Styczinski is the principal of New Eden Landscape Architecture in Wisconsin. She has designed many healthcare and restorative gardens in her 25 years of practice, as well as serving on the regulatory board for landscape architects in Wisconsin. She has also completed the Chicago Botanic Garden's Horticultural Therapy Certification program and worked as a volunteer horticultural therapist.

*Martha Tyson, ASLA*

Martha Tyson is a landscape architect with over fifteen years of experience in designing healthcare, retirement home, school and residential gardens. She is the author of *The Healing Landscape: Therapeutic Outdoor Environments*, as well as numerous articles on the process of designing healing gardens. She facilitates workshops and lectures around the country on creating therapeutic gardens, and is a design consultant with the Chicago Botanical Garden Horticultural Therapy Service Program.

*Joanne Westphal, OD, ASLA*

Joanne Westphal teaches landscape architecture at Michigan State University, and is also a practicing physician. This gives her a valuable dual perspective on therapeutic garden design. She and her students have conducted several evaluations on behavior of patients with dementia both before and after building a therapeutic garden at a local healthcare facility. She is currently working on a book on therapeutic site design, incorporating the information gleaned from her experience.

*Pauline Youngren, RN*

Pauline Youngren is the assistant director of nurses at the Providence Benedictine Community Care home in Oregon. This facility includes independent living for the elderly, adult foster care homes, assisted living, and a 96-bed nursing unit with dementia care. She has studied horticultural therapy with Teresia Hazen and is working with Brian Bainson on developing therapeutic gardens for the whole Providence Benedictine center. She has a strong interest in incorporating horticultural therapy practice into daily living in the all sectors of community living for older adults.

### 3.5 Summary

Qualitative research methods using conversational, open-ended interviewing were chosen as the best way to address the research questions. Because of the cross-disciplinary nature of this research, some of the interviewees asked the investigator to explain certain research findings from the literature review, particularly various aspects of brain function and reminiscence/life review therapy. Very little has been written specifically about using scent in gardens for reminiscence therapy, and it is difficult even for experienced practitioners to keep up with medical and psychological literature. Although some horticultural therapists do use scent to generate conversations about the past with their elderly clients, it is not in the context of a structured reminiscence group or life review therapy. Part of the aim of this study is to share information, both among expert groups and with the larger population of landscape architects and horticultural therapists who work in therapeutic garden design and programming.

Background on the study participants is included in this chapter, because a key part of the elite interviewing technique in qualitative analysis is identifying and recruiting knowledgeable experts in the area of inquiry (Marshall and Rossman, 1989). Their responses are included and analyzed in the following chapter.



## CHAPTER 4

### RESEARCH FINDINGS

#### 4.1 Introduction

The main goal of this study was to determine if experts in the fields of therapeutic garden design found the research hypothesis plausible and worthy of further exploration: Does it make sense to deliberately include fragrant plants and materials in gardens for the elderly, to trigger early memories and facilitate reminiscence therapy? The logical next step was to find out if the respondents knew of facilities where this was occurring. Finally, experts were asked what plants and construction materials were effective stimuli for memories, and a list was generated which may be applied to other sites with similar growing conditions.

Many other comments were offered by the respondents in the study, ranging from the need for more research to personal stories about their grandpas. Several themes became apparent in the course of the interviews which were not anticipated; these are analyzed after the discussion of the research questions. These additional categories of meaning are valuable indicators of what's on the minds of practitioners in the field of therapeutic garden design.

#### 4.2 Question 1: Could aromatic plants and construction materials be used in gardens for the elderly for reminiscence therapy?

For all but one respondent, the answer was positive. That respondent felt that older people could not smell well enough for the aroma to be effective, unless it were extremely strong. The remaining experts agreed that they had often seen long-term memories being called up by the fragrance of a particular plant, or experienced it personally, or both. Hoover, a landscape architect who designed one of the first Alzheimer's gardens and is familiar with reminiscence therapy, stated, "I absolutely know it works. There are too many examples in my experience of certain plant materials that do that (trigger memories of the past)." One landscape architect who has also completed horticultural therapy training said, "You know, you're going back to the (nursing) home every week, and it's a different small miracle every time." However, several of the landscape architects had not heard of reminiscence therapy. "No doubt in my mind that scent triggers long-term memory—I've seen it happen," said one. "The question is, what's the benefit of that?" The researcher had to explain the practice of reminiscence therapy before the potential utility of recalling memories in the garden could be judged.

The six experts with horticultural therapy training interviewed were aware of the process of accessing memories with fragrance and the benefits of reminiscence, although only a few conduct group reminiscence therapy in the garden. Haller, who has taught horticultural therapy for many years, notes that most trained horticultural

therapists are familiar with both the practice and terminology of reminiscence therapy. It is included in the standard horticultural therapy certification program at the Chicago Botanic Garden. “Strong memories are evoked by the sense of smell,” notes Schofield, a horticultural therapist in New Jersey. “This idea of reminiscence therapy sounds like a part of what we do as a regular part of horticultural therapy” (Carman, personal communication, 2007).

Hazen agrees that reminiscence therapy is a normal part of horticultural therapy training, whether indoors or outside. At the Legacy Health System gardens, they also do structured life review with “the very older adult,” a more intensive and individual process. “We always want to relate to it to the past,” she notes. “I don’t care about teaching them about *our* garden. We use the garden as a tool for them to reminisce about the past.” Haight, the dean of reminiscence and life review therapeutic practice, explained that “scents serve as probes for further conversation...(you can) use the garden as a prop to stimulate memory.”

Another horticultural therapist noted that using plants to stimulate long-term memory is very effective for people with dementias, particularly vascular dementia, because “they feel kind of lost without things to talk about.” She has witnessed occasions when a person who has not recognized family members for some time will suddenly know them again in association with a familiar scent: “It happens quite a lot.” “The magic of the day,” Styczinski calls it, “when you get the child of the person (in the home) there, working with them, and you get some interaction with the family,” from

elders who hadn't had that recognition recently. Easterling pointed out that using scent "builds on past relationships people had with plants," while Youngren, a gerontology nurse, said that fragrance evokes old memories "instantaneously. It's the old memories that are retained—the newer ones are gone."

#### *4.2.1 Some Cautions*

The most significant cautionary remarks had to do with placing too much emphasis on any one therapy or garden element. While smells and memory provide "serendipity," notes Hoover, "scent and reminiscence therapy need to be (just) one component of what makes up the garden." Hazen concurs, observing that in her experience, people go to brightly colored flowers first and then begin noticing the various scents. She maps the gardens for all five senses, through all four seasons of the year, to make sure there is plenty of stimulation for everyone.

One respondent felt that elderly people generally lose their sense of smell, and that it take a very strong fragrance to be detectable. Conversely, several others have heard or read that 'smell is the last thing to go' in older people. Youngren, however, noted that while some older adults really cannot smell much, it is extremely variable from one individual to another and even from one plant to another. This illustrates Hoover's rule, which is "Never say never!" Or as Carman quoted from the Alzheimer's Association literature, "When you've met one person with Alzheimer's, you've met one person with Alzheimer's." So many factors can affect a person's sense of smell—colds,

allergies, medications, gender, even genetics—it is impossible to generalize about whole populations simply based on age.

A horticultural therapist cautioned that strong smells can make people receiving chemotherapy treatments sick, so this type of fragrance-related therapy would not be appropriate for them. And one respondent jokingly warned of the dangers of overstimulation, recounting how in conducting research with aromatherapy oils, she and a colleague had overdone the dosage and “...gone to the manic side....we were like little old ladies at the perfume counter at Macy’s. I would never have thought about the power of aromatherapy until that experience!” she said.

4.3 Question 2: Do you know of facilities where fragrant plants are being used for reminiscence therapy?

This question overlapped to some extent with Question 1, since respondents explained their working situations as they answered the question. In general, there don’t seem to be many facilities where either structured group reminiscence therapy or individual life review therapy are being done with fragrant plants, or even outdoors. Large botanical gardens such as those in Chicago, Denver and Chapel Hill, where horticultural therapists lead groups of elderly people about the gardens, do have such programs. However, they are not clinical, in that the same groups of therapists and elders do not meet weekly to make progress together.

Legacy Health System has perhaps the most extensive system of therapeutic gardens in the country—six gardens in five hospital centers, with several more planned. The goal of their therapies is to “help people focus on something other than their

impairment,” according to Hazen. Youngren, whose facility has elders in all levels of long-term care, from independent living through dementia units, says gardens provide a welcome relief from the “medical sights and sounds and smells.” The more therapies can be conducted outside, whether as structured groups or just passive, individual reminiscence, the better off people are. “People aren’t necessarily sick,” she notes. “They just need assistance. When it’s a nice day, everyone wants to go outside. They need good quality days.”

Morris often used herbs in her horticultural therapy practice in hospices in Florida, and felt that they offered many opportunities for reminiscence and distracting patients from their situation. Lavender and spearmint alleviated anxiety, and small vases of herbs gave patients something to talk about with visitors. While not everyone was responsive, some were very enthusiastic. “One patient’s interest was obvious when I walked into his room with a vase of ‘green leaves,’ ” she writes. “He immediately identified them as herbs and told me, as he buried his face in them and relished their aromas, that he had been a chef and loved using fresh herbs” (Morris, personal communication, 2007).

A more comprehensive survey would be needed to determine if there is a great deal of reminiscence therapy using scented plants in gardens going on around the country. From this small sample, it appears that horticultural therapists do conduct some reminiscence therapy. But unless they are on the staff of a large institution like Legacy Health System, or a contractor visiting a long-term care home regularly, it may be

sporadic or a one-time occurrence for individual elders. Regular clinical therapy implies intake assessments and an individualized program to meet identified medical needs. It is debatable whether a tour of a sensory garden that includes use of fragrant plants and recall of memories qualifies as therapy, even though it may have a therapeutic effect.

4.4 Question 3: Have you found particular aromatic plants that trigger autobiographical memory?

Horticultural therapists and landscape architects both knew of many plants that stimulate long-term memory, even without thinking about the question in advance. Herbs, lilacs and roses were mentioned most often. Nostalgia and familiarity were key characteristics. “Old fashioned flowers bring back the best memories,” according to Gerry Stride, a horticultural therapist at an elder-care facility in New Jersey. “Older residents are not familiar with all the new hybrids, but old fashioned ones seem to evoke the most memories” (Carman, personal communication, 2007).

A surprising finding was that several people mentioned native plants gardens. Although these may or may not have a distinctive fragrance, native plants are worth including because otherwise it may not occur to therapeutic garden designers to add them to their plant palette. One thinks of nostalgic plants as being those in “Grandma’s backyard,” not “Grandma’s backwoods.” Hazen remarked that many people head for the Pacific Northwest section of the garden first, given a choice, “especially the men.” Bainnson cites the cedars, Douglas firs and evergreen ferns as fragrant Northwest natives that resonate with people. Horticultural therapists with access to such gardens

noted the same effect; Easterling mentioned columbine as a North Carolina native that stirred up memories in many people, as well as pines, cedars and hemlock.

#### *4.4.1 Taste and Smell*

Vegetables, though again not always fragrant, fall into the “familiar and meaningful” plant category. The Piedmont garden at the North Carolina Botanical Garden has such staples as okra, tomatoes, cabbage, cotton, tobacco, peanuts and potatoes. Easterling tells of one old gentleman who waxed eloquent about his potatoes, even sharing recipes with her. Corn was the crop that brought a depressed, elderly Wisconsin farmer to life, as Styczinski relates: “I mentioned that the corn was coming up, and would be ‘knee high by the Fourth of July,’ and he just opened up.” A nurse later told her he hadn’t been so animated in a very long time.

Haight noted the strong connection between taste and smell, remembering the pleasure a group of South Carolina old people derived from growing their own watermelons, cutting them open and eating them. Carman mentioned raspberries and strawberries, as well as a BLT party the elders had in the garden when their tomatoes ripened. Since taste buds only distinguish four or five tastes, most of one’s sense of taste actually derives from the odorant molecules entering the nasal cavities from both inside and outside the mouth (Saltus, 2007). Food plants constitute another category that a landscape architect may not normally consider when designing a therapeutic garden. Plants mentioned in the interviews are listed below.



Table 4.1 Herbs

<i>Name of herb</i>	<i>Number of mentions</i>
Rosemary	6
Oregano	2
Sages	4
Lavender	6 Help allay anxiety in hospice patients, calms restless Alzheimer's patients
Basil	4
Chives	2
Mints	2 Spearmint was a favorite for one
Thyme	1
Lemon verbena	1
Lemon balm	2 smells like Lemon Pledge, recalls domestic life (dusting)
Culinary herbs in general	2 bring up cooking memories

Table 4.2 Shrubs

<i>Name of Shrub</i>	<i>Number of mentions</i>
Roses	10 N. England coast esp. <i>Rosa rugosa</i> 'brings back the beach'
Lilacs	10 plant most often mentioned in lit. and interviews
Daphne	2 highly fragrant, popular shrub
Boxwood	2 popular with people from the east
Hydrangeas (not for scent so much)	2 nostalgic 'grandma' plant
Gardenia	3 high school dance corsage flower for women of "a certain age," who were girls in the 30s and 40s
Viburnums	3 <i>V. juddii</i> , <i>V. carlesii</i>

#### A shrub story

"One day we sat on the back porch dead heading flowers. One middle stage dementia resident began to talk to the plant. She said, 'They think there's not much life left in you, but you've got them fooled. There's plenty of life left. They just don't know it.' As she talked on, I realized she was talking about her own life and her sense of being forgotten. She had always been a gardener. She was able to express her feelings through the plant. Perhaps in sharing the story she felt better."

--told by Gerry Stride, horticultural therapist (Carman, personal communication, 2007)

Table 4.3 Trees

<i>Name of Tree</i>	<i>Number of mentions</i>
Cedar	2
Pine	1
Douglas fir	1
Hemlock	1
Honey locust	1
Flowering crabapple	1 ‘smells like spring’ in Wisconsin
Linden	1 spring flowering trees help with sense of time in older people
Oak	1 people used to carve initials in trees
Elm	1
Pecan	1 in Texas—people have pecans in back yards, gather pecans to make pie
Magnolia	1

Table 4.4 Annuals and Perennials

<i>Name of Flowers</i>	<i>Number of mentions</i>
Peonies	1 old fashioned 'Grandma plant'
Scented geraniums & pelargoniums	4 <i>Pelargonium tomentosum</i> 'Peppermint' <i>P. denticulatum</i> 'Pine' Regular geraniums very familiar also
Heliotrope	1 vanilla scent
Marigold	1 pungent smell, in many old gardens
Violas/violets	2 sign of spring
Lilies/Easter lily	3 religious meaning, families tend to visit at Easter
Hyacinths	1
Narcissus	1 traditional winter forcing bulb
Primrose	1 maybe more for color than scent
Fragrant coneflower	1
Honeysuckle	2
Daylilies	1
Daisies	1
Lily of the valley	1

4.5 Question 4: Have you found particular aromatic construction materials that trigger autobiographical memory?

This was a difficult question for most people to answer. There were three or four mentions of earth, mulch, and soil smells as being very evocative of memories. In terms of normal construction materials, cedar came to mind for two or three people—Western red cedar on the west coast, eastern white or red cedars in the east. The discussion turned instead to seasonal phenomena that stimulate long-term memories.

Mooney mentioned propylus, the sticky, gummy coating of new leaf buds that bees use in hive-building, as being particularly evocative for him, since he kept bees as a young man in England. “It’s a great topic, (one) could do a lot more with that,” he mused. “The leaf scents, trees blooming, the soil...” Hoover brought up the smell of new lawns being cut, as well as mulch and earth. The North Carolina contingent of horticultural therapists thought of the pines, the sweet gums, and even the way the soil smelled at peanut harvest time. The “wet, dripping” Pacific Northwest evergreen forests resonate in the memories of many people there, according to Bainnson.

Haller described the smell of the sagebrush after a hard summer rain in the intermontane West, as well as the pungent odor of wild mustard in the desert in the spring. She said she would know she was in an aspen grove in the fall “even if I were blind,” because of the distinctive odor of fallen aspen leaves. She noted that Ponderosa pine bark, as well, smells like vanilla on the warm side of the tree where the sun hits it. In the same region, Sachs noted the smell of pinyon pine after a summer rain in New

Mexico. Styczinski said Wisconsin natives are “very fond of their crabapples...when you open the window when they’re blooming, it smells like spring.”

So it is clear there are natural phenomena that are very evocative for people, and landscape architects and horticultural therapists may already be aware of them. It would be interesting and worthwhile to try to incorporate these effects more consciously into therapeutic gardens. By paying attention to wind, walls and orientation, naturally occurring smells in the exterior landscape could be captured in the garden. Or in a more urban setting, one could incorporate some of the plants or materials that generate these aromas.

#### 4.6 Question 5: Do you have any other comments?

This question generated some of the richest and most interesting themes. Although it presented a challenge to the inexperienced interviewer to steer the discussion to fragrance and memory, many interrelated issues were raised that are worth further investigation.

##### *4.6.1 Ethnic Differences*

Several respondents noted that herbs which resonate with one group of elders might actually offend others. For instance, rosemary, which carries delightful cooking and literary associations for people of European descent, is used in some Asian cultures to mask the smells at funerals, according to one horticultural therapist. An interviewee in the Pacific Northwest also noted many cultural ‘no-no’s’ made in a recently built Chinese garden, which is now being modified after consultation with the Chinese

community. Bainnson described a meeting at a Cedars-Sinai home for elderly Jewish people, where he had designed a garden using Jewish religious motifs suggested by the facility's administrative staff. The residents disliked it so much, "I had to pull the drawing off the wall!" he related. Fortunately he had prepared several alternatives. Hazen cautioned that therapeutic gardens must be inclusive and not exclusive, especially in a public park or in hospitals like the Legacy system that serve a wide range of people.

#### *4.6.2 Economic Differences*

Mahan noted that economic factors may affect the type of garden elderly people will appreciate. Based on some of Hoover's early work, she was discussing the use of garden props like mailboxes and clotheslines with staff at a facility for wealthy elders in Maryland. "Honey, these people never did a load of laundry in their lives, and they're not going to start now!" the nurses told her. Yet at Sedgewood Commons, a clothesline is both a strong reminder of a previous life and a center of activity for old ladies who like to hang out clothes. One common challenge is designing a garden for a new facility where there is no user group yet, notes Mahan.

#### *4.6.3 Generational Differences*

Hoover brought up the point that cultural heritage changes over time. "The lilac that worked with my grandmother is going to be a very different plant for my son, who's now seven." Bainnson and his clients have already discussed this issue for the gardens they work on: What will be resonant to people in the future? "In twenty years it

will need renovating anyway, and we'll re-evaluate it then," he said. They try to make the "big stuff"—large shade trees and shrubs—timeless and permanent, but recognize that the old farmers of today have very different childhood memories than people who grew up in suburbs. Asked about the smell of new-mown hay, Westphal (who has a cherry farm in Michigan), asks, "How many people live on a farm anymore?" She anticipates a move toward containerized products, or typical suburban plants like forsythia and tulips. Future generations may only respond to indoor smells, or more likely sounds, she postulates.

On the other hand, Tyson noted that people are likely to put plants in their gardens that their parents and grandparents had, providing for some generational continuity. Daisies, lilacs, and lily of the valley are familiar plants that people mention and will likely to continue to enjoy for generations, she said.

#### *4.6.4 Bees, Wasps and Hornets: No Bees, No Flowers*

The issue of bees being attracted to fragrant plants came up so frequently in the early interviews that the investigator decided to add it to the list of questions. "Bees are a biggie," notes Hoover. It is up to the administration and staff of a facility to determine their tolerance level for bees, but he recommends addressing it right up front. All respondents felt that bees in general are a good thing, and in fact there are not enough of them. "The big problem these days is that all the bees are dying off like crazy," says former beekeeper Mooney. "I'm professionally dragging my feet on that issue," said another landscape architect.



Several strategies were mentioned for addressing the issue of bees. First, plants that attract bees should not be placed too near paths or gateways. Sachs noted that lavender, like any plant with blue flowers, is a bee attractor; while it might seem nice to line a path with it so that people brushing against it release the fragrance, this may also increase the chances of bee encounters. Second, most horticultural therapists said they take information on the visitor or patient group before they lead people out into the garden, to discover if anyone has serious bee sting allergies. Third, Westphal notes that a bee sting kit should be on hand for quick treatment should anyone be stung. Hazen stresses that “we need bees, we need a viable wildlife habitat,” and garden designers just need to work with staff to keep the user population in mind and site plants correctly.

A bigger problem is wasps, according to Mooney. Wasp stings are worse than bee stings, and wasps are “more persistent.” Soft-bodied fruits such as figs and peaches should be avoided, since wasps like them. Haller noted that “you just have to get rid of wasps and hornets.” Styczinski felt that if flowering fruit trees are desired in the garden, they should be kept well away from where people are likely to wander: along a fence line, or even outside it.

In general, the sentiment was bee-friendly. Designers need to be aware of the characteristics of the user group: are they allergic? Do they have dementia, and perhaps likely to react inappropriately when bees are present? Will people be using the garden with or without supervision? Keeping these factors in mind, staying in contact with the

staff and their possible anxieties, and placing plants safely in the garden should prevent problems with bees. Wasps and hornets, however, simply have no place in therapeutic gardens; designers should make sure that they do not feel at home there.

#### *4.6.5 Poisonous Plants: Where to Draw the Line?*

Another subject that came up often was the use of poisonous plants in a therapeutic garden. As Sachs points out, the first job of a designer of therapeutic gardens is, like a doctor, to “do no harm.” Hazen has developed guidelines for the Legacy hospital gardens. They “have to decide what level of risk they’re doing to take,” depending on the user population, she said. There was general agreement that gardens for Alzheimer’s and other dementia patients should not have anything that could not be ingested.

Almost all respondents felt that the “level of toxicity is highly overrated,” as Mooney put it. “How much of these plants or the fruit do you really have to ingest?” asks Mahan. “There’s poisonous, and then there’s fatal...and a lot in between.” She notes that many plants popular in mid-Atlantic landscapes are toxic: azaleas, rhododendrons, daffodils, lily of the valley, hollies, and yews. She has visited facilities where administrators have told her, “Oh no, we would never use poisonous plants.” But then when they go into the garden, the maintenance staff has installed nothing but ‘poisonous’ plants, because they know what grows well, or what is available.

The overall feeling was that poisonous plants have a wide range of toxic effects, and that the main considerations should be user population and type of oversight

planned for the garden. Plants that are only mildly poisonous—that might give you a mild stomachache, for instance—would probably be used in most gardens, as would those whose only toxic parts are the roots. The North Carolina Botanic Garden actually maintains a Poison Garden, which is used in education programs to teach people what plants to avoid. But for very frail elders with late-stage dementia, Youngren notes, “We just need to make sure it’s safe out there.”

#### *4.6.6 Plant Knowledge, or the Lack Thereof*

Discussion of poisonous plants often led to mention of plant knowledge. Durand, for instance, mentioned with some dismay that a landscape architect proposed oleander, which is highly toxic, for a dementia garden. Hazen felt like she had had to look long and hard for landscape architects who knew enough plants to properly design the type of garden she envisioned. “These are plant-rich environments,” she said, “It is essential that we have the right mix of plants (for all five senses). My experience is that landscape architects don’t understand this yet.” On the subject of collaboration, a horticultural therapist appreciates the contribution of landscape architects in bringing good design and structure to the garden, but said “I pick the plants!”

Mahan noted that “it makes me insane” that landscape architecture schools seem to be teaching fewer and fewer plants classes. Her firm has several people with horticulture degrees as well as other in-depth plant knowledge. “We pick our own plants,” she said firmly. As Hazen pointed out, in order for the garden to meet clinical

needs well, the garden has to have a rich variety of plant materials—well beyond the fifteen or twenty commercial landscape standards so overused in many markets.

#### *4.6.7 Collaboration between Disciplines*

Many respondents stressed the necessity of good working relationships between administration, staff, landscape architects and various therapists when planning a therapeutic garden of any kind. Hoover acknowledged the priority of the clinical need: “We set up the groundwork for the practitioners. We design our gardens to provide for different therapies.” Hazen says that landscape architects must “fit the garden to the therapists’ programming, and not the other way around.”

This doesn’t mean that there is no room for creativity. One landscape architect mentioned that he has redone gardens of other designers because they were ‘boring’ and also did not meet the therapists’ needs. But the reason hospitals and long-term care homes spend the money on gardens is to improve the quality of life and the medical outcomes for their user groups; these needs should come before aesthetic concerns.

#### *4.6.8 The Need for Research*

Both Mooney and Westphal stressed the need for more research on therapeutic gardens, to clarify the economic and medical benefits to potential users. “The field really suffers, because most of the support for therapeutic gardens is anecdotal,” notes Mooney. Westphal finds the lack of rigor in many studies distressing. “We need to move the design arts forward into the sciences,” she laments. “We’ll never build a body of knowledge of case studies at the rate we’re going.” Schools do not adequately train

young professionals in academia on the importance and methodology of conducting post occupancy evaluations. Sachs felt that designers ended up reinventing the wheel too often, because of the lack of concrete information.

Practicing landscape architects agreed that more studies would be beneficial, but noted that they were too busy and lacked the training to conduct scientifically meaningful research. They suggested that universities with departments of environmental behavior spend more time studying therapeutic gardens, both before and after construction, so that reliable data could be obtained.

The economic benefits of such studies could impact both the healthcare industry and landscape architecture. Westphal noted that it can cost a hospital \$75,000 to bring a single new nurse into their system, in recruiting and advertising costs (LAND Online, April 2005). Studies which show that therapeutic gardens can significantly improve behavior in dementia patients draw the notice of hospital and nursing home administrators. As Mahan noted, if you reach a point where you can actually reduce a person's medications, "You get the administrators' (attention), because they start thinking, 'Ka-ching! Ka-ching! Because you only build the garden once, but you give them medication every day.'"

#### *4.6.9 Other Suggestions*

Hazen stresses the need to 'map' the garden for all five senses, including textural plants and materials, sounds of water and wind, bright colors, and even herbs, vegetables or fruits to eat. Nunnelee, a practical nurse who recently completed a PhD in

applied gerontology, and often works with the elderly, painted a picture of a garden for elders worthy of Renoir: “Pipe in music,” she suggested, “so people can dance in the garden. Music brings back so many memories....Use the kind of park benches and gazebos today’s elders remember from their youth (being careful to have chairs and swings they can get in and out of, with no sharp corners to tear fragile skin.) Have a pond with rowboats....!” This would be more on the order of a public park than a small courtyard garden. But she urged starting with a wider vision, reducing it later if needed.

#### *4.6.10 Questions for the Future*

Several respondents brought up significant questions for future research. Youngren wondered if families would visit their elderly relatives more often if there were pleasant garden spaces for them to use. This would build on research such as Cohen and Day’s indicating that ‘family members and residents seem to prefer to visit outdoors when weather permits’ (cited in Gilson, 1994). She is also intrigued by the idea of taking a “garden history” from individuals entering her facility, to determine what their past experience in gardens might be and what could be done to accommodate them. This is similar to the work of Ozga, who interviewed assisted-living home residents about their favorite childhood plants, and then tailored their window view to include several familiar shrubs or flowers. The idea of adapting part of a garden to individuals was mentioned by several other people. Bainnson is working on a facility where elders in independent living can have a plot of their own, like a community

garden. If the interest on the part of the staff is sufficient, many older people may be able to continue their relationships with plants even after leaving their family home.

A last question which occurred to several respondents: Are plants which bloom for a short season *more* evocative of early memories than the long-bloomers? Would this also apply to seasonal phenomena, like the sagebrush in summer thunderstorms or falling leaves in aspen groves? Smell research would tend to support this, since one's senses become acclimated to things encountered on a daily basis (coffee, for instance). Ephemeral bloomers like lilacs or lindens evoke a particular place and season. It would be interesting to try to determine if people have more emotional memories associated with such short-lived phenomena than with more common or longer-blooming plant fragrances.

#### 4.7 Conclusion

This study shows the benefits of open-ended, conversational qualitative research very well. Even though the questions were narrow and few, they prompted an expansive discussion of many issues involved in therapeutic garden design for the elderly. All of the respondents recognized that memory is a concern of many older adults and their families, and were interested in ways to alleviate that concern. Including the perspectives of landscape architects, horticultural therapists, reminiscence therapy experts, a doctor and nurses gave a prismatic view of therapeutic garden development, as practitioners reflected on both their own roles and those of other disciplines.

## CHAPTER 5

### CONCLUSION

This paper began with a simple idea: that since French literary figures find aromas to be so powerful in raising the ghosts of childhood landscapes, maybe there was something more to it, some application to the art of modern landscape architecture. Thus began an odyssey into an ocean of literature, plowing through stacks of medical and psychological writings on olfaction and autobiographical memory, gerontological studies of reminiscence, and expositions of therapeutic gardens new and old. What is presented here is a distillation of the variety of sources available—by no means exhaustive, but a thorough and representative sampling. The combination of fragrance, memory, and therapeutic effects discovered in the literature led to the hypothesis: that aromatic plants and materials could be intentionally included in the design of gardens for the elderly, so that odor-evoked recall of long-ago memories could facilitate therapeutic reminiscence.

#### 5.1 The Process of Research

The review of literature also generated a list of potential study participants. People who design, research, write about and work in therapeutic gardens—landscape architects as well as horticultural therapists—were one resource. Gerontology nurses gave another perspective, having a great deal of experience working with older adults of



all abilities and being involved in (or at least aware of) reminiscence therapy. The open-ended interview process enabled the respondents to fill in details and expand on topics as they felt inspired, rather than being confined to a “yes-no-some of the time” survey format. With this method, their combined insights painted a more complete picture of the possibilities of using scent in gardens to improve mental health in elderly people.

The hypothesis—that scented plants and building materials could be used to stimulate memory recall and conduct reminiscence therapy—was confirmed by the respondents, particularly the horticultural therapists. Many plants and natural phenomena that facilitate this recall were mentioned, along with stories of “seeing it happen.” The ability of fragrance-triggered reminiscence to improve quality of life in elderly people became evident through those stories: a rose taking an old lady back to the English garden of her childhood, or gardenias reminding elderly Wisconsin women of the high school dances of their youth. Sharing stories also made people happier by allowing them to demonstrate past competencies in cooking, gardening or flower arranging.

## 5.2 Importance of the Research

These memories have been shown to help the elders themselves feel better about their lives, and come to know and appreciate the other residents and staff where they are living now. But when the perfume of the lilac or magnolia blossom brings a rare moment of recognition of a family member, an additional level of therapy is reached: one that helps the loved ones of the older adult cope with the gradual fading away of the

person they knew. As elders and families look for long-term care, homes that address their concerns about mobility, choices, and memory—or to quote another famous declaration of independence, ‘life, liberty and the pursuit of happiness’—will have an advantage over more traditional ‘warehouse’ style facilities.

### 5.3 Relevance to the Profession of Landscape Architecture

Winds of change are blowing in the provision of care for older adults, and this research has opened a window to the breeze. Based on the pioneering work of many of the study respondents, models of effective therapeutic gardens are in the field for practitioners to examine. An absorbing picture of the issues involved in developing these model gardens emerges, as the experts discuss their challenges and opportunities in addressing clinical needs. These needs are clearly the focus of the garden; improving mental and physical health is always at the forefront of the design process, rather than an afterthought.

On a purely commercial level, demographic trends mean that many more people will be seeking quality long-term care in the next twenty to thirty years. New homes for the elderly are being built and old ones renovated. Landscape architects who wish to capitalize on this trend “had better figure it out,” in the words of one study participant. Boring, cookie-cutter garden plans with too little stimulation and the wrong plants will not impress healthcare providers. Practitioners who are familiar with research and plants and can design a beautiful, safe, functional garden that improves medical outcomes will be busy. More than ten years ago, it was already evident that

...landscape architecture curriculum could benefit from inclusion of a specialty in healthcare design. Not only is the market for the design of outdoor space related to healthcare facilities growing...but the process involves an opportunity to teach theory and program development for special user groups, whose needs often conflict with the accepted principles of design (Gilson, 1994).

As medical facilities and elder care homes renovate aging physical plant, they will be looking for ways to both reduce costs and enhance care. Both of these goals can be met by gardens, as implied in the Westphal and Mooney studies. Decreases in violent incidents impact the amount of medications given and the liability risks of the institution, as well as dramatically lowering stress in patients, families and staff. Many study respondents pointed out that they could use more proof of the benefits of therapeutic gardens—including research on stimulating memory with fragrance in gardens—if it were scientifically rigorous, and not purely anecdotal.

#### 5.4 Sharing Information

“Decisions about the environment are being made every day. Designers, planners, and managers continue to ply their trade, with or without adequate information” (Kaplan and Kaplan, 1982). A key aim of this study is to share information. Asking experts to comment on the feasibility of using fragrant plants for reminiscence therapy achieves several useful goals. Themes that emerged from their answers represent valuable knowledge about how to design future therapeutic outdoor spaces. Also, in explaining the hypothesis and asking people to think about it, ideas will be generated in a group of practitioners well-positioned to test it in the field. The exposure to this body of literature and research may affect their practice, whether it is in

landscape architecture, horticultural therapy, reminiscence therapy or medicine. It is hoped that this study can be distributed in a condensed form to a wider audience of people involved in the development and design of therapeutic gardens, so that intentional consideration of fragrance and its effects on memory may be added to the practitioner's toolbox.

### 5.5 Directions for Further Research

Several avenues for future research emerged in the discussions. Tailoring gardens to individuals, by providing them their own space if they are still able to garden, or by including favorite plants in their “window experience,” was mentioned several times. The ethnic, cultural and economic backgrounds that affect which plants and aromas are meaningful to people might prove to be a fascinating topic for another thesis. Likewise, the idea that the fragrance of short-lived blooms and natural phenomena may be more evocative of old, emotional memories than more commonly encountered smells could lead to new thinking in garden planning. Perhaps it would be worth planting a perennial or shrub with only a fleeting, fragrant glory, rather than relying on the ever-blooming odorless vigor of the hybrids.

The whole idea of seasonal phenomena, and of native plants, touches on the study of regionalism in landscape architecture. People develop powerful attachments to their native landscapes—its trees, stones, flowers, what carries on the breeze. Tapping into those memories with fragrance, as well as sights, sounds and textures, could help reestablish a sense of being home in older adults who have moved to long-term care.

Landscape architects could develop a palette of plants and materials that would resonate with elders of a particular region by interviewing people and studying old family home photos, as well as cultivating awareness of the popular plants of that area in the past.

Youngren's question about the visitation habits of family members possibly being affected by gardens would also be an interesting subject to study. For Alzheimer's patients, access to outdoor spaces has already been shown to increase frequency and length of family visits (Zarit, 1990). A more detailed investigation of what kinds of environments appeal to families of healthy elders, as well as those of different abilities, could help designers create gardens for all types of elder care facilities.

Finally, queries about what will trigger reminiscence in elders twenty years from now, or fifty years, open a whole world of questions about how children spend their time now, compared to previous generations. It relates directly to current research about the ill effects of children spending too much time indoors, and the impact that may have on the environment in the future. Perhaps the study of people's relationships with plants and landscapes throughout their life cycles, in each generation, would lead to insights about how to educate and entertain children, as well as what sort of gardens old people may enjoy.

## 5.6 Conclusion

Given that most elderly people need to reminisce to maintain good mental health, and that fragrance is the one of the best stimuli for autobiographical memories, it follows that fragrant plants should be a key component of any garden designed for older

residents. Landscape architects can deploy plants and materials to revive both the past lives and the present spirits of the residents.

Proust, who began this odyssey, should have the last word:

...when from a long-distant past nothing subsists, after the people are dead, after the things are broken and scattered, taste and smell alone, more fragile but more enduring, more unsubstantial, more persistent, more faithful, remain poised a long time, like souls, remembering, waiting, hoping, amid the ruins of all the rest; and bear unflinchingly, in the tiny and almost impalpable drop of their essence, the vast structure of recollection.

*Swann's Way, 1928*

APPENDIX A

QUESTIONS FOR TELEPHONE SURVEY OF EXPERTS

*Questions for telephone or internet survey of experts in therapeutic garden design, horticultural therapy, and reminiscence therapy*

Introduction

I am a graduate student in the landscape architecture department at the University of Texas at Arlington. For my masters' thesis, I am proposing the use of scent gardens for reminiscence therapy in communities for the elderly. My literature review has led to the following points:

1. Links among smell, emotion and autobiographical memories are very strong due to the organization of structures in the human brain and evolutionary adaptations
2. Smells have been proven to be an extremely effective stimulator of early memories—often more effective than auditory or visual cues
3. Research shows that elderly populations in institutional settings benefit by accessing autobiographical memories and engaging in reminiscence (or life review) therapy. Reminiscence therapy helps fight depression, maintain good mental health and increase social interaction

With this in mind, landscape architects designing facilities for older populations might be interested in incorporating specialty fragrance gardens, developed in response to the memories of a particular group of residents, or as an expression of the regional plant and materials palette of each site. Such gardens could be used by horticultural therapists, staff, and trained volunteers for reminiscence therapy with elderly residents in long-term care settings.

Questions

--My hypothesis is this: Aromatic plants and construction materials in gardens for the elderly could be used in reminiscence therapy to help alleviate depression, increase life satisfaction and improve social interaction in long-term care settings. What do you think?

--Do you know of any facilities where fragrant plants are being used for reminiscence therapy?

--How about facilities where aromatic construction materials are being used for reminiscence therapy?

--Have you found any particular aromatic plants or construction materials that elicit autobiographical memory?

--Do you have any other comments?

Thanks very much for your help!

*[By leaving the questions open-ended, people with expertise in these fields will feel free to add their experiences, steering me to research or sites I might have missed in my literature review.]*

Wendy Meyer  
MLA candidate  
University of Texas at Arlington



APPENDIX B  
THERAPEUTIC GARDEN CHARACTERISTICS

## **THERAPEUTIC GARDEN CHARACTERISTICS**

(Adapted from American Horticultural Therapy Association Board of Directors, 4/30/95)

Therapeutic gardens are featured in national publications and are being built with increasing frequency in health care settings. Among these new gardens, there is a high degree of correlation in physical design and programming intended to improve therapeutic benefits to garden visitors and participants. These identified factors interrelate with a vigorous plant dominated landscape to achieve restorative and horticultural therapy objectives and are likely to be associated with excellence in the design of therapeutic gardens. Some common characteristics are:

**1. Scheduled and programmed activities:** A horticultural therapy program guiding and promoting a program of activities and experiences in the garden is ideal. However, even in gardens designed for the passive enjoyment of visitors, special events increasing the number of visits, classes encouraging routine garden tasks, and publicizing activities of all kinds familiarize special populations, facility staff, families of clients or patients, and nearby community residents with the garden.

**2. Features modified to improve accessibility:** Garden elements, features and equipment are all selected or modified to provide accessible places, activities and experiences to the greatest extent possible. Each modification to the therapeutic garden environment eases the task of gardening and or enhances the horticultural experience for the visitor/gardener enabling them to see and even to study plants, to touch or smell them, to encounter the luxuriant garden growth in their own way, on their own terms and at their own pace.

**3. Well defined perimeters:** Edges of garden spaces and special zones of activities within the garden are often intensified to redirect the attention and the energies of the visitor to the components and displays within the garden.

**4. A profusion of plants and people/plant interactions:** Therapeutic gardens introduce individuals to planned, intensive outdoor environments in which the conscious provisions of spaces and places for restoration, horticulture education, therapy, and for social exchanges are organized into legible and verdant, plant-dominated open spaces with simple patterns of paths and workplaces. The garden promotes four seasons of sensory stimulation.

**5. Benign and supportive conditions:** Therapeutic gardens provide safe, secure and comfortable settings for people. The avoidance of potentially hazardous chemicals such as herbicides, fertilizers, and insecticides, the provision of shade and other protective structures, the flourishing plants, and the protected and protective nature of the therapeutic garden offer personal comfort and refuge to the garden user.

**6. Universal design:** Therapeutic gardens are designed for the convenience and enjoyment for people with the widest possible range of conditions. As practical and pleasurable landscapes for people of all ages and all abilities, these gardens commonly stimulate the full range of senses

including memory, hearing, touch, smell and sometimes taste as pleasurable alternatives to the visual experience of gardens. The therapeutic garden exploits the most complete range of people/plant interactions and experiences possible within its enclosures.

**7. Recognizable placemaking:** Therapeutic gardens are frequently simple, unified and easily comprehended places. An intensified recognition of garden patterns and garden experiences enhance the unique identity of a garden as a special place for the people it serves. Placemaking, an important strategy in all landscape design efforts, heightens the visitor's focus on plant-related sensuality, comfort, and independence experienced within a therapeutic garden.

**Resources:**

Legacy Health System and AHTA 150-Hour Certificate "Therapeutic Horticulture Activity Specialist" course. Apply now for Fall 2007 class. [thazen@lhs.org](mailto:thazen@lhs.org)

See Legacy Gardens at <http://www.asla.org/lamag/lam03/august/feature3.html>

American Society of Landscape Architects (ASLA) Therapeutic Gardens Professional Practice Network (PPN) <http://host.asla.org/groups/tgdpi/group/index.htm>

Chicago Botanic Garden, Healthcare Garden Design Certificate Program, [chicagobotanic.org](http://chicagobotanic.org)

Therapeutic Landscape Data Base <http://www.healinglandscapes.org/contact.html>

APPENDIX C  
PLANT LISTS

Creating a Sensory Garden - *Plant Slide List*

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[www.htinstitute.org](http://www.htinstitute.org)

<u>See</u>	Notes:
1. <i>Populus</i> – Aspen in fall	Color
2. <i>Acer</i> – Japanese maple	Color
3. <i>Salix</i> – Weeping willow	Form
4. <i>Prunus</i> – Weeping cherry	Form, color (fruit)
5. <i>Sambucus</i> – Elderberry	Form
6. <i>Sambucus</i> – Elderberry fruit	Form, color
7. <i>Cotinus</i> – Smokebush	Form, color
8. <i>Buddleia</i> – Butterfly bush	Color, butterflies
9. <i>Clematis</i>	Form, color
10. <i>Clematis</i>	Form, color
11. <i>Eremus</i> – foxtail lily	Form, color
12. <i>Tritomia</i> – Red hot poker	Form, color
13. <i>Lilium</i> – Trumpet lily	Color
14. <i>Solidago</i> – Goldenrod	Color
15. Fern	Mood
16. Gourd	Form
17. Iris – (close up)	Form
18. <i>Heracleum</i> - Hogweed	Size
19. <i>Papaver</i> – Oriental poppy	Color
20. <i>Celosia</i> ‘Torch’	Color
21. Winter weeping tree	Form
22. Dwarf weeping tree	Form
<u>Touch</u>	
23. <i>Juniperus</i> ‘Blue Star’ – Juniper	Prickly
24. <i>Pinus</i> – Bristlecone pine in winter	Form, prickly
25. <i>Pinus</i> – Bristlecone pine close up	Bottle brush
26. <i>Picea</i> ‘Pygmaea’ – Dwarf Norway spruce	Needled
27. <i>Juniperus</i> – Juniper	Prickly
28. <i>Carpinus</i> – Hornbeam	Muscles
29. <i>Larix</i> – Weeping larch	Soft
30. <i>Fallugia</i> – Apache plume	Fluffy
31. <i>Delosperma</i> – Ice plant	Cool, succulent
32. <i>Molucella</i> – Lady’s mantle	Hairy, soft, “jeweled”
33. <i>Antennaria</i> – Pussy toes	Soft, fuzzy
34. <i>Eryngium</i> – Sea Holly	Prickly

35. Cactus	Sharp
36. <i>Nigella</i> – Love-in-a-mist (seed pods)	Papery
37. <i>Limonium</i> – Statice	Papery
38. <i>Helichrysum</i> – Strawflower	Papery
39. <i>Brassica</i> – Flowering kale	Textured
40. <i>Thymus</i> – creeping thymes	Soft, “steppable”
41. Gourd	Bumpy
42. Grass	Soft, hair-like
43. Dead tree	Textures
44. Pine bark and rock	Textures
45. Mulch, soil	Also fragrant
Smell	Notes:
1. <i>Lonicera</i> – Honeysuckle	
2. <i>Philadelphus</i> – Mock orange	
3. <i>Nerium</i> – Oleander	Toxic
4. <i>Daphne</i>	Toxic
5. <i>Daphne</i>	
6. <i>Rosa</i> – ‘Scentsational’ rose	
7. <i>Lavendula</i> – Lavender	
8. <i>Geranium</i> – Cranesbill	
9. <i>Berlandiera</i> – Chocolate flower	
10. <i>Nepeta</i> – Catmint	
11. <i>Phlox</i> – Summer phlox	
12. <i>Allium</i> – Garlic chives	
13. <i>Dianthus</i> – Maiden pink	
14. <i>Rosmarinus</i> – Rosemary	
15. <i>Heliotropum</i> – Heliotrope	
16. <i>Nicotiana</i> – Flowering tobacco	
17. <i>Pelargonium</i> , <i>Tagetes</i> – Scented geranium, Marigold	
18. <i>Brugsmania</i> – Angel’s trumpet	
Hear	
19. Zebra grass	
20. <i>Papaver</i> – Poppy seed pods	
21. <i>Populus tremuloides</i> – Aspen	
22. <i>Koelreuteria</i> – Goldenrain tree	
23. <i>Pinus</i> – Weeping white pine	
24. Water fall	
Taste	
25. <i>Brassica</i> – Cabbages	
26. <i>Rosa</i> – Rose hips	
27. <i>Anthemum</i> – Dill flowers	
28. <i>Allium</i> , <i>Viola</i> – Onion flowers, Violas	
29. <i>Foeniculum</i> – Bronze fennel	
30. <i>Tropaeolum</i> – Nasturtium	

31. Tagetes – ‘Lemon Gem’ marigold	
32. Salvia – Pineapple sage	
33. Fragaria - Strawberry	
34. Malus – Apple	
35. Carrot	
36. Hibiscus	
Delight!	
37. Mimosa – Sensitive plant	Movement
38. Water garden	Fish
39. Stone path	Texture
40. Kid sculpture	Imagination
41. Hosta – Plantain lily	Heart leaves
42. Joshua tree, giant allium	Shapes
43. Victoria water lily	Giant
44. Pitcher plant	Carnivorous
45. Equisetum – Horsetail	Dinosaur plant
46. Fuchsia	Dancing ladies
47. Althea – Hollyhock	Dancing dolls
48. Crocus – Autumn crocus	Seasonal surprise

From a presentation to the American Horticultural Therapy Association Annual Conference “Securing Our Health and Wellness” in Atlanta, Georgia, 2004.

Aromatic plant list from “Therapeutic Garden Design in Residential Care for Older Adults Including Those with Dementia and Physical Frailties,” by Suzanne Gray, HTR. Published in the Journal of Therapeutic Horticulture vol. 10, 1999, p.45.

<i>Aroma Classification</i>	<i>Examples of Plants</i>
Top notes	Mock orange blossom - <i>Philadelphica coronarius</i> Wisteria – <i>Wisteria sinensis</i>
Middle notes	Lavender – <i>Lavendula angustifolia</i> Lily of the valley – <i>Convallaria majalis</i> Rugosa rose – <i>Rosa rugosa</i> Peony – <i>Paeonia</i> hybrids
Base notes	Eastern red cedar – <i>Juniperus virginiana</i> Scotch pine – <i>Pinus sylvestris</i> Musky angelica – <i>Aralia elata</i> Fading lilac blooms – <i>Syringa vulgaris</i> Jasmine – <i>Gelsemium sempervirens</i>
Multifaceted scents	Winter honeysuckle – <i>Lonicera fragrantissima</i>
Night fragrance	Tobacco plant – <i>Nicotiana glauca</i>
Fragrant when rubbed	Basil - <i>Ocimum</i> spp. Mint – <i>Mentha</i> spp. Dill – <i>Anethum graveolens</i> Scented geraniums: Peppermint – <i>Pelargonium tomentosum</i> Rose – <i>Pelargonium graveolens</i> Lemon – <i>Pelargonium crispum minor</i>





Oregon Burn Center Garden

Sponsored by

Portland General Electric  
PGE Employees &  
IBEW Local 125

**Garden Dedicated May 2004**

**Plant List July 2006**

*Bob M. Seivers Perennial Garden*

Botanical Latin

Common Name

*Trees*

Acer tartaricum

Tartarian Maple

Cupressus sempervirens 'Fastigiata'

Italian Cypress

Magnolia stellata

Star Magnolia

Stewartia pseudocamellia

Japanese Stewartia

*Shrubs*

Abies koreana 'Nana'

Dwarf Alpine Fir

Berberis thunbergia 'Rosy Glow'

Rosy Glow Barberry

Cedrus deodara 'Silver Mist'

Silvermist Dwarf Cedar

Ceanothus 'Joyce Coulter'

Joyce Coulter California

Lilac

Chamaecyparis lawsoniana 'Blue Surprise'

Blue Surprise Lawson

Cypress

Chamaecyparis lawsoniana 'Nymph'

Nymph Lawson Cypress

Chamaecyparis lawsoniana 'Wissel's Saguro'

Lawson Cypress

Chamaecyparis obtusa 'Gracillimus'

Slender Hinoki Cypress

Calluna species

Heather

Daphne odora

Winter Daphne

Deutzia gracilis

Dwarf Deutzia

Hibiscus syriacus 'Helene'

Helene Rose of Sharon

Ilex crenata 'Skypencil'

Columnar Holly

Ilex crenata 'Green Island'  
Juniperus chinensis 'Spartan'  
Juniperus virginiana 'Skyrocket'  
Picea abies 'Nidiformis'  
Spiraea bumalda 'Goldflame'  
Spiraea japonica 'Little Princess'  
Thuja occidentalis  
Vaccinium ovatum

Green Island Holly  
Spartan Juniper 10'  
Skyrocket Juniper  
Birds Nest Spruce  
Goldflame Spiraea  
Little Princess Spiraea  
Emerald Green Arborvitae  
Evergreen Huckleberry

*Perennials*

Achillea millefolium 'Fireland'  
Anemone japonica  
Aster x Frikartii 'Monch'  
Bergenia crassifolia  
Campanula carpatica 'Blue Chips'  
Bellflower  
Crocus sp. 'Blue Pearl'  
Echinacea magnus  
Eupatorium purpureum  
Fuchsia x hybrida  
Heuchera 'Purple Palace'  
Hosta 'Golden Sunburst'  
Iris pseudacorus 'Fiore Pleno'  
Iris siberica  
Miscanthus sinensis 'Siber Feder'  
Pennisetum setaceum 'Little Bunny'  
  
Penstemon x gloxinioides 'Wine Kissed'  
  
Phygelius aequalis  
Primula vialli  
Rubeckia fulgida 'Goldsturm'  
  
Rosa 'Coral Rose'  
Rosa 'Manhattan'  
  
Sedum spectabile 'Autumn Joy'  
Sedum spurnium 'Dragon's Blood'  
Tulipa kaufmanniana 'Shakespeare'

Fireland Yarrow  
Japanese Anemone  
Monch Fall Aster  
Winter Bergenia  
Blue Chips Dwarf  
  
Blue Pearl Crocus  
Purple Coneflower  
Joe Pye Weed  
Hardy Fuchsia  
Purple Palace Coral Bells  
Plantain Lily  
Yellow Flag  
Siberian Iris  
Siber Feder Eulalia Grass  
Little Bunny Fountain  
Grass  
Wine Kissed Garden  
Penstemon  
Cape Fuchsia  
  
Goldsturm Brown-eyed  
Susan  
Coral Rose Flower Carpet  
Town and Country  
Manhattan Rose  
Autumn Joy Stonecrop  
Dragon's Blood Stonecrop  
Shakespeare Tulip

*Dave Fuchigami Butterfly and Hummingbird Garden*

<u>Botanical Latin</u>	<u>Common Name</u>
<i>Trees</i>	
Sequoiadendron giganteum 'Pendula'	Weeping Sequoia
Styrax japonica	Japanese Snowbell
Zelkova serrata 'Green Vase'	Greenvase Japanese
Zelkova	
<i>Shrubs</i>	
Berberis thunbergii 'Rose Glow'	Rose Glow Barberry
Buddelia davidii 'White Profusion'	White Profusion Butterfly Bush
Buxus sempervirens	Boxwood
Daphne odora	Winter Daphne
Fothergilla gardenia	Fothergilla
Ilex crenata 'Green Island'	Green Island Japanese Holly
Osmanthus heterophyllus	Holly Leaf Osmanthus
Pieris taiwanensis	Dwarf Andromeda
Rosa	
Rosa	
Trachleospernum jasminoides	Jasmine
<i>Perennials</i>	
Aster alpinus 'Trimix'	Alpine Aster
Clematis 'Hagley Hybrid'	Hagley Clematis
Clematis 'Villa Delyon'	Villa Delyon Clematis
Heuchera 'Palace Purple'	Palace Purple Coral Bells
Humulus lupulus	Ornamental Hops
Iris germanica	Bearded German Iris
Lavandula angustifolia	English Lavender
Lavandula angustifolia 'Twickle Purple'	Twickle Purple English Lavender
Lavender	
Lavandula stoechas	Spanish Lavender
Lonicera japonica 'Halliand'	Hall's Honeysuckle
Rosa 'Golden Showers'	Golden Showers Climbing Rose
Rosmarinus officinalis 'Tuscan Blue'	Tuscan Blue Rosemary
Rudbeckia fulgida	Brown-eyed Susan

Stachys byzantina

Lambs Ears

*Rose City Classics Fragrant Garden*

Botanical Latin

Common Name

*Trees*

Acer palmatum 'Full Moon'

Full Moon Maple

Cercidiphyllum japonica

Katsura Tree

*Shrubs*

Corylopsis pauciflora

Wintersweet

Deutzia gracilis

Slender Deutzia

Philadelphus x virginalis

'Dwarf Minnesota Snowflake'

Dwarf Mock Orange

Sarcococca ruscifolia

Sweetbox

Syringa meyeri 'Palibin'

Dwarf Korean Lilac

*Perennials*

Anemone coronaria de caen

Windflower

Aster

Bergenia cordifolia

Heartleaf Bergenia

Crocus sp. 'Ard Schenk'

Ard Schenk Crocus

Dianthus chinensis

Chinese Pinks

Epimedium rubrum

Bishop's Hat

Iris germanica

German Bearded Iris

Lavandula angustifolia

English Lavender

Lavandula angustifolia 'Twickle Purple'

Twickle Purple English

Lavender

Lavandula densata

French Lavender

Lillium 'Casa Blanca'

Casa Blanca Oriental Lily

Lillium 'Dizzy Lizzy'

Dizzy Lizzy Lily

Lillium "Stargazer"

Stargazer Oriental Lily

Pelargonium graveolens

Lemon Rose Scented

Geranium

Rosemary officinalis

Rosemary

*Benefit Golf Classic Shade Garden*

<u>Botanical Latin</u>	<u>Common Name</u>
<i>Trees</i>	
Acer truncatum	Norwegian Sunset Maple
Cercidiphyllum japonica	Katsura Tree
Chamaecyparis nootkatensis pendula	Weeping Alaska Cedar
Chamaecyparis obtusa 'Filicoides'	Fernspray False Cypress
Cornus mas	Cornelian Cherry
Fagus sylvatica 'Red Obelisk'	Red Obelisk Upright Beech
Malus transitoria 'Schmidtcutleaf'	Golden Raindrops Crabapple
<i>Shrubs</i>	
Camellia sasanqua 'Kanjiro'	Kanjiro Winter Camellia
Camellia sasanqua 'Yuletide'	Yuletide Winter Camellia
Camellia setsugekka	Setsugekka Winter Camellia
Ceanothus g.h. 'Diamond Heights'	Diamond Heights California Lilac
Ceanothus imp. 'Victoria'	Victoria California Lilac
Hebe 'Amy'	Amy Hebe
Hydrangea petiolaris	Climbing Hydrangea
Hydrangea quercifolia	Oak Leaf Hydrangea
Hydrangea quercifolia 'Sike's Dwarf'	Dwarf Oak Leaf Hydrangea
Juniperus communis 'Compressa'	Dwarf Columnar Juniper
Lonicera nitida 'Baggesen's Gold'	Baggesen's Gold Box Honeysuckle
Physocarpus opulifolius 'Diablo'	Diablo Ninebark
Pieris japonica	Andromeda
Vaccinium ovatum	Evergreen Huckleberry
Viburnum carlesii	Korean Spice Viburnum
Viburnum davidii	David Viburnum
<i>Perennials</i>	
Acanthus mollis	Bear's Breech
Anemone japonica	Japanese Anemone
Aster ericoides 'Pink Star'	Heath Aster
Aster 'Pixie Dark'	Pixie Dark Aster

Aster novae-angliae ‘Purple Dome’  
Astilbe ‘White Gloria’  
Blechnum spicant  
Calocasia esculenta  
Cucurbitaria japonica  
Dryopteris  
Epimedium grandiflorum  
Fuchsia  
Hakonechloa macro  
Hebe ‘Autumn Glory’  
Hosta ‘Blue Cadet’  
Hosta ‘Golden Sunset’  
Hypericum  
Iris siberica  
Lamium maculatum  
Lobelia ‘Grape Knee-Hi’  
  
Lobelia ‘La Fresco’  
Miscanthus gracillimus  
Oxalis species  
Phlox  
Primula x bulleesiana  
Salvia elegans ‘Frieda Dixon’  
  
Salvia hybrid ‘Indigo Spires’  
Salvia ‘Playa Rosa’  
Sedum  
Stachys byzantia  
Vaccinium vitis-idaea minus

West End Garden

*Trees*

Acer  
Cryptomeria japonica elegans  
Malus

*Shrubs*

Abies  
Cornus alba ‘Elegantissima’  
  
Hebe ‘Pink Icicles’

Purple dome aster  
Astilbe  
Deer Fern  
Elephant Ears  
Bugbane  
Lady Fern  
Bishop’s Hat  
  
Japanese Forest Grass  
Autumn Glory Hebe  
Blue Cadet Hosta  
Golden Sunset Hosta  
Variegated Hypericum  
Siberian Iris  
Spotted Nettle ‘Chequers’  
Grape Knee-Hi Cardinal  
Flower  
Lafresco Cardinal Flower  
Eulalia Grass  
Wood Sorrel  
Variegated Phlox  
Candelabra Primrose  
Frieda Dixon Pineapple  
Sage  
Indigo Spires Meadow Sage  
  
Lamb’s Ear  
Lingonberry

Plume Cryptomeria  
Malus Columnar Apple

Variegated Red Twig  
Dogwood

Hydrangea grandiflora 'Anabelle'  
Picea abies 'Nidiformis'  
Rosa  
Viburnum plicatum tomentosum

Annabelle Big Leaf  
Hydrangea  
Bird's Nest Spruce  
Climbing Rose  
Doublefile Viburnum

**Perennials**

Acanthus mollis  
Anemone coronaria de caen  
Alstromeria  
Aster lateriflorus 'Lady in Black'  
Aster  
Canna  
Calmagrostosis acutifolia  
Crocosmia 'Lucifer'  
Fragaria  
Geranium biokova  
Hosta  
Helleborus orientalis  
Lobelia cardinalis  
Salvia elegans  
Vine

Bear's Breech  
Windflower  
Peruvian Lily  
Aster  
  
Canna Lily  
Karl Forester Grass  
Monbretia Lucifer  
  
Hardy Geranium  
  
Lenten Rose  
Purple Cardinal Flower  
Pineapple Sage

*Johnson and Johnson Pergola*

Akebia quinata  
Akebia trifoliata  
Vitis labrusca  
Vitis vinifera 'Purpurea'

Akebia Deep Purple  
Threeleaf Akebia  
Ornamental Grape  
Claret Vine

*Rock Fountain Bed*

Botanical Latin

Common Name

*Trees*

Acer platanoides 'Princeton Gold'

Princeton Gold Maple

*Shrubs*

Camellia sasanqua 'Chansonette'

Chansonette Winter  
Blooming Camellia

Tsuga canadensis 'Pendula'

Sargent Weeping Hemlock

*Perennials*

Acanthus mollis  
Bergenia crassifolia  
Calluna vulgaris 'Alicia'

Canna  
Coreopsis verticillata 'Moonbeam'  
Erodium  
Festuca glauca  
Gunnera tinctoria  
Jonquilla narcissus 'Intrigue'  
Lavandula  
Lobelia cardinalis  
Melianthus major  
Osteospermum  
Oxalis  
Phormium hybrids  
Sedum  
Sisyrichium  
Vaccinium vitis-idaea minus  
Yucca aloifolia 'Variegata'  
*Circle Raised Garden*

Bear's Breeches  
Winter Blooming Bergenia  
Alicia Summer Flowering  
Heather  
Canna Lily  
Moonbean Coreopsis

Blue Fescue  
Dinosaur Food  
Intrigue Narcissus  
Lavender  
Cardinal Flower  
Honey Bush  
African Daisy  
Wood Sorrel  
New Zealand Flax  
Sedum Varieties

Red Pearl Lingonberry  
Spanish Bayonet Yucca

*Trees*

Acer rubrum 'Northwood'  
Tsuga canadensis 'Pendula'  
Hemlock

Northwood Red Maple  
Weeping Canadian

*Perennials*

Calluna vulgaris 'Mairs'  
Santolina chamaecyparissus  
Rosemarianus prostratus  
Gladiolus 'Elvira'  
Garden Shed Orchard Garden

Mairs Heather  
Lavender Cotton  
Creeping Rosemary  
Orchid Gladiolus

*Trees*

Malus 'Golden Sentinel'  
  
Malus 'Northpole'  
Malus

Golden Sentinel Columnar  
Apple  
Northpole Columnar Apple  
Columnar Apple



*Shrubs*

Arbutus unedo 'Elfin King'  
Lagerstromia indica 'Minnow'

Dwarf Strawberry Tree  
Petite Snow Crape Myrtle

*Perennials*

Alstromeria hybrids  
Aster novae-angliae 'Hella Lacey'

Peruvian Lily  
Hella Lacey Aster

*NW Natives Garden*

Botanical Latin

Common Name

*Trees*

Calocedrus decurrens  
Cornus nutalli

Incense Cedar  
Native Dogwood

*Shrubs*

Cornus stolonifera  
Holodiscus discolor  
Mahonia aquifolium  
Myrica californicum  
Philadelphus lewisii  
Spiraea douglasii  
Vaccinium ovatum

Redtwig Dogwood  
Oceanspray  
Oregon Grape  
Myrtle  
Wild Mock Orange  
Western Spiraea  
Evergreen Huckleberry

*Perennials*

Adiantum pedatum  
Aarum caudatum  
Blechnum spicant  
Dicentra Formosa  
Dodecatheon sp.  
Fragaria chiloensis  
Lupinus rivularis  
Polystichum munitum  
Sisyrinchium angustifolium  
Trifolium repens

Maidenhair Fern  
Wild Ginger  
Deer Fern  
Western Bleeding Heart  
Shooting Star  
Beach Strawberry  
Streambank Lupine  
Sword Fern  
Blue-eyed Grass  
Green Ice Clover

*Staff Garden*

*Trees*

Cornus kousa

Korean Dogwood

*Shrubs*

Acer circinatum

Vine Maple

Chamaecyparis obtusa

Hinoki False Cypress

Daphne odora

Winter Daphne

Hedge

Hydrangea macrophylla 'Variagata'

Variagated Bigleaf

Hydrangea

Pieris japonica

Andromeda

Ribes alpinum

Alpine Currant

Thuja occidentalis "Emerald Green"

Emerald Green Arborvitae

*Perennials*

Alstromeria hybrids

Peruvian Lily

Aster

Dwarf Variety

Belchnum spicant

Deer Fern

Clematis

Epimedium rubra

Hellebore orientalis

Lenten Rose

Iris germanica

German Bearded Iris

Polystichum munitum

Sword Fern

**Sunset Western Garden Book** by Sunset Publishing Corporation is the major reference book for Legacy Therapeutic Gardens.

For more information about Legacy Therapeutic Gardens, please call 503-413-6507 or [thazen@lhs.org](mailto:thazen@lhs.org)

Help Grow Our Gardens! For giving information, please call 503-413-6089.

## Fragrant Plants in Indo-Islamic Gardens

List of scented plants reported by Avicenna (b. 980 AD, d. 1037 AD) as preventatives and tonics for the heart. From “Exhilarating Fragrances in Indo-Islamic Gardens,” article by S. Ali Akbar Husain in Interaction by Design: Bringing People and Plants Together for Health and Well-Being. Edited by C. Shoemaker (see “Works Cited”).

Scientific Name	Common Name
<i>Abies alba</i>	Silver fir
<i>Amomum subulatum</i>	Greater cardamum
<i>Aquillaria agallocha</i>	Aloes wood
<i>Asparagus racemosus</i>	
<i>Bambusa arundinaceae</i>	Bamboo manna
<i>Borago officinalis</i>	Bugloss
<i>Boswellia glabra</i>	Frankincense
<i>Camphora officinarum</i>	Camphor
<i>Centaurea behen</i>	
<i>Cichorium intybus</i>	Chicory
<i>Cinnamomum zeylanicum</i>	Cinnamon
<i>Citrus medica</i>	Citron
<i>Coriandrum sativum</i>	Coriander
<i>Crocus sativus</i>	Saffron
<i>Cyperus rotundus</i>	
<i>Delphinium denudatum</i>	
<i>Doronicum hookeri</i>	
<i>Elettaria cardamomum</i>	Smaller cardamom
<i>Emblica officinalis</i>	Emblic myrobalan
<i>Helianthus annuus</i>	Sunflower
<i>Iris florentina</i>	Iris
<i>Lavandula stoechas</i>	Lavender
<i>Melissa officinalis</i>	Balm
<i>Mentha arvensis</i>	Mint
<i>Myrtus communis</i>	Myrtle
<i>Nardostachys jatamansi</i>	Nard
<i>Nymphaea lotus</i>	Water lily
<i>Ocimum basilicum</i>	Basil
<i>Ocimum gratissimum</i>	Basil
<i>Paeonia officinalis</i>	Peony
<i>Pandanus odoratissimus</i>	Fragrant screwpine
<i>Parmelia perlata</i>	Rock moss
<i>Pistacia terebinthus</i>	Pistachio
<i>Punica granatum</i>	Pomegranate
<i>Pyrus communis</i>	Pear
<i>Pyrus malus</i> syn. <i>Malus domestica</i>	Apple
<i>Rheum emodi</i>	
<i>Rosa damascena</i>	Damask rose
<i>Santalum album</i>	Sandalwood

Tamarindus indica	Tamarind
Terminalia chebula	Chebulic myrobolan
Thymus serpyllum	Wild thyme
Zinziber zerumbet	Zedoary

Source: Hamid 1983

APPENDIX D

SAMPLE INTERVIEW

Teresia Hazen interview Thursday April 5, 2007

(Greetings)

T: I get some good online things too. All kinds of people are doing great projects, I'm just so impressed!

*W: ... trying to combine some different disciplines, I've done a bunch of reading about the brain and how it works, and how your sense of smell works and how memories are stored, particularly autobiographical memories. It seems like landscape architects that I've talked to so far (aren't familiar with reminiscence therapy), but Rebecca Haller said, Oh yeah, we do reminiscence therapy!*

T: Oh sure, we do, and recreational therapists do, and activity professionals do, and nurses understand that.

*W: Right. Well that's something I'm trying to introduce to my field. I haven't found anybody yet that knows a lot about it, although some of the people who have done Alzheimer's gardens have heard of it. What I'd like to know is if you, as part of your horticultural therapy programs, do reminiscence therapy in the garden, in any of your facilities?*

T: You know, that is the normal activity that we're trained to do indoors or outdoors, in my work, when I'm working with plants, with people. With all people we do reminiscence therapy because it helps them draw on the strength of their past, and what they've learned, and their experience....to set goals for what they still want to accomplish in life. With the very older adult we do life review. I thought of a person this morning while I was sitting there that I want to connect you with. I'm back at work on Saturday and a nurse manager I know at a senior living community, Polly Youngren, is very well-informed about life review. (W: OK) T: And I think she would be a terrific person for you to speak with about this. So I can connect you by email when I get back to work on Saturday.

*W: Alrighty, that would be great.*

T: Ok, so what's the next question?

*W: One of them would be, do you just focus on plants, or do find sometimes other phenomena, something in the construction materials, like stone, for example: Richard Neutra writes about how when you smell damp limestone you think of cathedrals, or Richard Haag talks about the Bloedel Reserve when you walk on the fallen katsura leaves they smell like caramel. So there are some other things besides just flowers....also seasonal trees and things that aren't so obvious.*

T: OK. First of all, we always want to, in my work, we want to tie *their* (patient's) experience to the garden. They come out and they say, Oh the air smells so good! So we'll say "Well, what kind of area had you come from, that this air reminds you of that?" So then it will take us to the coast, or to the mountains, or to time of day, or they'll come out and...or even when I'm working with patients indoors, they'll smell the soil when we're planting. And so then we'll talk about the smell of the soil in their past. We always want to relate it to their past. I don't care about teaching them about *our* garden. We use our garden as a tool for them to reminisce about their past (03:49), and acknowledge their achievements, and things that maybe didn't work right, but then also to set goals about what one still wants to accomplish in life.

(W: *mm hm*)

T: Yes, so people will come and they'll say, "Oh, my grandma has this plant!" Or that looks kind of like my grandma's plant. So we'll say, "Well where did your grandma live? And what did you do with your grandma?" Our objective is to help people focus on something other than their, either short-term or long-term impairment. The major losses, the trauma of having had a stroke...to take some time away from thinking about that, but rather about how the butterfly bush makes one remember their grandmother.

*W: Mm hm. Do you think seasonally, um, short-season flowers have more emotional memories? I've just run across this a little bit...Lilacs seem to be a really big trigger, things that aren't in bloom all the time?*

T: That's interesting. Boy, that's interesting.

*W: Linden trees, someone mentioned...*

T: You know, I'll tell you a couple of my experiences in the garden.

*W: OK*

T: Flowers—and now we're lucky, we have flowers, at least in this area, we have blooming plant material every day of the year in our gardens

*W: Wow!*

T: Yes, you're from Texas aren't you? Have you met Roger Ulrich yet? (*W: No*) He's a dear, he's just a dear. But anyhow, we have blooming plant material year round. But that's not always, in my observation, where people head. In my observation, we have two Northwest gardens, in one of our big gardens, and we have a Northwest garden in

our Oregon Burn Center garden. And I have to tell you that that seems to be the first place that people head. I see it particularly in a lot of men, hanging about those areas. And we have signage also that describes the different Northwest native plants. But I think, personally, I think it's because it's familiar. And easily comprehended.

*W: Is it more like the woods, or what?*

T: Yes, uh huh. And it's familiar to the Pacific Northwest. And then it seems like from there, then they start moving about to other things.

T: So I think familiarity. My point with that is, it seems like while some of the really new, different plant material is interesting, people go to the pansy bowl, or they go to the primroses, or they head right for the hyacinths. We have two big masses of hyacinths right now. People head for those *familiar* things first. That seems to be my experience. And...we're celebrating our 10<sup>th</sup> anniversary at two of our big, major gardens, that are each 10,000 square feet or more.

*W: Hm. So you think, those things are all fragrant, the pansies, the ...what was the second thing, I'm sorry?*

T: Hyacinths...what was the other one I said, oh, primroses, primroses tend to be fragrant. They're very bright and colorful, and I think the visual first draws people. And then, right now as a matter of fact, there's a large mass of hyacinths in a raised bed, and behind that there's still some daphne blooming. And yesterday I was listening to a family....

They first of all went over there because of the visual. Then they started to smell, and I heard them talking about the two different fragrances, and then they were discerning, was this the hyacinth fragrance or was it the daphne fragrance?

T: So, I personally believe it's usually the visual that draws people. Familiar, and visual, draws them. But then those who have that tendency, that strength, who enjoy and need fragrance, then they explore that further. But I really believe it's the visual that draws people out first.

*W: Mm hm. So you put things up higher, where they are more visible? (8:04)*

T: Well, in therapeutic gardens we need to raise some of the garden *up* to the gardener. And the gardener is a very general (term), I consider a gardener anyone who goes out and enjoys a nature space. So we need to bring some of it up, because some people can't bend to the ground. Some people couldn't smell the hyacinths if they were on the ground, they couldn't *see* them if they were on the ground. We have a variety of raised beds. I could send you some pictures if you like.



*W: Yes, that would be great. Do you find, some people have mentioned, that old people really, often can't smell very well. And I've done the research on that and I know that's true for some people...*

T: There's a wide range, with all the senses, right.

*W: So do you try to plant stronger-smelling plants?*

T: I try to plant, number one, what is familiar and meaningful to them. And then, number two, I try to be sure that we have all five senses in the garden. Real strengths, I mean, when we design a garden, I map the garden *for* the five senses. (9:12) We have to have five senses, for four—I call it a 'rich, lush, intriguing, botanical collection for four seasons of sensory stimulation.' That's what makes these places, *one* thing that makes these places special and different. That makes them help meet clinical needs.

*W: Yes. So when you're designing a garden, do you meet with all the nurses?*

T: I lead the interdisciplinary team, I select the landscape architect, and I facilitate our three, one-hour design team meeting process. We've been doing that for ten years. We have six gardens built now, we have one in construction documents and another one in fund-raising for a quarter of a million dollars, and we're getting ready to get one more ready for fund-raising. (W: Wow.) So we have experience.

*W: Do you only build up there, in that area? There's a Legacy at Willow Bend here, but I think it may be a different (organization)*

T: Right. We're just the Portland metropolitan area. We have five hospitals.

*W: Ok. Do you find people resisting things that draw bees, do you have to think about that?*

T: You know, I don't think too much about it, because I want bees. We need bees, we need birds, we need the wide range of wildlife, to make it a viable nature habitat. I think in an Alzheimer's garden, we'd want to be very careful that we didn't have a high bee-attractant plant at the gateway! You know, we'd put that in the back of the border. And also, each geographical setting is different. If a particular plant, say in Texas, is going to draw 500 bees at a time, we'd probably want to put that at the far side of the property where the residents aren't going to go. But there's a way to work around all of this. We need to have the right mix of plants in these gardens.

*W: Right. Do you have flowering trees that you use, that are not so obvious? Or things that smell, but aren't big bold flowers?*

T: Things that smell in trees....

*W: Or shrubs. Like the daphne, it's not a very big flower*

T: Right, right, it doesn't have to be a big one. I don't think we have any (huge?) with fragrant flowers....that's a good question!

*W: There's one we used in Washington, for real high-end residential. I came from Virginia, you know, I keep moving schools...*

T: Good for you! Did you know Diane Relf there?

*W: I emailed her, but I was actually at their Northern Virginia campus. But there's a sweet box, sarcococca humilis, it smells really good.*

T: Yes, that's a shrub here

T: There are several varieties, right. Now you know the sweet box is toxic, so I wouldn't myself use that in an Alzheimer's garden. Might use it outside the fence!

T: So there's another element we have to think about. And that sweet box also has a little dark berry, and I would worry that demented elders might pick and eat. So we need to look at that too, what are *safe* plants? And you know, plants can have a certain level of toxicity, and by our placement in the garden, they can be OK. But we need to decide what risks we're going to take. I personally wouldn't use that one in an Alzheimer's garden because I just couldn't be sure that I could be watching them all the time, so they wouldn't pick one of those little berries and think it was a blueberry and eat it!

*W: Right. I never thought about that one being toxic. We weren't doing Alzheimer's gardens there...*

T: Mmm hmm

*W: I did almost mess up once, I did a garden for my kids' school. I had just been to a garden tour, and seen someone using a 'Blue Bird' hibiscus and they had a castor bean planted through it..*

T: Oooh, the castor bean!

*W: Well, it looked fantastic, and I thought Oh that's great!*

T: Yes, it's so architectural! It's gorgeous!

*W: Yes, but not for kindergartners...*

T: Yes that's another one of course that's not for demented elders' garden either.

*W: Yeah, that was my first introduction to toxic plants. And fortunately someone at the garden center said, 'You don't want to use that in a school garden!'*

T: Oh, well you know. We keep learning. The Timber Press book is excellent on that, Timber Press has a book on toxic plants. Should be at your library. Or it should be in your department.

*W: Hm. Well, I don't know. I might just have to buy it. Well. Do you have any really great stories, of when people have had this kind of experiences, that you can think of?*

T: Oh... You know, it just happens every day. It's just essential that the garden has the right blend of visual, tactile, auditory, gustatory and olfactory stimulants. It's just essential that we get that right mix. My experience is that landscape architects don't understand this yet.

*W: Well we're working on it.*

T: That's right, that's right. But you know it's hard for some people to change because they think they know.

*W: Well, I had a strange path in getting to this and I went through the landscape design program at George Washington University, and a woody plants certificate is part of it. So I took 6 plants classes, and I took another one here in Texas natives when I got here.*

T: Oh, excellent. So you know more than 65 plants!

*W: That's just something that the schools don't think is important.*

T: Oh but it is

*W: That's a struggle for me because, well, I like plants!*

T: Well, but you can do that then in your professional work. I know they don't train that way but it is *essential!* These are plant-rich environments. And they need to remind people of home. Did I send you the therapeutic garden characteristics?

*W: Um, you sent me a thing from Yale that talked about your gardens.*

T: Ok, I'll send you the therapeutic garden characteristics, too. And I'll connect you with Polly Youngren too, because she's a nurse.

*W: OK, that would be great. I am trying to get people with different perspectives, because the landscape architects have one perspective and the horticultural therapists have another one...*

T: Well I'm also the coordinator of all of our therapeutic gardens at Legacy. And you know, my theory is, I only hire landscape architects that are going to do it the way we need for our clinical programs. The landscape architects better figure it out! And I hire an excellent one who's been willing to learn with us.

*W: And who is that?*

T: Bryan Bainnson.

*W: Should I talk to him too?*

T: You could. I could connect you on Saturday by email

*W: OK. Well him I can probably look up in the ASLA membership list.*

T: Yes Brian, and Mark Epstein has also been (involved). I belong to the PPN for the therapeutic landscapes, too. You're in that one?

*W: Well I signed up. I've been in touch with them. I've also used that website that Naomi Sachs runs, it's very good.*

T: Oh yes, Naomi's great.

*W: That's got a lot of good information on it.*

T: And you know, I really appreciate you just helping to make the profession more aware of what is needed, and what the research is, and also to look at a real integrated approach to reporting this, like you're doing.

*W: Yes, I'm hoping to write it up and put it on that network. Because I'm just fascinated, the stuff I've read about why autobiographical memories are stored with smell in your brain, and how you get when you smell something that's emotional, you get these adrenal stress hormones released. I don't know if you've read any of James McGaugh, he's a neurobiologist at UC Irvine. He writes about how because of evolution, smell is what triggered that fight-or-flight, or mate, or nurture an offspring, whatever the kind of crisis, emergency was, you got these stress hormones, and that's why smell, those memories last longer and have less interference. Once you have a smell association it doesn't change as much as a visual or an auditory one. So you get that big emotional charge because it's all stored in the same place in your brain.*

T: Interesting! Well, I'll look forward to it. Have you thought of doing even a PowerPoint report and starting to float that about?

*W: Well, gosh, I have to do a PowerPoint for my thesis presentation....*

T: Because I've had other MLA, or other masters' level students in other fields do that, and that really helps to get the word out there, get your name out there, and then advance that into a paper.

*W: Yes. Well right now I'm really trying to graduate! But it may be August, at the rate I'm going.*

T: Good for you!

*W: I actually was not going to interview people, I was just going to do a massive lit review, and then my advisor said, Well, you know, you really ought to talk to some people!*

T: Well I'll send you a few pictures, and send the info on Brian Bainnson and Polly Youngren.

*W: You know what else I'd like to include is some plans....because you've sort of got it down, how to do it. So if you could send me maybe a couple of planting plans, that would be really helpful.*

T: Um, how about a plant list?

*W: Yes, that would work. Because I'm compiling plant lists too. You know the other thing that I've run across, which would be like another paper, is the ethnic differences....*

T: Yeah, oh yeah. And now we want to try to blend that in anyway. In hospitals, where I work, we serve a wide range of people. So we have to be sensitive.

*W: But old folks' homes, quite often are designed for a specific population, or they're in an area where most of the people share a background.*

T: Yes. And we need to be careful to be inclusive and not exclusive. It's kind of like, we don't decorate our gardens for Easter or Christmas, but we use a seasonal focus. Right now we're for spring, and then it's summer, and then it's fall, and winter, so that we're inclusive, everyone is welcome....So it's a real interesting kind of facilitation that the LA needs to be able to do, to try to help people get what they don't know they need, and what's possible....People don't know what's possible!  
So, I'll send you that information when I get back to work on Saturday.

*W: And I'll need to send you an informed consent form to get shipped back to me.*

*Thank you very much!*

Etc. Closing.

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Other

Author's discussion with fellow Virginia Tech student Sean Surla about her visit to the Bloedel Reserve, March 2004.

Personal communication from Virginia Tech research fellow George Hazelrigg about the Henry Ozga's work at the Presbyterian Home in Bethesda, MD, April 2007.

Personal communication from Jack Carman, including stories from Gerry Stride at Medford Leas and Peg Schofield at Cathedral Village elder homes, April 2007.

## BIOGRAPHICAL INFORMATION

Wendy Meyer grew up in Virginia and Maryland. She received a B.A. *cum laude* in Slavic Languages and Literature from the University of Virginia in 1979. She worked for twelve years in the advertising business before moving to Berlin in 1990, having two children and studying German and European gardens. Upon returning to the United States she worked as a translator of defense documents, moved across the country several times, and studied field ecology and native plants in California and Virginia. She began her masters' work with the certificate programs in woody plants and landscape design at The George Washington University, and completed one year in the MLA program at Virginia Polytechnic University before landing at the University of Texas at Arlington, where she finally plans to graduate.

She has been married to George Rodrigue, a patient man, for twenty-eight years, has two delightful children, two bad German Shepherd dogs, and a buffalo grass lawn sadly in need of weeding. She plans to work for a residential landscape firm in Dallas, Texas upon graduation, and perhaps eventually work on therapeutic gardens in addition to pursuing her interests in native plants and rainwater management.