

ARCHITECTURE, NATURE AND CARE:

The importance of connection to nature with reference to older people and dementia

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This is a bibliography of the evidence supporting the importance of nature and outdoors in the lives of older people, in particular those in long term care environments and people with dementia. It is drawn from current research projects and published papers in architecture, geography, landscape architecture, social horticulture and dementia care. It is by no means comprehensive but represents a broad sweep of current knowledge in support of the topic across a range of disciplines. An appendix contains recent papers with references to further reading. The general domains include:

1. [Importance of nature for health and wellbeing](#)
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3. [Home, view, gardens and gardening](#)
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1. Importance of nature for health and wellbeing

Evidence attributes a wide range of health benefits to contact with nature for people of all ages and in all manner of mental and physical health or infirmity. Physiological benefits such as better sleep patterns, improved hormone balance, lowered stress level, restoration, decreased agitation and aggressive behaviour have all been observed in association with contact with nature and the outdoors. This literature forms the basis for the gold standard - evidence based design (EBD). Furthermore, emotional and psychological benefits to nature form an established literature in environmental psychology.

- Barnes, M. (1996). Designing for emotional restoration: Understanding Environmental Cues. *Journal of Therapeutic Horticulture*, **8**: 11-14. The article looks at the passive impact of our surroundings in terms of offering therapeutic benefit. Individuals have a range of needs and move through phases (the journey, sensory awareness, self awareness and spiritual awareness) each of

which has design principles with examples. This research elucidates the connection between emotional restoration and the environmental settings specifically chosen by individuals to assist their healing process. The resulting conclusions have significant implications for the design of outdoor therapeutic spaces.

- Betrabet, G. (1996). The garden as a restorative environment: Theoretical perspective. *Journal of Therapeutic Horticulture*, **8**: 15-20. The article presents existing conceptualizations of restorative environments from the fields of healthcare and environmental psychology, landscape architecture, horticultural therapy and tourism. It makes a composite picture of a restorative environment and uses the 'restorative environmental profile' to diagram them. "The garden is simultaneously an idea, place, and action and is attributed different meanings that are reflected in various aspects of people's daily lives." (p 18)
- Francis, M. and Cooper-Marcus, C. (1992). Restorative Places: Environment and Emotional Well-Being. In: *Proceedings of the 23rd Annual Conference of the Environmental Design Research Association*, Oklahoma City, OK: EDRA.
- Gerlach-Spriggs, N., Kaufman, R.E., and Warner, S.B. (1998). Restorative Gardens: The Healing Landscape. New Haven, CT: Yale University Press.
- Hartig, T. (1991). Natural environments. *Environment and Behavior*, **23**: 3-26. People experience restorative effects of natural environmental experiences. An attention-restoring experience can be as simple as looking at nature. 'As well as sustaining life, natural environments help foster, to paraphrase John Muir, inner peace and a renewal of mental energy'.
- Haviland-Jones, J. (2000). The Emotional Impact of Flowers Study. This research, sponsored by the Society of American Florists, revealed that flowers have an immediate impact on happiness, have a long-term positive effect on moods, make intimate connections and are a symbol for sharing. For details the website is <http://www.twincitiesflorists.com/happiness.html>
- Kaplan, R. and S. Kaplan (1990). Restorative Experience: the healing power of nearby nature, in The meaning of gardens. Francis & Hester (eds). Cambridge: MIT Press. This article is a review and discussion of Kaplan's previous work on gardening satisfaction and brief description and development of the argument for the 'Restorative Environment' (Attention Restoration Theory).
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology* [Special Issue: Green psychology] **15**(3): 169-182.
- Sato, Takayuki (2003). Emotional Responses to Flowering Landscapes. Unpublished Master's Thesis. California State Polytechnic University. "The findings support contentions by Adachi, Rohde, and Kendle (2000), Cooper Marcus and Barnes (1999), Haviland-Jones (2001), Lewis (1992, 1994), Schroeder (1991), Shoemaker (1994), and Ulrich and Parsons (1992), that flowers have a positive influence on emotional response. Also, the findings suggest that the presence of flowers

tends to generate responses into the activated range, while the absence of flowers tends toward a deactivated response. Furthermore, the scale of massing, proximity, and content of the floral display appear to influence emotional responses. The results reveal that large-scale massings of flowers have greater effect on emotions than small or medium-scale massings; in addition, proximate views of flowers (a distance of less than 2 meters) demonstrate higher impact on emotional responses.”

<http://www.csupomona.edu/~la/grad/thesis2.html>

- Ulrich, R. S. (1983). Aesthetic and affective response to natural environment, in Human Behaviour and Environment: Behaviour and the Natural Environment, Altman & Wohlwill (eds.). New York: Plenum. 6: 85-125. This is a review of work on responses to landscape & nature.
- Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, **224**: 420-421. Classic study in which records on recovery after cholecystectomy (gall bladder surgery) of patients in a suburban Pennsylvania hospital between 1972 and 1981 were examined to determine whether assignment to a room with a window view of a natural setting might have restorative influences. 23 surgical patients assigned to rooms with windows looking out on a natural scene had shorter postoperative hospital stays, received fewer negative evaluative comments in nurses' notes, and took fewer potent analgesics than 23 matched patients in similar rooms with windows facing a brick building wall.
- Ulrich, R.S. & R. Parsons (1992). Influences of passive experiences with plants on individual well-being and health, in The role of horticulture in human well-being and social development, Diane Relf (ed). Portland: Timber Press.
- Ulrich, R. S. (1999). Effects of Gardens on Health Outcomes: Theory and Research. Book chapter in Healing Gardens: Therapeutic Benefits and Design Recommendations. Marcus & Barnes (eds.), p. 27-86. New York: Wiley. Extensive review and discussion of research into the perception of landscape and nature and effects on behaviour with 166 references.
- Wilson, L. M. (1972). Intensive care delirium: the effect of outside deprivation in a windowless unit. *Archives of Internal Medicine*, **130**: 225-226. Wilson found that "more than twice as many patients in the windowless intensive care unit developed post-operative delirium...and also a greater incidence of post-surgical depression among those patients in the windowless unit who did not develop post-operative delirium " (Collins, p.29) He attributed the increased incidence of delirium in the windowless unit to the absence of windows, saying that windows provide a necessary psychological escape from the traumas of the ICU, and that "the absence of windows can contribute severe additional stress."(p. 30)
- Yamane, K. et al (2006). Effects of interior horticultural activities with potted plants on human physiological and emotional status. XXVI International Horticultural Congress: Expanding Roles for Horticulture in Improving Human Well-Being and Life Quality. Results showed that activities with

plants promoted physiological relaxation, and working with flowering plants appeared to have a stronger positive effect on human emotions than non-flowering plants.

2. Role of nature in quality of life

Connection to nature, access to the outdoors, and participation in nature-based activities were among a wide range of enjoyable activities reported by study participants of the Independent Project (Appendix A). Older people living in private homes or in residential care provided evidence that connection to outdoors plays a key role in their quality of life for many reasons, including sensory stimulation, supporting social life by engaging with community and neighbourhood, contact with wildlife, fresh air, physical exercise, having a pleasant view, distraction from the day to day routine, stimulation for conversation and reminiscence. For people in long term care, architectural design, care practice and lack of social involvement from family carers provided constraints. These included restrictions on movement within secure settings, lack of outdoor areas with easy access, non-priority among care staff for going outdoors, double-loaded corridors with no natural light, lack of visual access to existing outdoor resources, north-facing lounges, rooms with no view to greenery or local activity and lack of social support from family carers.

- Chalfont, G. E. & Gibson, G. et al. Housing and connection to nature for people with dementia: Findings from the INDEPENDENT Project. (book chapter, forthcoming)

3. Home, view, gardens and gardening

There is growing interest in the vernacular, domestic spaces of the home in terms of nature. Gardening has traditionally been used both by individuals and groups to develop a physical as well as a spiritual connection to place. There is well-documented evidence of the social, physical and psychological benefits of gardens and gardening for older people.

- Bhatti, M., (2005). Healthy pleasures: Homes and Gardens in later life. Paper presented to the RGS/IBG Conference 31st Aug – 2 Sept 2005 London. “There is a growing academic literature that explores the social, physical and psychological benefits of gardens and gardening. Recent research on healthy ageing shows that various garden forms can play an important part in improving the quality of life for older people. This paper extends and compliments this research by providing qualitative evidence which suggests ‘work’ in the garden has many positive benefits. Moreover, simply ‘being’ in the garden is a source of pleasure and enjoyment. ...for older people the garden is an important part of the meaning of home, which includes remembered gardens in childhood.”
- Bhatti, M. & Church, A. (2004). Home, the culture of nature and the meaning of gardens in Late modernity. *Housing Studies*, **19**(1): 37-51.

- Devlin, (1980). Housing for the elderly: cognitive considerations. *Environment and Behavior*, **12**(4): 451-466. Living environments; older people in garden apartment housing derive satisfaction from physical aspects of ground-level design and proximity to nature, while highrise residents experience greater attentional demands and confusion but have a supportive social environment.
- Dunnett, N. and M. Qasim (2000). Perceived Benefits to Human Well-being of Urban Gardens. *Hort Technology*, **10**(1): 40-52. This is a major survey on the role of private, urban gardens in human well-being, conducted with a wide cross-section of randomly selected garden owners from the city of Sheffield, England, over the summer of 1995. The article discusses the perceived value that gardens have to the well-being of people, both individually through the enjoyment of their own gardens and collectively through the contribution of city gardens to environmental enhancement.
- Kaplan, R and Kaplan, S. (1990). *Restorative Experience: The Healing Power of Nearby Nature*, in M. Francis and R.T. Hester (eds.) *The Meaning of Gardens*. Cambridge, Mass.: MIT Press. This chapter is a review and discussion of Kaplan's previous work on gardening satisfaction and brief description and development of the argument for the 'Restorative Environment' (Attention Restoration Theory).
- Kaplan, R., (1973). Some psychological benefits of gardening. *Environment and Behavior*, **5**(2): 145-162. Benefits include: desire to work in soil, want to see things grow, like being outside, interest in learning about gardening, ability to sustain interest, valuable way to spend time, diversion from routine, aesthetic pleasure from plants, opportunity to relax, provide sense of accomplishment, enjoy the feeling of producing some of my own food, cut food expenses, and harvesting.
- Kaplan, R. (2001). The nature of the view from home: psychological benefits. *Environment and Behavior*, **33**(4): 507-542. Having natural elements or settings in the view from the window contributes substantially to residents' satisfaction with their neighbourhood and with diverse aspects of their sense of well-being.
- Markus & Gray (1973). Windows in low rise, high density housing -- the psychological significance of sunshine, daylight, view and visual privacy. *Windows and their function in architectural design*. Conference proceedings published by CIE. To evaluate satisfaction with windows in residential buildings in Scotland; satisfaction appeared to be related to the amount of greenery and 'nature' visible, the amount and kind of activity occurring, and to the degree of brightness of the visible scene. Visual satisfaction was strongly related to the visible extent to grassy areas around the house, the size of the garden, the amount of open space and the distance between houses. Brightness, spaciousness and the amount of blue sky visible through the windows were also deemed important.
- Percival, J. (2002). Domestic spaces: uses and meanings in the daily lives of older people. *Ageing and Society*, **22**(6): 729-749.

- Sixsmith, A (1990). The meaning and Experience of 'home' in Later Life. In Bytheway, W. and Johnson, J. (eds.) *Welfare and the Ageing Experience*. Aldershot, Avebury.

4. Access to neighbourhood

- Del Aguila M., Choi, M, et al. (2005). Community based housing for South Korean seniors with cognitive and physical impairments: A design project for 2020 and beyond. International Association for People-environment Studies, IAPS Bulletin #27 2005 <http://www.iaps-association.org/> "The design project aimed to utilize a community's capacity to assist aged community members in their community. Given the declining availability of family care-giving resources (space, time), the choice of location was seen as paramount in enabling a seamless transition from family based care to family's active participation in community-based care. Creating a flow between the building and the community further enables the transition. In addition to being a home for aged community members, the design supports the community with a medical centre and recreation facilities. By forming an integral part of the community fabric, the design enables family, friends, and community members to remain active participants in the ongoing lives of elderly community members."
- Mitchell, L., E. Burton, et al., (2004). Neighbourhoods for Life. Oxford, Oxford Centre for Sustainable Development, Department of Architecture, School of the Built Environment, Oxford Brookes University, pp. 1-10. This checklist of recommendations for designing dementia-friendly outdoor environments 'gives a range of design recommendations to help housing associations improve the quality of life of older people with dementia in the outdoor environment.'
- Mitchell, L., Burton, E. and S. Raman (2004). Dementia-friendly Cities: Designing Intelligible Neighbourhoods for Life. *Journal of Urban Design*, 9(1): 89–101. This research explored 'ways in which the design of the outdoor environment affects the ability of older people with dementia to understand and navigate their local urban neighbourhoods.' It establishes 'the importance of legibility in using and enjoying their local neighbourhoods' and 'identifies design features that make an area legible such as the character of street networks and the presence and type of landmarks. By focusing on designing urban areas that are explicitly easy to understand, navigate and access, the findings are relevant to all members of society.'
- Rapelje, Papp & Crawford, (1981). Creating a therapeutic park for the mentally frail. Dimensions in health service: 12-14. Articles and events from the past provide people with dementia with opportunities to reflect upon past experiences and environments.
- Sullivan, W. C., Kuo, F. E. & S. F. DePooter (2004). The fruit of urban nature: Vital Neighborhood Spaces. *Environment and Behavior*, 36(5): 678-700. Reports that the presence of trees and grass is

related to the use of outdoor spaces, the amount of social activity that takes place within them, and the proportion of social to nonsocial activities they support.

- Current Research Project: The IDGO project is aimed at identifying ways of ensuring the outdoor environment is designed inclusively, to improve the quality of life for older people. The EPSRC-funded consortium includes OPENspace, based at Edinburgh College of Art and Heriot-Watt University, SURFACE research centre at the University of Salford and the Oxford Centre for Sustainable Development (OCSD) at Oxford Brookes University. Website: www.idgo.ac.uk

5. Social and therapeutic nature

Healing gardens and landscapes designed for therapeutic purposes are an area of special concern to landscape architects, with the design of such spaces within hospital environments and other healthcare facilities receiving much attention. Activities involving communal garden spaces impact wellbeing both personally (the person individually) and socially (the person within their social network.) Furthermore, community garden projects provide social interaction at a neighbourhood level for people with various physical and mental health needs with participants often experiencing a wide range of benefits.

Horticultural therapy in the USA <http://www.ahta.org/> and social and therapeutic horticulture in the UK <http://www.thrive.org.uk/> promote the use of horticulture for health and wellbeing for a wide range of client groups. See for example reviews of the literature as well as practice in the UK (Sempik et al, 2003). Also, a report on Health, Well-being and Social Inclusion resulting from a national survey of over 800 projects can be found at www.policypress.org.uk. The use of a garden for psychotherapeutic purposes has taken on new momentum, notably for communication between a psychologist and an autistic child (ref?) and within geography with sensory workshops exploring the relationship between self and landscape (Bingley, 2003). The benefits of community gardening for older people has received attention (Milligan, Bingley & Gatrell, 2005) as well as community garden work assisting people with severe and enduring mental health problems to achieve social inclusion and stability (Parr, 2005). Furthermore, gardens are beginning to be used as routine settings for psychotherapy to engage adults with chronic and severe mental health needs (Linden & Grut, 2002). One such garden environment developed in Maryland, USA allows the therapist to use nature symbolically. The clients use nature as a tool to communicate and reflect on their emotional experiences using the natural processes of decay, dormancy, growth and fruition (www.chalfontdesign.com). The concept of a restorative garden is not new. But an “instorative environment strengthens our identity and self-esteem and makes us feel part of a meaningful context. When the experiences and activities in the environment are in harmony with the user’s background and character health, well-being and drive are promoted (Grahn, 2005; Stigsdotter & Grahn, 2003; Stigsdotter & Grahn, 2002). Whereas the concept of restorativeness focuses on the experiences in an environment that gives opportunity to recover and to improve health outcomes, the

concept of instorativeness also adds the possibilities of *gaining something more than recovery, something of existential value and reorientation in life* (emphasis added) that make us more fit to meet future misfortunes” (Bengtsson & Carlsson, 2005, p. 2).

- Abbott, (1997). Innovations in intergenerational programs for persons who are elderly: The role of horticultural therapy in a multidisciplinary approach. *Activities, Adaptation & Aging* **22**(1-2): 27-39. This study looked at a gardening and horticulture programme for intergenerational respondents at a medical centre. It describes responses to gardening and working together and suggests ideas for further programmes.
- Bingley, A. (2003). “In here and out there: sensations between Self and landscape.” *Social & Cultural Geography*, **4**(3): 329-345.
- Borrett, N. (1996). “Our crucial connection with nature.” *Journal of Dementia Care*, Sept-Oct, pp 22-23. "The concept of a healing environment is based on an understanding of the connection between body, mind and spirit which is fundamental to the whole question of environmental design."
- Burgess, C. W. (1990). Horticulture and its application to the institutionalized elderly. *Activities, Adaptations and Aging*, **14**(3): 51-61. Looks at the use of gardening programmes in the US to provide staff with the setting to work towards physical and emotional goals. Horticultural activities offer outlets for creative self-expression, variety and change, control and independence, and social interaction. Gardening also offers opportunities for people to be of service to others; and provides mental, visual, and auditory stimulation, and physical benefits such as exercise.
- Cooper-Marcus, C. and Barnes, M. (1999). Healing Gardens: Therapeutic Benefits and Design Recommendations. New York, NY: John Wiley & Sons, Inc. This is a major work examining the background and design of gardens in healthcare, mainly focusing on hospital gardens.
- Ebel, S. (1991). Designing stage-specific horticultural therapy interventions for patients with Alzheimer’s disease. *Journal of Therapeutic Horticulture*, **6**(1): 3-9. “A rehabilitative approach using behavioural strategies and environmental modifications can improve physical and mental functions of people with dementia, often allowing them to perform at their highest ability. Optimal functioning and esteem-building need to become the goals of rehabilitation intervention for patients with early-stage dementia; sensory stimulation, awareness outside of self, and bringing pleasure to the patient should become the goals of late stage dementia intervention.”
- Gigliotti & Jarrott, et. Al. (2004). Harvesting health: Effects of three types of horticultural therapy activities for persons with dementia. *Dementia*, **3**(2): 161-180. This recent study lends support to the value of horticultural therapy activities. High levels of positive affect and engagement were observed during all of the categories of HT activities. This study found that the percentage of time spent doing nothing was lower during HT than traditional activities. Also, the affect was more positive during HT than traditional activities.

- Heath, Y. (2004). Evaluating the effect of therapeutic gardens. *American Journal of Alzheimer's disease*, **19**(4): 239-242. This article describes a post-occupancy evaluation (POE) of therapeutic gardens in a multilevel care facility for older people and people with dementia. It also documents the changes implemented to address problems identified in the POE, as well as general recommendations for designing therapeutic courtyard gardens. User views were obtained, they found that visitors were more likely to feel more relaxed after visiting the garden and residents were more likely to feel a 'spiritual uplift'.
- Linden, S. & J. Grut (2002). The healing fields – working with psychotherapy and nature to rebuild shattered lives. London: Frances Lincoln.
- Marcus, C. C. and M. Barnes (1995). Gardens in healthcare facilities, users therapeutic benefits and design recommendations. University of California. Commenting on this book, Nick Borrett (1996) says, “they reported a strong correlation between how people feel and their relationship with gardens and the external environment...95% of people using gardens related to health care facilities reported feeling different; over 70% described feeling more relaxed and calmer; nearly 70% referred to trees and plants as important; nearly 60% referred to features involving tactile sensations, including wind, fresh air, light and shade, fragrances and quietness; 50% referred to psychological or social aspects of the landscape, such as peace, openness, privacy, companionship, an oasis, watching others; 25% of the respondents referred to important visual qualities of the landscape, e.g. attractive design, views, variety of elements, textures, shapes and sizes.” (Borrett, p. 23)
- McGuire, D. (1997). Implementing horticultural therapy into a geriatric long-term care facility. *Activities, Adaptations and Aging*, **22**(1-2): 61-81. Describes the use of flower arranging classes, a garden club (working with plants, plant seeds etc.) flower visits (taking flower arrangements to individuals in their rooms) and sensory stimulation outreach (to give residents opportunities to increase the use of their senses in groups). Observations of how residents responded to these therapies are recorded. Presents a personal account of how horticultural activities were used on a contractual basis in a number of nursing homes and later used in an activities therapy department. 'This paper shows how horticulture as an activity becomes respected as a therapy among disciplines of the care planning team at one long-term care facility.'
- Milligan, C., Gatrell, A. & A. Bingley, (2004). 'Cultivating health': therapeutic landscapes and older people in Northern England. *Social Science & Medicine*, **58**: 1781-1793. This paper examines how communal gardening activity on allotments contributes to the maintenance of health and well being amongst older people. Involvement in the domestic garden and on allotments provides a sense of achievement, satisfaction and aesthetic pleasure. Communal gardening on allotment sites creates inclusionary spaces in which older people benefit from gardening activity in a mutually supportive environment that combats social isolation and contributes to the development of their social

networks. By enhancing quality of life and emotional well being, communal gardening sites offer one practical way in which it may be possible to develop a 'therapeutic landscape'.

- Milligan, C., Bingley, A., & A Gatrell, (2005). Digging deep: Using diary techniques to explore the place of health and well-being amongst older people. *Social Science & Medicine*, **61**: 1882-1892. This paper reports on the effective use of diary techniques to exploring the role of communal gardening and other social activities in maintaining the health and mental well-being of older people.
- Mooney & Milstein, (1994). Assessing the benefits of a therapeutic horticulture program for seniors in intermediate care. The Healing Dimensions of People-Plant Relations Conference. UC Davis, CA: Center for Design Research. Controlled study and focus group discussion. Benefits reported: increased orientation to place, task and seasons, increased attention span, improved or increased interactions with other residents both during and outside of program times, reminiscence, increased or improved physical functioning, displays of initiative, increased motivation, and the opportunity to experience success and accomplishment.
- Mattson & Hilvert, (1976). Psychological, social, physical and educational effects of horticultural therapy for geriatrics. *Hortscience*. Activity therapy and gardening activities maintain life satisfaction indexes of senior citizens, while inactive residents significantly declined in self-esteem...horticultural therapy improved socialisation, helped maintain physical coordination, and provided an educational stimuli. Some arthritic and physically disabled geriatrics also benefit from group and/or individual involvement in gardening activities. Art and craft activities, interior fluorescent light gardens, raised vegetable gardens, specialized tools, and involved therapists help to retard the disengagement process of the aging.
- Parr, H. (2005). Sustainable Communities? Nature Work and Mental Health. Dept of Geography, University of Dundee. Project report on mental health, nature and social inclusion.
- Sempik, J., Aldridge, J. & Becker, S. (2003). Social and therapeutic horticulture: Evidence and Messages from Research, Reading: Thrive and Loughborough: CCFR.
- Stigsdotter, U. & Grahn, P. (2003). Experiencing a Garden: A Healing Garden for People Suffering from Burnout Diseases. *Journal of Therapeutic Horticulture*, **14**: 38-48. Sorts three different theories of healing effects of gardens into schools: the healing garden school, the horticultural therapy school and the instorative school, each with health effects differently derived. The paper tells of the Healing Garden at Alnarp offering treatment programs, a setting for interdisciplinary research, a testing site for design hypotheses and an object of study for students.
- Stigsdotter, U. & Grahn, P. (2002). What Makes a Garden a Healing Garden? *Journal of Therapeutic Horticulture*, **13**: 60-69. 'The first part discusses healing influences of healing gardens based on theories and findings from the different research disciplines of environmental psychology, landscape architecture, medicine, and horticultural therapy. The second part of the article focuses on the people

the healing garden is intended for' ...in order to determine 'how and why the human beings benefit from being in a healing garden' (p. 1).

6. Sensory stimulation and sensory deficits

For therapeutic benefits multi-sensory stimulation has been applied indoors through the design and use of environments such as the Snoezelen room. In such environments nature is present in the sound of water features and in the herbs used during aromatherapy massage. For a summary of research on multisensory environments (MSE) see Staal, et al (2003). Sensory stimulation is also a primary benefit of being outdoors, as nature is full of stimuli to excite the senses. Since the experience of being outdoors affords auditory, tactile and aromatic stimulation, people with sensory deficits, such as the visually impaired, benefit from gardens specifically designed to stimulate the senses of touch, smell and hearing. Such gardens often have Braille signage. In one unique sensory garden (Japan?) Braille text was felt and read by visitors along the handrail as they entered the site. A research project into the support needs of older people with sensory impairment reported a "keen demand for access to a garden." Furthermore, "there may be a real design opportunity to design accessible, contemplative sensory gardens (tactile, aromatic, auditory) that compensate for poor vision, maybe even extending to a degree of safe, active gardening for those who continue to enjoy this activity" (Hanson, et al, 2002).

- Aveyard & Sykes, et al (2002). Therapeutic touch in dementia care. *Nursing Older People*, **14**(6):20-21.
- Ballard, C. (2002). Aromatherapy as a safe and affective treatment for the management of agitation in severe dementia: The results of a double-blind, placebo-controlled trial with Melissa. *Journal of Clinical Psychiatry*, **63**(7): 553-558.
- Burns, A., J. Byrne, et al (2002). Sensory stimulation in dementia. *British Medical Journal*, 325: 1312-1313. Aromatherapy and bright light treatment seem to be safe and effective and may have an important role in managing behavioural problems in people with dementia.
- Chalfont, G. E. (2005a). Reconnecting with nature. *Journal of Dementia Care*, **13**(2): 35. (Appendix D)
- Hanson J., Johnson, M., Percival, J. and Zako, R., (2002). Housing and Support Needs of Older People with Visual Impairment – experiences and challenges. Occasional Paper Number One, Thomas Pocklington Trust, Chiswick, London.
http://www.bartlett.ucl.ac.uk/research/space/housingfutures/OAP_VIP.htm
- Staal, J. A., Pinkney, L. & D. M. Roane (2003). Assessment of Stimulus Preferences in Multisensory Environment Therapy for Older People with Dementia. *British Journal of Occupational Therapy*, **66**(12): 542-550.
- Wareing, L., R. Baker, et al (2001). A randomized controlled trial of the effects of multisensory stimulation (MSS) for people with dementia. *British Journal of Clinical Psychology*, **40**(1): 81-96.

7. Nature by design – theory, older people and dementia

The importance of including nature in environmental design of domestic living environments is increasingly understood as contributing to wellbeing and quality of life. Design guidance has developed specific to various client groups, such as older people and people with dementia.

A. Spatial use and design

- Lawton, M. (1975). Competence, environmental press and adaptation. Theory development in environment and ageing. P.G. Windley, T.O. Byerts and F.G. Ernst. Washington, DC, Gerontological Society of America. The ecologic model of aging – behaviour seen as a function of competence in dealing with demands from the environment; low competence or high demand can result in behaviour inappropriate to the situation.
- Lawton, M. (1985). The elderly in context: perspectives from environmental psychology and gerontology.” *Environment and Behavior*, **17**(4): 501-519. Control of one’s immediate environment means both knowing it well and maximizing the possibility of determining how the space is used.
- Lawton, M. (1990). Residential environment and self-directedness among older people. *American Psychologist*, **45**(5): 638-640. Environmental prosthetics would have a disproportionately strong and positive effect on impaired older people's behaviour. Environmental Proactivity Hypothesis: a person may seek, choose or create an environment in order to satisfy needs and preferences. Change gives the best opportunity to understand the transactional nature of the older person and the environment...good health and favored social position have been shown to be associated with self-directed effort to enlarge one's psychological and physical space. Biological decline, whether in the form of chronic illness, cognitive impairment, or simple reduction in energy, moves the person in the opposite direction. One of the most sensitive areas of negative impact is on the size of one's social space...with the contraction of space and reduction of stimulation...may come an interesting process of increasing the density of one's control of the remaining space; by learning to apply choice and self-direction in the everyday uses of their own housing, occupants of any level of intactness or impairment can actively affect their overall quality of life.
- Moore, K. D. (2005). Using place rules and affect to understand environmental fit: A Theoretical Exploration. *Environment and Behavior*, **37**(3): 330-363. The degree of fit between the day care participants with dementia (grouped according to retained abilities) and their environmental milieu varied. The needs of the groups involved the ability to regulate stimulation, accessibility (physical, visual, and informational) and social interaction.
- Reimer, M., S. Slaughter, et al. (2004). Special care facility compared with traditional environments for dementia care: a longitudinal study of quality of life. *Journal of the American Geriatrics Society*,

52(7): 1085-1092. The SCF is a 60-bed purpose-built facility with 10 people living in six bungalows. The facility followed an ecologic model of care that is responsive to the unique interplay of each person and the environment. This model encompasses a vision of long-term care that is more comfortable, more like home, and offers more choice, meaningful activity and privacy than traditional settings. The intervening SCF group demonstrated less decline in activities of daily living, more sustained interest in the environment, and less negative affect than residents in the traditional institutional facilities.

- Stoneham, J. & Thoday, P. (1996). Landscape Design for Elderly and Disabled People. Woodbridge: Garden Art Press.
- Teresi, J. A., D. Holmes, et al. (2000). The therapeutic design of environments for people with dementia: Further reflections and recent findings from the National Institute on Aging collaborative studies of Dementia Special Care Units. *Gerontologist*, **40**(4): 417-421.
- Zeisel, J. et al. (2003). Environmental Correlates to Behavioral Health Outcomes in Alzheimer's Special Care Units. *Gerontologist*, **43**: 697-711. This research demonstrates the potential that environment has for contributing to the improvement of Alzheimer's symptoms.

B. Nature in design for dementia

That there is an effect of the physical environment on people with dementia is widely recognized. During cognitive decline the person relies increasingly on non-verbal cues such as those offered by the built environment. Since the building affects a person's behaviour, evidence-based design has become the gold standard for dementia care environments. The design criteria specified by the Scottish Action on Dementia (1986), by Cohen & Weisman (1990) and the Dementia Services Development Centre, Stirling University include small scale, domestic style, using the past, individual rooms, see and be seen, lots of cues, different functions in different rooms, avoid sharp contrast in flooring, make clear signage and provide something to watch. However, besides the Eden Project, there is very little about connection to nature in design guidance for dementia environments, except what one would expect generally for any living area – views to nature and things going on, accessible outdoor space, raised beds, seating and so forth.

- Brawley, E. C. (1997). Designing for Alzheimer's disease: strategies for creating better care environments. New York: John Wiley & Sons. Addresses sensory stimulation, using the outdoor environment and checklist for outdoor spaces.
- Calkins, M. P. (1998). Design for dementia: planning environments for the elderly and the confused. Owings Mills, MD: Health Publishing. One of the earliest environmental designers to codify design approaches to ameliorate the difficulties experienced by persons with dementia. Identifies

interactions between such social phenomena as territoriality, familiarity, and residentiality and gives specific physical supports for those with Alzheimer's disease.

- Calkins, M. P. (2001). The Physical and social environment of the person with Alzheimer's disease. *Ageing and Mental Health*, 5(2): 74-78. Contains a reference to environmental determinism; direct relationship between an environmental feature or characteristic and a specific outcome. Early design efforts tend to follow a similar epistemological perspective, developing specific environmental interventions to address specific behaviours.
- Cohen, U. and G.D. Weisman (1991). Holding on to Home: designing environments for people with dementia. Baltimore: Johns Hopkins University Press. "There is both empirical and theoretical support for the positive role of physical setting in the care of people with dementia." One of the early classics offering design guidance, graphics, bird's eye view of building layouts and practical advice from attributes of the environment, mobility, disability, access, cueing, signage and building organization to therapeutic goals. Guidance offered about the environment in terms of the needs of a person with dementia includes: sensory stimulation without stress; dementia may impair effective processing of information from the environment; regulated stimulation and challenge; ensure awareness and orientation; adapt to changing needs of people with dementia; daily patterns - sundowning; stimulation - over versus under; sensory involvement increase with textures, windows, handholding. building organization: clusters of small activity spaces; decreased capabilities in perceiving and processing environmental information; maximize awareness and orientation with respect to time and place; retain links with the healthy and familiar; encourage increased social contact, homelike activities, meaningful wandering, landmarks; support functional ability through meaningful activity; positive microclimate, flexible seating; greenhouse, sunrooms, places for plants; positive outdoor spaces (the shape of the building defines a sheltered outdoor area); places for visiting; adaptable, accessible, functioning kitchen; support highest level of functional ability; maximize opportunities for autonomy and control; multiple sensory cueing; consistent messages; accentuation of the message with moderate background stimulation; compensatory design and a gradation of spaces from public to private realm.
- Cohen-Mansfield, J. (2001). Managing agitation in elderly patients with dementia. *Geriatric Times*, 2(3): 1-5. Suggests one way of preventing or treating agitation (aggression, depression) in the elderly with dementia is to 'encourage patients to walk in a sheltered garden.'
- Coons, D. H. (1991). Specialized Dementia Care Units. The Johns Hopkins Series in Contemporary Medicine and Public Health. Baltimore: Johns Hopkins University Press. "Four attributes appear to be particularly salient: image, negotiability, familiarity and stimulation... these attributes are a function not only of the physical environment but also of the interactions of physical, organizational and social subsystems. Thus, the creation of a more homelike environment requires appropriate

furnishing and finishes, patterns of ongoing activity typical of residential settings, and policies and programs supportive of such residential activities....non-institutional image, more negotiable environments, things from the past, sensory stimulation without stress..." (p 91)

- Day, K., D. Carreon, et al (2000). The therapeutic design of environments for people with dementia: A review of the empirical research. *Gerontologist*, **40**(4): 397-416. Design of the physical environment is increasingly recognized as an important aid in caring for people with dementia. This article reviews the empirical research on design and dementia, including research concerning facility planning (relocation, respite and day care, special care units, group size), research on environmental attributes (noninstitutional character, sensory stimulation, lighting, safety), studies concerning building organization (orientation, outdoor space), and research on specific rooms and activity spaces (bathrooms, toilet rooms, dining rooms, kitchens, and resident rooms).
- Eriksson, S (2001). Impact of the Environment on Behavioral and Psychological Symptoms of Dementia. *International Psychogeriatrics*, **12**, suppl 1, 89-91. 'Environmental factors that can influence BPSD include the patient's interactions with the caregiver and other patients, and the patient's physical surroundings, including sounds, temperature, wall color and the physical structure of the facility.'
- Lawton, M. (2001). The physical environment of the person with Alzheimer's disease. *Aging and Mental Health*, **5**, suppl. 1, S56-S64. 'Characteristics of the anticipated user population are the starting point in the search for environmental features that will minimize unwanted behaviours and feelings, and maximize those that are desired. The assumption is that some of this control may be built into the way the residence is designed.'
- Marshall, M. (1992). Designing for confused old people, in Recent Advances in Psychogeriatrics, T. Arie. Edinburgh: Churchill Livingstone. 'Our surroundings reflect the way we are valued... by providers of accommodation in the case of people with dementia who cannot organize their own environment' (p.203).
- Marshall, M (1997). Therapeutic design for people with dementia. Book section in Dementia: Challenges and New Directions. London: Jessica Kingsley. People with dementia function at very different levels with the same degree of neurological damage, so the question has to be answered about the nature of the mediating factors. One chapter examines the impact of the built environment. Dementia is a disability which can be compensated for through design.
- Marshall, M., Judd, S., and Phippen, P (1998). Therapeutic buildings for people with dementia' in Design for Dementia. London: Journal of Dementia Care. They fortell a rapid increase in expertise in adapting or designing ordinary houses so people can remain in their own homes, and ask for design for the highest level of disability so that people with dementia can increase their chances of remaining in situ.

- Marshall, M., S. Stewart, et al., (2000). Just another disability, making design dementia friendly: a strategic brief and audit tool for houses and flats for people with dementia. Glasgow. To decide whether or not a building is dementia-friendly, this audit tool has been developed which offers three approaches to assess the building: a walk through, a user consultation and a checklist. Aspects considered include the location, site, appearance of the building, the garden, front door, hallway, living room, kitchen, dining room, bedroom, bathroom and daily life. The design should be clear and well structured, stable and familiar, serve as a cue to behaviour, to memory and to reality. Principles state that the design should compensate for disability or physical impairment, maximise independence, enhance self-esteem and confidence, should demonstrate concern for carers, be orientating and understandable, reinforce personal and cultural identity, and should welcome relatives and the local community.
- Pickles, J. (1999). Housing for Varying Needs: a design guide. Part 2: Housing with Integral Support. Edinburgh, The Stationery Office. Section 17, external areas, describes design guidance for external sitting areas and gardens – good attention to benefits and therapeutic effects.
- Pollock, A. (2001). Designing gardens for people with dementia. Stirling: Dementia Services Development Centre. Book giving ideas and rationale for designing gardens for people with dementia. The inspiration for the book began with the design of a dementia garden for the Royal Horticultural Society Show in Strathclyde Country Park in 1999.
- Rappe, E. & Lindén, L. (2004). Plants in health care environments: Experiences of the nursing personnel in homes for people with dementia. In D. Relf (Ed.), Expanding Roles for Horticulture in Improving Human Well-Being and Life Quality. Acta Horticulturae, **639**: 75-81.
- Taira, E. D. (1990). Adaptations of the physical environment to compensate for sensory changes. In Aging in the Designed Environment. London: Haworth Press. ‘The environment has the greatest effect on the person with the least capacity.’
- Thomas, W. (1995). The Eden Alternative: Nature, hope, and nursing homes. Sherbourne, NY: Eden Alternative Foundation. The Eden Alternative is "a radically non-medical way of thinking about nursing homes," and, "in practice, it substitutes a holistic understanding of human needs and capacities for the 'diagnosis and therapy' driven medical model of care....it seeks to promote the well-being of nursing home residents by creating an enlivened human habitat that, at the very least, echoes the complexity and synergy that mark successful natural habitats.”
- Tooth, J. (1994). Four into one will go....*Journal of Dementia Care*. Nov/Dec: 15-17. ADARDS nursing home in Tasmania (built and administered by the Alzheimer's Assoc.) provides domestic scale care for the most disturbed people with dementia at two-thirds the cost of a psychiatric hospital; designed so ambulant people with the most difficult behaviours could like in an environment closely resembling a 'normal' house; secure garden area, chicken coop, meals cooked in

the house, single bed rooms, economies of staff achieved by clustering by day and conversion to 32 bed unit at night with the location of the nurses station in the centre of the wings. It also is a training unit; low level of tranquilising medication and disturbed behaviour, no staff burnout.

8. Access to nature in care settings

A body of evidence exists in support of the importance of outdoor environments in care settings such as nursing homes, residential care, day centres and hospice, to name a few. Logically, since the sensory garden is therapeutically beneficial to older people, the layout and content of outdoor spaces in care settings have been thoughtfully designed to afford such benefits. Gardens in dementia care environments have proven to be beneficial to residents with empirical evidence supporting the positive effects of gardens on behaviour. There is reason to believe that the more fragile the person is the greater the health effects they gain from use of outdoor environments (Ottosson & Grahn, 1998; 2005). A Norwegian study of the design and use of 8 gardens for people with dementia is being completed by *landskapsarkitekt* Ellen-Elisabeth Grefsrød, Project Leader on "sanehager som del av utomhusanlegget for personer med demens" <http://www.hageselskapet.no/terapeutiskehager>. A therapeutic garden is successful to the extent that it is used and valued by the client. While the use of a place can be measured, therapeutic value depends on its meaningfulness to the client, in particular, how well the place supports relationships. Residential garden environments for people with dementia can support person-centred care by providing opportunities for place-making. For just as a place is a space made meaningful, one's ability to make and sustain relationships makes a life more liveable (Chalfont, 2004).

- Bengtsson, A. & Carlsson, C. (2005). Outdoor Environments at Three Nursing Homes: Focus Group Interviews with Staff. *Journal of Housing for the Elderly* (in press). Two themes emerged. 'Theme one, *being comfortable in the outdoor environment* (describe the residents' special needs to be able to and dare to use the outdoors) suggests a *precautionary design*, which promotes security and safety and protects from disturbance and negative impressions. The second main theme, *access to surrounding life*, describes the residents' needs for change and variety in the everyday situation and suggests an *inspiring design*, which promotes stimulation of senses and mind and provides positive impressions' (p. 1).
- Chalfont, G. E. (2004). Current research on connection to nature: Implications for garden design in dementia care, *Therapeutic Garden Design Professional Interest Group Newsletter*, 4(1): 4-6. American Society of Landscape Architects.
http://host.asla.org/groups/tgdpigroup/TGD_FallWinter04.pdf
- Coble, M. (2002). Using outdoor spaces for people with dementia: A carer's perspective. *Working with older people*, 6(2): 23-30. Reports on the benefits of spending time outdoors, the healing power

of nature, activities in the garden, health benefits of gardening, exploring memories, seasonal activities, using what's grown in the garden, designing gardens for people with dementia at different stages and designing for varied needs.

- Cohen-Mansfield & Werner, (1998). Visits to an outdoor garden: impact on behavior and mood of nursing home residents who pace. *Research and Practice in Alzheimer's Disease*. B. Vellas and L. J. Fitten (eds.). New York: Springer, pp. 419-436. This study supports the use of outdoor visits for improving the well-being of nursing home residents who tend to pace and for decreasing disruptive behaviors such as trespassing. Several barriers to the intervention were encountered: the weather; residents' requiring one-to-one supervision; residents' fear of going outside; and accessibility of the outdoor areas.
- Cohen-Mansfield & Werner, (1998). The effects of an enhanced environment on nursing home residents who pace. *Gerontologist*, **38**(2): 199-208. This study sought to enhance the well-being of older nursing home residents who pace and wander by enriching their nursing home environment. Visual, auditory and olfactory stimuli were added to the nursing home unit environment to simulate two types of environments - a home environment and an outdoor nature environment. Participants seemed to prefer the enhanced environments by choosing to spend more time in them, and by sitting on benches in those environments. There was a trend toward less trespassing, exit-seeking, and other agitated behaviors being exhibited in the enhanced environment, and residents were observed to manifest more pleasure in it.
- Cohen-Mansfield & Werner, (1999). Outdoor wandering parks for persons with dementia: A survey of characteristics and use. *Alzheimer Disease & Associated Disorders*, **13**(2): 109-177. Detailed survey of gardens, parks, courtyards and other outdoor areas associated with nursing homes for the use of residents with dementia, including Alzheimer's disease. Information was obtained from 320 nursing homes as to the size, design and intended and actual use of the areas. "In addition, facilities were asked to rate the impact of the outdoor spaces on eight domains: on cognitively intact residents, on cognitively impaired residents, on nursing home residents who wander, on family and visitors, on staff members and volunteers, on neighbourhood children, on the facility's public relations and their marketability." This study aimed to characterize the features of outdoor areas for persons with dementia, and to clarify the relationship between design features, use, and satisfaction with these areas. A national survey of long-term care facilities with outdoor areas investigated the characteristics and features of these areas, and how those related to their perceived impact on their users. As many as 82% of the facilities perceived a positive impact on users of the spaces. Most respondents rated outdoor spaces as very useful, and as having a great benefit for users. This was attributed to the presence of design features such as gazebos and number of activities offered in the

area. However, outdoor areas were not used as much as possible. Respondents citing problems related to safety of residents.

- Dunlop, A. (1994). Hard architecture and human scale designing for disorientation. Stirling: Dementia Services Development Centre. Principles and design recommendations for environments for people with dementia – ‘harnessing all the site has to offer in views, aspect, orientation and land formation; maximum use of natural day light; variation in spaces satisfying their functional requirements at the same time delighting the senses and stimulating the brain and to assist orientation; and access to outdoor spaces for recreation.’ ‘The environment which aides orientation, provides stimulation without stress and promotes self reliance, is not just more pleasant; it gives residents more independence and thus more dignity.’
- Iwarsson, S. & Ståhl, A. (2003). Accessibility, usability and universal design – positioning and definition of concepts describing person-environment relationships. *Disability and Rehabilitation* **25**: 57-66. ‘One factor influencing older persons’ desires and possibilities to go out is the experience of the usability of the environment, i.e. the possibilities to move around, be in and use the environment on equal terms with other citizens’ (Bengtsson & Carlsson, 2005 p.2)
- Mather, Nemecek & Oliver, (1997). The effect of a walled garden on behavior of individuals with Alzheimer's.” *American Journal of Alzheimer's Disease*, **12**(6): 252-257. ‘Provision of Special Care Units for people with Alzheimer's is seen as a solution to difficulties with their behavior, but the effect of such a unit is rarely tested. After Southland Care Center built an enclosed garden next to such a locked-in unit, Residents' behavior was observed to look for such an effect. To find out if the garden helped change behaviors of the residents, 3 different types of observations were used: measurement of disruptive behaviors, outdoor observations and indoor observations. Although a small sample size (n=10), individuals using the garden showed lower (but not significant) levels of disruptive behaviour and disturbed sleep. The provision of a garden appeared to please both patients and staff. The garden affected morale positively but was used relatively little (14% of peak afternoon use time).
- Messer, E. R., (1996). The Primary Colors of Nature: The Essentials of Therapeutic Landscapes.” *Journal of Therapeutic Horticulture*, **8**: 26-31. ‘Therapeutic landscapes exist as places to stimulate the senses, the body, and the mind and to encourage imagination and exploration. This experience can be much more significant when we consider the various forms of the landscape and the natural phenomena that affect it, such as light, temperature, air movement, and sound. In understanding the relationship between nature and human functioning, therapeutic landscape design can go beyond accessible gardening to incorporate and magnify qualities of the surrounding environment which evoke positive responses.’

- Mooney, P. and P. L. Nicell, (1992). The importance of exterior environment for Alzheimer residents: effective care and risk management.” *Healthcare Management Forum*, **5**(2): 23-29. The use of exterior environments reduced incidents of aggressive behaviour, and contributed significantly to a risk management program. “The rate of violent incidents declined by 19% between 1989 and 1990 while the total rate of incidents fell by 3.5% over the same period. In the non-garden institutions, the rate of violent incidents increased by 681% and the total rate of incidents increased by 319%...whether gardens are designed especially for Alzheimer's disease patients or not, gardens beneficially affect behaviour and, by extension, quality of life for such residents." (p. 26)
- Ottosson, J. & Grahn, P. (1998). *Utemiljöns betydelse för äldre med stort vårdbehov*. [The significance of outdoor environment for older persons in need of institutional care. In Swedish], Stad & Land, 155:1998, Alnarp.
- Ottosson, J. & Grahn, P. (2005). A Comparison of Leisure Time Spent In a Garden with Leisure Time Spent Indoors on Measures of Restoration in Residents in Geriatric Care. *Landscape Research*, **30**: 23-55. ‘Results showed that having a one-hour rest outdoors in a garden setting plays a role in elderly people's powers of concentration, and could thereby affect their performance of activities of daily living.’ The health effects arising from experience and use of outdoor environments are greater the more weak and fragile a person is.
- Rodiek, S. D. (2002). Influence of an outdoor garden on mood and stress in older persons.” *Journal of Therapeutic Horticulture*, **13**: 13-21. ‘Reports of benefits to quality of life from contact with nature and the outdoors; positive influence on mood and stress.’
- Rodiek, S.D., Fried, J T. (2005). Access to the outdoors: using photographic comparison to assess preferences of assisted living residents. *Landscape and Urban Planning* 73(2-3): 184-199. Using doctored images of the site with furnishings added to illicit preferences for outdoor areas.
- Torrington, J. (1996). Care homes for older people: a briefing and design guide. London: Chapman and Hall. Contains a section on gardens covering eyesight, hearing, dexterity, thermal comfort, user requirements, planting, lighting, seating, handrails, hands-on planting and grounds maintenance.
- Torrington, J. (2004). Upgrading buildings for older people. London: RIBA Enterprises. Includes recommendations to increase the connection to nature, plants, daylight, views and wildlife for residents through building modifications, room layouts, orientation, circulation routes and windows, as well as modifications to outside areas and spaces close to the building.
- Zeisel, J. & Tyson, M. (1999). Alzheimer’s treatment gardens. In C. Cooper Marcus and M. Barnes (Eds.), Healing Gardens, pp. 437-504. New York: John Wiley & Sons.

9. Developing the 'edge spaces' in care settings

Designers and care practitioners are often frustrated by the underutilisation of outdoor areas by residents of long term care facilities, in spite of the clear intention to design outdoor spaces that meet residents' needs. Even though many residents express enjoyment from contact with nature, and interdisciplinary research evidence strongly supports such interaction, investment in outdoor resources is often a gamble. An ecological approach to research and design has been suggested which engages people, plants and place in ways that stimulate curiosity and provide opportunities for normal life. From an architectural perspective, the edges of buildings are an underutilised resource in the design of care settings (Appendix B) and can be re-imagined to assist in this way. Historically these 'edge spaces' included covered walkways and cloisters which provided simultaneously the shelter of indoors with the stimulation of nature and being outside – fresh air, flowers, fragrance and sunshine (Appendix C). Contemporary buildings have porches, entrances and glass-enclosed rooms which can afford sensory stimulation as well as limited contact with the outdoors if these spaces are used by the residents. Use of such spaces may be limited – conservatory rooms are often too hot in summer or cold and draughty in winter. However, entrances are popular areas for residents to spend time observing the rhythm of daily life to and from the home. Spaces where inside and outside meet need to include seating, views out and a large enough area for people to gather. This kind of place-making, at the building's edge can encourage enjoyment and human relationships. 'Edge space' is one example of a design solution embedded into the rhythm of day to day life.

- Chalfont, G. E., & Rodiek, S. (2005). Building Edge: An ecological approach to research and design of environments for people with dementia. *Alzheimer's Care Quarterly*, 6(4): 341-348.

10. Outdoor enabling environments

The concept of an enabling environment is one in which the physical arrangement of the built environment is designed to facilitate social interaction, with involvement in activity being a result. For outdoor enabling environments, the combination of physical elements and human energy in the presence of nature affords a person the benefits of engagement with nature as well as social life. The overlapping of patterns of use with daily routines insures that spaces are used by the residents. Visual and physical proximity of elements is necessary since 'out of view, out of mind' applies in general, but it is specifically relevant to people with dementia who may forget the amenity that is unseen.

- Chalfont, G. E. (2005b). Creating enabling outdoor environments for residents, *Nursing and Residential Care*, 7(10): 454-457. (article appears below in Appendix D)

SUMMARY

A substantial interdisciplinary evidence base has been presented to support the importance of nature in the lives of older people, particularly those in long-term care environments and people with dementia. For these persons, availability of natural stimuli may be compromised through decisions concerning the architecture of the building or the management and running of the home. Such evidence can be cited when arguing for design which ensures rather than eliminates the possibility of natural stimulation within living environments, either domestic or communal. An ecological approach to research and design was shown to be advantageous within the complexity of a care environment, in order to accurately identify the challenging factors to successful connection to nature for the older person. It was shown that connection to nature for a person with dementia is difficult to guarantee, and likewise equally beneficial to attain. It is down to the building and the care provision to afford this type of connection for the well-being and life quality of the person living there.

APPENDIX

- A. [Housing and connection to nature for people with dementia: Findings from the INDEPENDENT Project](#) (abstract only, article upcoming in the Journal of Dementia Care)
- B. [Building Edge: An Ecological Approach To Research And Design Of Environments For People With Dementia](#) (abstract only, article in the Alzheimer's Care Quarterly Vol. 6 issue 4, 2005)
- C. [Older People's Connection to Nature at Home: an Architectural Perspective](#)
- D. [Creating Enabling Outdoor Environments for Residents](#)
(Nursing and Residential Care Vol. 7 No. 10 October 2005)

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Housing and connection to nature for people with dementia:
Findings from the INDEPENDENT Project

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Abstract

This paper reports on the qualitative findings of the first phase of the INDEPENDENT Project, an EPSRC funded EQUAL 4 consortium project in the UK that aims to investigate enabling environments for people with dementia. The overall project focus is on wellbeing and quality of life for people in different types of housing, with particular focus on the possible roles technology can play in maintaining the person's independence as long as possible. Connection to nature, access to the outdoors, and participation in nature-based activities were among a wide range of enjoyable activities reported by study participants living in their own homes or in residential care. First, an overview of connection to nature for people with dementia and the importance of this connection within their home environments are given. Secondly, the research study is described and data from interviews with people with dementia and from focus groups with family and professional carers including access to, and preferences for nature are summarized. Multiple factors enabling or challenging a person's participation in nature-related activities included personal factors, formal support, social networks, as well as cultural and spiritual aspects. These factors are briefly described and compared. Lastly, factors of the built environment and differences between building types are presented and conclusions drawn.

Keywords Dementia; nature; home; residential care; gardens.

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APPENDIX B

BUILDING EDGE: AN ECOLOGICAL APPROACH TO RESEARCH AND DESIGN OF ENVIRONMENTS FOR PEOPLE WITH DEMENTIA

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ABSTRACT

Designers and care practitioners are often frustrated by the underuse of outdoor areas by residents of dementia care facilities, in spite of the clear intention to design outdoor spaces that meet residents' needs. Even though many residents express enjoyment from contact with nature, and interdisciplinary research evidence strongly supports such interaction, investment in outdoor resources is often a gamble. Evidence-based design is the accepted norm, although gathering evidence and applying it to design requires creative strategies. This paper suggests taking an ecological approach to research and design by engaging people, plants and place in ways that stimulate curiosity and provide opportunities for normal life. Case studies illustrate how listening to the residents directly, and research by immersion rather than intervention, affords integrated design solutions that are embedded in day to day life. Suggestions are given for place-making at the building's edge, to encourage enjoyment and human relationships, through which the use of outdoor environments by people with dementia and care staff is a happy consequence instead of a primary aim.

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APPENDIX C

Older People's Connection to Nature at Home: an Architectural Perspective

G. E. Chalfont, MA ASLA

This paper was first presented at 'Nature Therapy: People, health and contact with nature' seminar of the South Yorkshire Biodiversity Research Group on Saturday 24th April 2004 at Norfolk Heritage Park, Sheffield, UK

This paper briefly examines the way in which architectures of care for older people in the UK historically transformed, in particular how the built form determined a connection to nature for the inhabitants. It then highlights the importance of this connection today, particularly for physically or mentally frail older people. Finally, an assessment tool called 'PLANET' is introduced to measure the potential for connection to nature within a built environment, and mention is made to a study underway.

Architectures of Care Historically

Purpose-built architectures of care for older people in the UK can be found as early as the 10th century. The Hospital of St. Cross, Winchester (1132 AD) was a cloistered almshouse which included a church, a refectory hall and two-story dwellings for 13 poor men (Godfrey, 1955) (fig 1). Later improvements included a sitting room, bedroom, scullery and privy for each resident. Having developed from the enclosed Medieval monasteries, the site plan characteristically had natural areas and gardens centrally located with the inward-looking buildings forming the exterior walls. By 1444 it housed 2 priests, 35 brethren and 3 sisters and contained the Brethren's kitchen garden, quadrangle, burial ground, master's private garden, kitchen garden and ambulatory. A painting by Fred Walker entitled 'the Harbour of Refuge' portrays Jesus Hospital, Bray, Berkshire with its interior garden, walkways, flowering trees, hedges, roses and places to sit (fig 2). A statue of the benefactor was often prominent in the centre of the garden as almshouses were the response of charity organisations to the elderly poor following the dissolution of the monasteries. God's House in Ewelme, England (1436) with two-story dwellings around an internal courtyard was constructed for 13 paupers and is still intact today (fig 3). The central cobbled open area is surrounded by a ground floor porch which serves as both a connected, covered walkway (reminiscent of the ambulatory) and a personalised seating area in front of each dwelling - an 'edge' space between in and out.

Connection to nature, specifically fresh air, ventilation and sunshine, played a role architecturally in the evolution of the 'cross' hospital and the Nightingale ward, where the maximum width of the ward was determined by the ability of a breeze to pass in and out of opposite windows (Thompson & Goldin, 1975). Such advances were overshadowed in the 16th and 17th centuries by mixed use hospitals and asylums which treated the poor, aged and mentally ill alike by emphasising punishment, surveillance, control and physical restraint. The workhouse system responded to the needs of the disenfranchised with equally degrading, one-size-fits-all treatment regimes, but it was here that the needs of the elderly began

to be recognised (Morrison, 1999). William Battie proposed 'Moral Treatment' for the insane at St. Luke's, London in 1758, arguing for lifestyle changes to cure insanity, including healthy food, exercise, strolling the grounds and farming. Hospitals also reflected a turn to nature with courtyard plans such as at Guy's and St. Thomas' hospitals in London. By the 2nd half of the 18th century workhouses had evolved into houses of industry, providing occupation. Separate sitting rooms and sleeping accommodations for the elderly began to emerge such as in Newport (1771). Common features of urban workhouses in the 1700's were smaller sites, similar proportion of working to living space and large open courtyards. The ground floor plan for Eastborne, which housed the aged and infirm, shows a U-shaped building around a courtyard with stables and workshops, and a small, heated room where old people sat and picked wool, a boring menial task.

18th century humanitarian thinking was fearful of contagion among the hospitalised sick and was hopeful of the benefits of pure air and water, designing fair-weather promenades with trees, views and flowers as treatment for the insane. But the late 18th century brought the theory of 'miasma' which blamed air for bringing disease and began the practice of keeping windows tightly closed. By the early 19th century it was the fear of moral contamination that resulted in classification and separation of the poor into old, young and able-bodied men and women. Consequently, policies towards the 'aged & infirm' began developing, influenced by the House of Protection plan by Sir Gilbert Heathcote. Liverpool Workhouse provided "the old people...with lodging in a most judicious manner...as in a secluded cottage...comfort of a private fireside...the most infirm live on the ground floor...all dine together in a large room which serves occasionally as a chapel" (Morrison, 1999, p. 31). Greater leniency for the aged and infirm within the workhouse, spurred by the Report of the Royal Commission and the 1834 Poor Law Report in England and Wales, led to separate dormitories, day-rooms and exercise yards. The 'courtyard' and 'radial' plans both achieved this but not until the corrected 'square' (notably at Epping) were the dorms rearranged to enable the infirm to live on the ground floor and avoid climbing stairs. Windows still however looked out back onto the yards. But Samuel T. Welsh in Somerset designed back to back dayrooms which allowed the elderly to face forward - out the front of the building. Another version of the radial plan was 'hexagonal'. William T. Nash, the appointed surveyor for Bishop's Stortford Union Workhouse criticized the design for allowing "all the windows above the ground floor a command of the surrounding country" (ibid, p. 74).

One of the earliest 'corridor' plans was the Greenwich Union Workhouse erected in 1840 where rooms for the aged faced the front - and here the front was also the south. Between 1840 and 1875 about 150 corridor-plan workhouses were built, even though they ruled out the health benefit of cross-ventilation, perhaps because corridors facilitated ease of access through the institution. But variations on the central corridor did appear. Light wells were introduced, for example in Birmingham Union Workhouse (1850-2). The Jacobean style workhouse in Kensington, London had an access corridor with

open arcades along the western side of the building. The City of London Union Workhouse had an arcade on the front of the main building. The workhouse of St Margaret & St John, Westminster had an open arcade along the south side of the ground floor and cross-lit upper floors without corridors. Double-width wards were built on urban sites to gain bed space. Some had bay windows for daytime seating and flat roofs where one could walk about.

The work of Florence Nightingale in the 1850's had far-reaching effects on architectures of care concerning air quality. As a miasmatist she insisted that air was key to health – no basements or enclosed courts of stagnant air; windows must be on both sides of a ward starting one foot from the ceiling and 2-3 feet from the floor and should take up one third of the wall space. Wards should be on a north/south axis. Also, the central court and the space between pavilions should be laid out as gardens for convalescents - sheltered exercise grounds. Corridors were criticized for insufficient air and light in the *Report on Metropolitan Workhouse Infirmaries and Sick Wards* (1866). It recommended a wide central corridor open at both ends, with cross corridors for light and air, and furthermore, “as many windows in their walls on both sides as there are windows in the outer walls; and, for the purpose of ventilation, should be so fixed that they cannot be quite shut” (Morrison, 1999 p. 98). The 1870's saw the ‘pavilion’ system with cross ventilation, projecting sanitary towers, division of the institution into separate blocks and opposing windows. Steyning Union Workhouse in Shoreham was a typical late 19th century complex. Connection to the natural world was built in with ‘edge’ spaces such as an external staircase, a wooden veranda along the front face of the receiving wards and covered walkways between pavilions. The dayrooms were designed with expansive canted bay windows. More accommodation was provided for married couples over 60 after 1870, even as debate continued over whether couples actually preferred living apart. Some provided cubicles in the main building. Others, like Steyning and Hastings, provided a few ‘deserving couples’ with small, one story detached ‘cottage’ or ‘bungalow’ blocks, often with verandas and a bay window.

Only two workhouses were built specifically for the elderly and infirm – St. Olave's in London and the West Derby workhouse at Alder Hey (1911-15). St. Olave's had covered walkways that connected the pavilion style ward blocks, opposing windows, small verandas and outdoor recreation areas (fig. 4). Within the architectural history of the almshouse and the workhouse lies the process by which connection to nature became increasingly possible for the aged and infirm homeless people in Britain. What of today?

Connection to Nature Today

Landscape architecture, nature therapy, ecopsychology, permaculture and therapeutic horticulture (also known as horticultural therapy) are among an increasingly diverse range of fields and professions promoting people-nature interaction, the importance of place in terms of accessibility and physical contact to the natural world (Kaplan, 2001; Stoneham & Thoday, 1994; Warner, 1995). Client

groups overcome physical, cognitive and emotional obstacles on practical and symbolic levels through numerous activities such as mountain climbing, horse-back riding, swimming and vision quests in the outback. Rather than getting people out, architecture on the other hand is increasingly concerned about getting nature in – hospitals and healthcare facilities, corporate working environments, children’s learning environments, etc. (Marcus & Barnes, 1995). However, research-based design guidance is still needed for residential environments, particularly for physically and mentally frail older people, including people with dementia.

Need for Research-based Design

While post-occupancy evaluations measure use and satisfaction of a public building, residential environments express an intimacy between person and building unattainable by questionnaire, interview or building analysis alone (Sixsmith, 1991). An assessment tool called PLANET has been developed which requires no specialist knowledge to administer and which shows graphical, easy to understand results. PLANET was researched and developed by the author within private homes and care settings for older people in America and England and is affective across a range of residential environments from private homes to specialist dementia care units. The tool is a series of simple questions relating to the domains of Person, Location, Architecture, Nature, Energy and Technology. A numerical score is derived which makes cross-setting comparisons possible – for instance comparing two rooms within a home or comparing two different homes. Scientific analysis of living environments contributes to design theory (Ulrich, 1991).

Measuring Connection to Nature with PLANET

First, in order to measure ‘connection to nature’ it must be defined. ‘Nature’ in this research is defined as something organic, animate or climatic. Therefore, soil, water, animals, plants, fire, wind, stars, flowers, rain and wildlife are among the natural elements which PLANET seeks to find in a particular setting. ‘Connection’ means to be accessible to the person’s senses, to provide some sort of sensory stimulation they can smell, hear, feel or see. Consider the richness of auditory stimulation for example (fig 5). People are a part of nature and they are included in the assessment - not in terms of being a natural element but rather by their capacity to enable the resident to connect to nature. People are discussed under the domain of *ENERGY*. The first two domains to be discussed below are *PERSON* and *NATURE*.

The domain of *PERSON* lies at the heart of the tool. It scores the person’s lived experience of dwelling in the place in three ways – sensory, physical, and psychological. Their sensory ability is relevant because if sight or hearing is diminished, their ability to see and hear nature is reduced. It is scored by asking the person to rate their sight, hearing, smell and balance (sense of balance is particularly relevant to this population whereas taste and touch and are rarely diminished by normal ageing). Their physical ability includes mobility (sitting, standing, walking, using lifts, ramps & stairs),

flexibility (stiffness/rigidity) and strength in upper and lower body and is scored by observing their movement or asking their opinion. Psychological ability determines the person's *fear* of falling, *desire* to move about and *presence* (being alert and engaged). Scores in this first domain reflect the person's ability to connect with nature. In particular, a low score for the *PERSON* domain reflects either a diminished capability on the part of the person or a level of dependence upon assistance from others, both of which lower the person's self-directed, autonomous ability to engage with their surroundings and receive sensory stimulation from nature.

The domain of *NATURE* determines the elements of the natural world that are physically present from within the setting. Scores include plant materials and their diversity, vitality, ability to create habitat, provide sensory stimulation and have practical uses. *NATURE* also includes structures and shelters that encourage the presence of nature (for instance nesting boxes and window boxes, or a trellis or wall for climbing plants), art and paths as well as cosmic forces, weather and local ecosystems available nearby.

P L A N E T	in a nutshell...
N	The <i>nature that exists</i>
P	The person's ability to experience the <i>nature that exists</i>
L A E T	Factors that enable or prevent the person from accessing the <i>nature that exists</i>

LOCATION, *ARCHITECTURE*, *ENERGY* and *TECHNOLOGY* mediate between the person and the nature that exists within and surrounding the building. *LOCATION* is measured in three ways: Proximity, Edge Space and Outdoor Structures. *Proximity* is which third of the room the person is usually located in (daylight falls into the third closest the window) and the number of openings (windows, doors, skylights) sensed from there. *Edge Spaces* are building features which mediate between indoors and outdoors such as porch, entrance alcove, balcony, covered walkway, mudroom, conservatory and exterior staircase. Spaces provide affordances (Gibson, 1986) for human involvement. An 'edge space' is rich in sensory stimuli by offering qualities of outdoors as well as some comforts of indoors, thereby increasing the potential for human involvement with nature by extending safety and comfort. *Outdoor Structures* are self-contained, separate from the house and designed to contain activity such as a greenhouse, a shed or a summerhouse.

The domain of *ARCHITECTURE* seeks to evaluate not only existing features but the level of control the person has over them, which is particularly relevant for frail, older people. There are three areas of inquiry within this domain: *Indoors* (sunshine, sunlight, doors, windows & windowsills), *View* (aspect, extent, content & depth) and *Outdoors* (access & comfortable seating). For *Indoors*, when assessing doors and windows the questions also contain the influence of staff & management over the

feature. This is particularly relevant in care homes. Do the residents actually experience the garden shown in the brochure? Scoring of *doors* and *windows* reflects frequency and control of their use as well as design decisions and specifications such as quantity, direction they face, adjustability, permeability and pane complexity. Likewise with windowsills it matters not just if they are wide enough, sunny and suitable for plants but if indeed they are being used for that. *View* has appeared in the literature for decades as being important for health and psychological benefits. This domain measures four variables for view: *aspect* is the number of compass directions viewed from the room; *extent* is how wide the view is (must you turn your head to take it all in?); *content* is what the view consists of (rural land or people & activities, or both?) and *depth* (foreground, middleground, background or a combination?). The third area is *Outdoors* and examines *access* (appropriately safe and challenging for the person) and *comfortable seating* (permanent, moveable, sheltered, near plants, visible from indoors, choice of seating areas, evidence of seating being used).

ENERGY is the most innovative of the domains because it measures the existence of the life force or energy known as *chi*. Four areas of assessment are *Care and Maintenance* of outdoor areas, *People Interactions* in outdoor areas, *Creative Energy* and *Animals*. This domain seeks to quantify emotional response to a place (an unarticulated gut feeling) which rarely appears in statistical analyses, but which has very clear implications in terms of attitudes towards a space and therefore frequency of use. In landscape terms, a park that is overgrown and full of rubbish both sends out and attracts negative energy – not a place an older person would gravitate towards. *Care & Maintenance* assesses positive inputs of human energy resulting in the look and feel of a place that is being cared for. Likewise, *People Interactions* checks whether people (horticultural or occupational therapist, social worker, interested staff person, grounds person, warden, informal carer, volunteer, friend, or neighbour) put their positive energy into the outdoors. *Creative Energy* asked whether the person (alone or in a group) has danced, sang, played music or exercised in the area. The life force or positive energy becomes embedded in a place during celebration or ritual and the place becomes meaningful. A place that resonates with meaning attracts people into it and it continues to be used in this way. *Animals* assesses the presence or visits of pets & wildlife or farm animals but also considers that a dog connects a person to the outdoors on a daily basis. Questions about feeding the birds and squirrels in a care setting or sheltered accommodation also addresses management policy.

The final domain is *TECHNOLOGY* and assesses the availability of assistive technology or adaptations to enable a person to connect with nature. Examples would be the use of a door sensor system to allow a mentally frail person to come and go freely instead of being locked inside, or the use of power window openers for a physically disabled person to open a window they might not manage on their own.

Relevance to Older People's Needs: Ongoing Research

As people age they may lose sensory abilities (particularly vision and hearing) and physical or cognitive abilities which may require adapting daily routines and the home environment (Swiatczak, 1992; Taira, 1990). Architectural features such as an upstairs bathroom may become increasingly problematic. A fall or a stroke may have landed them in hospital or they may be forgetting to take medication or turn the cooker off. If care needs are beyond the scope of home care, moving house may be necessary which will change a person's relationship with the natural world, depending on the architecture, surrounding nature, care staff and so on. While their sensory, physical and cognitive abilities will have changed, depending on the robustness of these other domains, the person's connection to nature may have actually improved as a result of a change in building typology: the size, layout and configuration of the building itself. As part of the author's doctoral research, studies are underway to analyse connection to nature for a number of people with dementia in care settings in Sheffield, UK. The buildings plans are first modelled on the computer in 3D and then PLANET is being used to score people's experience within the building. Interviews validate the reliability of the scoring and focus groups and literature searches have validated the domains and areas.

The reality of older people in care homes today is that most have chronic, long term and multiple conditions, including high levels of mental confusion and impaired sight and hearing, all of which place increasing restrictions on their activities (Froggatt, 2004) and increasing challenges on environmental design (Keen, 1989; Marshall, 1998; Valla & Harrington, 1998). Simultaneously we are more aware of the benefits of sensory stimulation and the therapeutic uses of nature (MacDonald, 2002). Research tools which join up the reality of the person living day to day in long term care with current thinking in design philosophy around connection to the natural world will contribute research-based architectural design guidance to benefit people whose lives are largely determine by the rooms and buildings in which they live.

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(Figure 5)

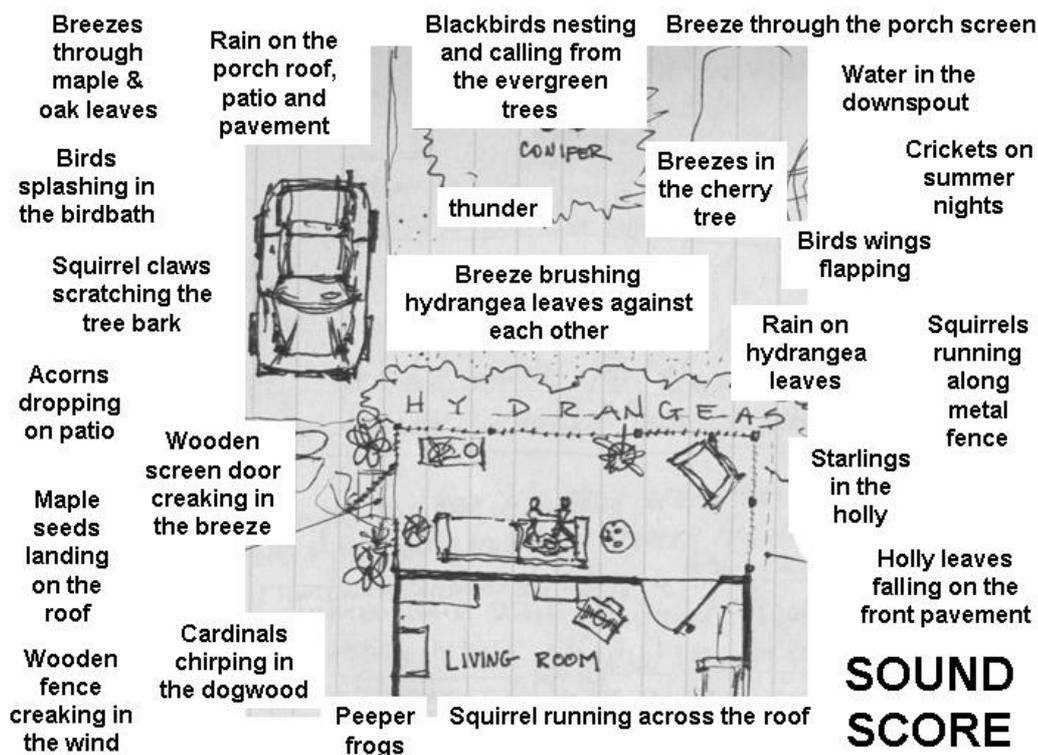


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- Figure 5. Sound Score

(Photos in Figures 1 - 4 are not available here. Please refer to original sources listed above)

CARE ANALYSIS

Creating enabling outdoor environments for residents

Contact with the natural world is difficult for older people to achieve if their care needs require that they move into a residential environment. In such settings, activity programmes address a person's need for fresh air, sunshine and green plants by providing opportunities for outdoor activities such as gardening.

Although the benefits of 'people-plant' connections are well known (Lewis, 1996; Marcus and Barnes, 1999; Linden and Grut, 2002; Milligan et al, 2004), in reality the difficulties of doing an activity can undermine success. Many factors must line up, such as good weather, residents' health, desire and willingness to participate, transport, availability of equipment, resources, supplies and the absence of scheduling conflicts or staff shortages.

The responsibility for success falls to the management, activities director and care staff. For the resident with physical disabilities or cognitive impairment, non-participation in activities may mean a decline in his or her contact with the natural world (Kwack et al, 2005).

Importance of nearby nature

I asked a resident living in a dementia care unit why she liked to go outside:

'Well the sunshine is good for everybody, isn't it? And, uh, well I just think it's a...a pleasant thing to do. You know, you can sit in the garden, you can garden, or you can potter in the garden, or go and visit somebody and enjoy being out with people, you know, it's got a lot for it...sunshine.'

The resident went on to say:

'I don't think I could live in a house that didn't have a garden.'

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What is an enabling outdoor environment, why does it work and what are the design principles that determine success? Garuth Eliot Chalfont explains.

When I asked why not, she replied:

'Because there's something so nice to look at or fetch in from outside, you know.'

I then asked her what sort of things she would like to bring in:

'Hmm, the roses I think. The roses are nice. And, uh, I can't think of anything else. I know there's something else but I can't think...'

I asked her what she liked about the roses:

'The smell of them I think...well, they smell sweet, don't they?'

Ecology of the built environment

Engaging in their domestic outdoor environment contributes to people's daily lives in many ways, as this lady explained. But for people like her who are physically or mentally frail, the environmental effects are profound (Lawton et al, 1984; Mooney and Nicell, 1992). The design of the built environment and how the building is actually used by staff, residents and visitors are important factors in facilitating contact with the natural world for the residents (Parker et al, 2004).

This article reports on an ecological design approach that explores the unique interplay of the person and his or her environment (Reimer et al, 2004). This approach is being tried and evaluated in the dementia care unit in which this resident lives. Since the outdoor area is accessible to all residents of the home, as well as to day centre clients, the design principles are applicable generally to older people in residential care.



The term 'ecology' means 'the relationships between organisms and their environments'. Therefore, an ecological design approach considers the human and physical factors enabling or challenging a person's success in a range of activities.

Resident involvement in nature-related activities or simply going outdoors can be facilitated through the design of the physical space. For many reasons, outdoor spaces intended for use by residents in a care setting often go unused (Cohen-Mansfield and Werner, 1999).

Understanding the relationships between human and physical factors can result in a space that enables people's use of it.

Enabling environments for people with dementia

The INDEPENDENT project is a 3-year consortium research project funded by the Engineering and Physical Sciences Research Council, which is looking into the use of assistive technology for enjoyment by people with dementia in different living accommodations. Uniquely, the project is being

led by the desires, interests and opinions of people with dementia themselves, as well as those of staff and family carers.

Consortium partners include the Universities of Sheffield and Liverpool, Bath Institute for Medical Engineering, Dementia Voice, Huntleigh Healthcare, Northamptonshire County Council Social Services and Sheffcare, a care housing provider. Interviews with residents and family carers identified nature and the outdoors as important to wellbeing, but there were many impediments. Some had to do with the symptoms of dementia, such as memory loss and confusion, but others had to do with the human implications of the design of the physical environment.

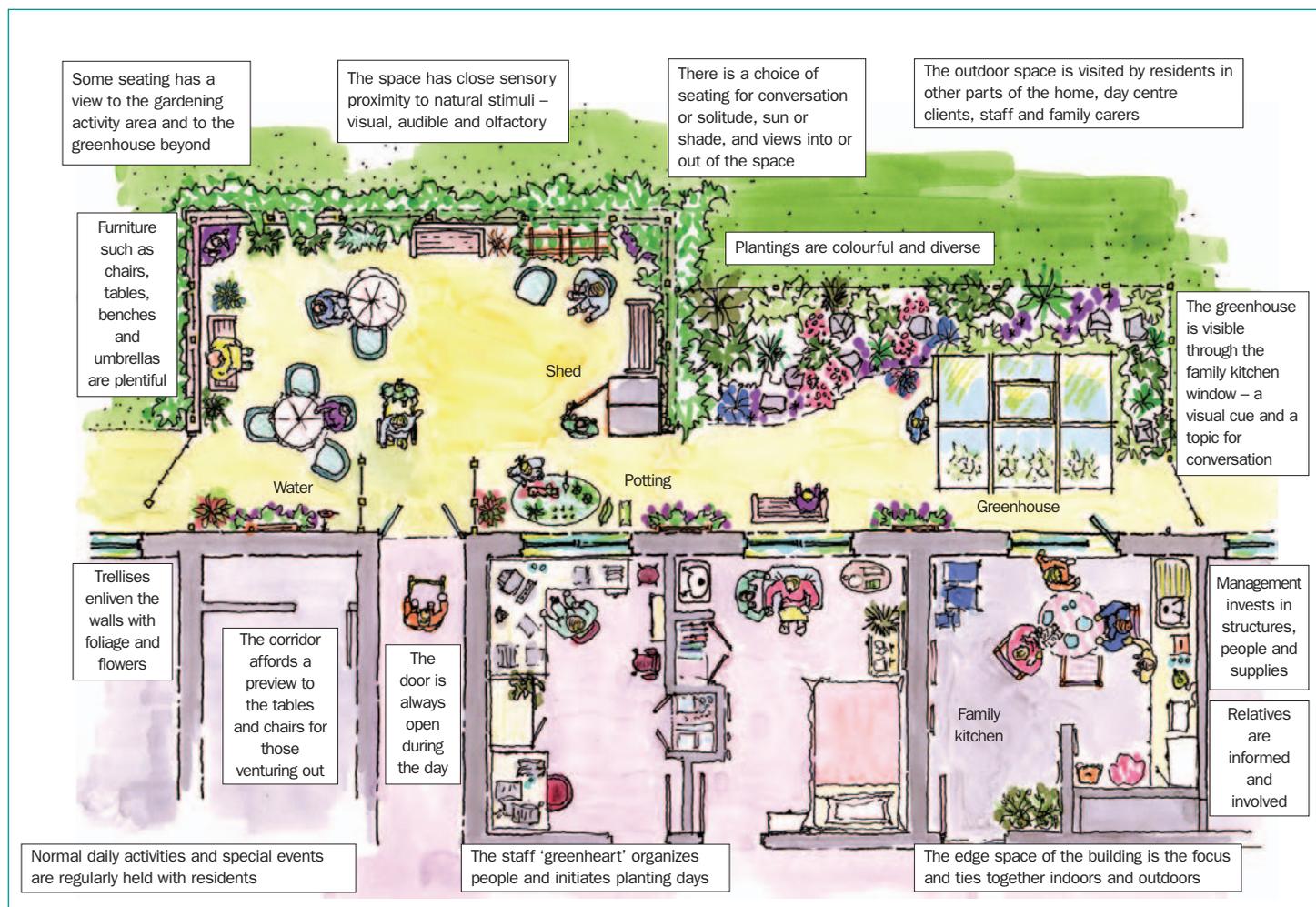
What is an enabling environment?

Theoretically, an environment affords the person something (Gibson, 1986; Heft, 1999). A chair may afford sitting, but a chair near other chairs, under an umbrella on a sunny day, near the building entrance, with a table to put a drink on or with a view to colourful flowers, increases the probability that interactions will occur.

The concept of an 'enabling environment' is by design, one that provides not just resources and access, but the probability that beneficial, enjoyable interactions will occur. Once the built environment is constructed in such a way, a small amount of effort and thought on the part of the car-



CARE ANALYSIS



ers and management can have the most effect.

Design project enabling contact with nature

As an experiment in creating an enabling environment, a project was undertaken to increase residents' contact with the natural world, the benefits of which include a positive influence on mood and stress (Rodiek, 2002). Was it possible that an environment that lowered stress and improved mood might facilitate people's engagement with it? If so, what spatial aspects could enable such engagement?

The willingness of the staff, family carers and management, plus some additions and modifications to the space, provided a significant change in the 'feel' of the environment. The results showed an increase in use, evidenced by observations and carer feedback. While the area is accessible from the ground floor dementia care unit, it is also visited by people living elsewhere in the

home. Therefore, these design principles are relevant to the diversity of older people who live in a residential care environment.

What additions and modifications were made?

Elements added to the existing patio area included a greenhouse, tool shed, potting table, trellises, plants in pots, hanging baskets and a rockery (Figure 1). A gate was removed and a length of fencing added.

Placing a greenhouse into the outdoor area was inspired by conversations with residents about parental involvement in the gardens of their childhood. Integrating it required the following:

- Placement close to and visible from the patio area. As Stoneham and Thoday (1994) said:

'Greenhouses tend to be placed as isolated features in the landscape rather than integrated with associated features; for example, a nearby shed for storing tools and materials.'

Figure 1. Features of an enabling environment.

- Placement next to the building wall. It is directly outside the window of the 'family kitchen', an earlier project to enhance family involvement.
- Matching existing paving pattern and material: Paving material matches the patio area and extends right up to the greenhouse door.
- Elimination of a threshold: **'The greatest barrier to going outdoors for many disabled and elderly clients is the process of going through the door... Thresholds should be avoided wherever possible.'** (Stoneham and Thoday, 1994).
- Cutting out the lower trip rail at the greenhouse door, making a level-entry door.
- Location near the tool shed and the potting table: It was possible to accommodate users of walking frames and wheelchairs, while also placing the tool shed,

potting table and greenhouse within a few steps of each other. Finding a critical spatial balance enabled the use of all three elements.

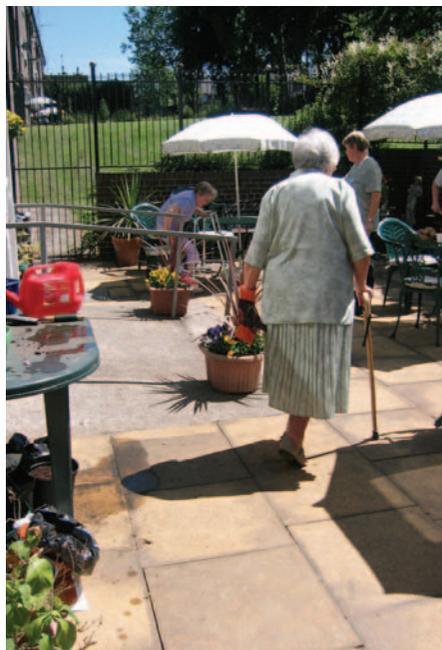
Design principles for outdoor enabling environments

1. Make the place meaningful: Make an area to go to that is comfortable, pleasant and beautiful. A gardening task can be on offer nearby for those who want to participate. Let gardening be not the aim, but a consequence of social time. Serve routine drinks and snacks outside on sunny days. Walk or wheel a resident outside just 'to see what's going on'.
2. Make spaces relate to each other: Make transitions effortless by interlocking the pieces – potting table, tool shed, greenhouse, chairs and tables, hanging baskets, trellises and plant pots. Locate different kinds of activities in close proximity so people can observe the action, comment on it and develop a desire to participate. Locate outdoor features and activity areas adjacent to the building edge and visible from indoor rooms (Chalfont and Rodiek, 2005).
3. Find and support 'green' staff who might care for the indoor plants, enjoy growing things from seed or pot up young plants outside. Encourage them by funding trips to the garden centre. Invest in a tool shed so watering cans, compost, trowels, gloves and pots are near to hand.

Conclusions

The success of outdoor nature-related activities in residential care settings is confounded by multiple factors over which the organizer has little control. The built environment, however, can be a positive presence.

A care environment, for example for people with dementia, is designed to be therapeutic and supportive (Teresi et al, 2000; Zeisel et al, 2003). But environments can also be catalysts (Rapoport, 1990). Complexity contributes to dynamic places and the probability that interaction will occur. In a case study of an existing outdoor area, complexity was increased by arranging elements in physical and visual proximity and overlapping patterns of use. The goal was place-making and spatial integration. The outcome was enjoyment of outdoor space.



A number of design features were annotated on the site plan and three principles for creating enabling outdoor environments were identified:

- Make the place meaningful
- Make spaces relate to each other
- Find and support 'green' staff.

Work upcoming includes design research into principles and features of enabling environments. From a study of exemplars, designs can be drawn to enhance the homes and engage the people who live, work and visit in residential care. **NRC**

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KEY POINTS

- Many factors affect a resident's ability to encounter the natural world.
- To make a place meaningful, listen to the people who live there.
- Human engagement can be enabled through design of the physical space.
- Complexity and proximity increase the probability that interactions occur.
- Make gardening not the aim, but merely the result of an enjoyable time.