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# A HEALING GARDEN FOR PEOPLE WITH ALZHEIMER'S DISEASE: A CASE OF GREEN THERAPY IN UMBRIA REGION (CENTRAL ITALY)

<sup>1</sup>Aldo Ranfa, <sup>2</sup>M. G. Rubeca, <sup>3</sup>Dr. Simonetta Cesarini, <sup>4\*</sup>Mara Bodesmo

<sup>1</sup>Researcher, Department of Civil and Environmental Engineering, University of Perugia, Italy

<sup>2</sup>landscape architect, Department of Civil and Environmental Engineering, University of Perugia, Italy

<sup>3</sup>Fontenuovo Residence, Italy

<sup>4</sup>PhD, Department of Civil and Environmental Engineering, University of Perugia, Italy

\*Corresponding author

### ABSTRACT

Throughout history it has been recognised that Nature satisfies not only human nutrition requirements, but also man's pyscho-physical well-being. 'Healing gardens', designed to stimulate sensory interaction between patient and the natural environment, arose from this concept. This paper illustrates the creation of a healing garden for Alzheimer patients, for whom physical surroundings can take on therapeutic value. The garden was laid out in five areas with different characteristics so as to act as a stimulus for subjects with cognitive disabilities, with particular attention being paid to the choice of plant species, flowering periods, foliage colour and clearly-defined visitor reference points.

Keywords: healing garden, green therapy, landscape design, Alzheimer's Disease, Umbria region

#### **1. INTRODUCTION**

Since ancient times the spiritual and therapeutic role of Nature, and the resultant influence on mental and psycho-physical well-being has been studied. Suffice it to remember that the world's mythologies and religions all originated in a garden. Indeed, the term 'Paradise' derives from the Persian and indicates a 'king's private garden'. A characteristic common to all such descriptions of Paradise lies in the idea of its being not only a place which provides food and water for physical sustenance, but which also sustains all aspects of human well-being. (Thompson, 2011).

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A great interest in Nature as a positive influence on physical well-being developed during the Middle Ages, to which the cloisters, gardens and orchards of the various European monastic orders bear witness. In the XIII century Humbert, ex-Master of the Dominican Order, decreed that part of the land surrounding the monastery's infirmary should include fields and gardens for patients' recreation (Montford, 2004). In 1700 Benjamin Rush, father of American psychiatry, stated that "... working the land and growing plants has a beneficial effect on human mental health." The first hospitals in the Western world were really the monastic communities where herbs and prayer were fundamental elements in healing the sick, and internal gardens were an integral part of the monastery complexes. (Cooper Marcus and Barnes, 1999).

In the second half of the 1800s some American hospitals began to build greenhouses for therapeutic activities, but it was only in the 1920s that specific programmes for the rehabilitation of patients with physical and cognitive deficits were established. In 1817 the *Friends Hospital* in Pennsylvania, one of the first hospitals to make pathways in the woods where the natural environment was seen as a safe, tranquil place, took part in rediscovering and applying many rehabilitation therapies. Towards the end of 1800 the City of New York boasted various horticultural activities, while in 1919 C.F. Menninger and his son Karl founded the Menninger Foundation in Kansas, where gardening and nature study were fundamental in treating their patients. (Vigorelli, 2005).

In 1950, after two World Wars, there was a pressing need for the rehabilitation of returned servicemen suffering from mental and physical impairments; this encouraged the creation of rehabilitation centres which included contact with the natural environment in their therapy techniques (Söderström, 2000). As years went by and research into hospital therapies associated with outdoor horticultural activities progressed and became more widespread, almost all rehabilitation programmes, particularly in Canada, the United States and Northern Europe, were based on therapeutic gardening and gardens. Indeed it was shown how continually spending time in such areas had proven therapeutic effects, in particular where individuals suffering from disabilities, paralysis, blindness and dementia were concerned, as in this way they were able to enjoy contact with the natural world in a safe context which facilitated psycho-physical recovery, or maintenance and reinforcement of residual activity (Antonelli and Casavecchia, 2005).

The 'healing garden', which offers relief by stimulating and satisfying sensory interaction between patient and nature, derives from these studies. (Cooper Marcus and Barnes, 1999). There are various kinds of 'green' – therapeutic gardens, areas given over to horticulture, gardens for meditation and rehabilitation (Valente and Cooper Marcus, 2015), and furthermore the literature demonstrates how therapeutic gardening is important in improving the mood of Alzheimer sufferers. (Cooper Marcus, 2001; Zeisel, 2001). In large psychiatric hospitals patients

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look after vegetable and decorative gardens as it has been demonstrated that daily gardening activities such as digging, planting and harvesting help to perceive the rhythms of each day and the passing of the seasons. This idea was put into practice in Swedish pyschiatric hospitals as early as 1940 (Söderström, 2000).

Various studies have confirmed the close link between length of hospital stay, use of pain-killers and the possibility to look out on the natural world from the hospital window (Ulrich, 1984). Indeed it has been found that patients who could enjoy a view, instead of looking out at a brick wall, recovered more quickly (Coile, 2002), thus stressing the close relationship between horticulture and general health (Gallagher and Mattson, 1986; Lecchese, 1994; Lemaitre *et al*, 1999), and the benefits that derive mainly from open-air physical activity (Patterson and Chang, 1999), benefits which are not only physical, but also psycho-physical (for example Galgali *et al*, 1998; Lecchese, 1994; Galloway and Jokl, 2000), and which may also play an important role in reducing cardio-vascular risk (Lemaitre *et al*, 1999). Studies have concentrated particularly on the beneficial effects of such activity in reducing HDL cholesterol levels in elderly men (Bijnen *et al*, 1996), in improving diabetes treatment (Armstrong, 2000) and in reducing the risk of gastrointestinal haemorrhage (Pahor *et al*, 1994).

In patients suffering from dementia, and in particular Alzheimer's disease, physical surroundings play a prosthetic, therapeutic role, therefore the layout of outdoor areas becomes an integral part of treatment to obviate cognitive and functional deficits (Valla, 2002; Pomposini, 2004). The benefits which derive from including healing gardens in the management and rehabilitation of Alzheimer's disease patients is now well-known (e.g.: Cooper Marcus and Barnes, 1999; D'Andrea *et al*, 2008; Edwards, 2013, Rivasseau Jonveaux T. *et al*, 2013). The garden needs to be planned taking into account the patients' impaired cognitive capacity and daily difficulties, and as it has been demonstrated that spending time in the open air has a calming effect and helps to reduce anxiety and aggressiveness in patients whose sensory perception is basic to their interaction with their surroundings, the importance of encouraging an interest in the outdoors is obviously of particular importance. (Zeisel, 2001).

The aim of this paper is to illustrate how a healing garden for people with Alzheimer's Disease was planned and set up, respecting the elements which can bring benefits and relief to Alzheimer sufferers.

#### 1.1 Why plan a healing garden for people with Alzheimer's Disease

The idea arose from the concept of creating a place of 'maximum freedom within maximum surveillance' (Valla, 2002), so a garden represents an ideal place for a programme of sensory stimulation, but also a place of freedom and relaxation in a recognisable, reassuring environment.

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Alzheimer patients become progressively estranged from their surroundings and lose self awareness, wherein lies the extreme difficulty in recognising objects and their place in the environment (Valla, 2002). A garden allows them to stroll in safety and satisfy the compulsive need to move which is typical of their condition, thus creating a sense of freedom and serenity which lessen aggressiveness and take on therapeutic value. If the area generates freedom without risks, obstacles or limitations, wandering is no longer a behaviour, which needs to be controlled but rather becomes a therapeutic resource.

### **1.2 Healing gardens in Italy**

It was only in the 1980s that the importance of open spaces attached to health care institutions was recognised in Italy. At first medicinal herbs for use in various therapies were grown, then areas were set aside for rest and meditation in the struggle against illness (Valente and Cooper Marcus, 2015). In the 1990s the first 'Experimental Alzheimer Project' was carried out in the Lombardy Region, followed by projects in Piedmont, Emilia Romagna ad Tuscany. As from 1989 the most important gardens for Alzheimer's Disease patients were established. The Fondazione Grimani Butteri Garden in Osimo (the Marches) chose mainly aromatic herbs to stimulate memories of the past, and reduce behaviour problems and the tendency to wander aimlessly (Valente and Cooper Marcus, 2015). A garden planned by Giovanni Ingrao in 1996 in Monza (Lombardy) included an experimental vegetable garden as well (Valla, 2002); in a long-term care home in the Varese province artificial vegetation and wallpaper were used to create a life-size forest in an indoor winter garden; at the Villa Serena Rest Home at Montaione near Florence (Tuscany), the Region's first green area for Alzheimer patients was specifically planned to include perfumed, seasonal, non-poisonous plant species.

Umbria has also shown to be open to these questions; in 2012 a project named 'Therapeutic Parks' was launched in which therapeutic activities including community vegetable patches, gardens, musical and theatrical events, and activities with animals, but also amateur sporting events such as mountain biking and Nordic walking, are held in the Region's parks. They are aimed at various sectors of society – people with disabilities, those in economic difficulty, the elderly, those undergoing rehabilitation – the idea being to create areas in which to implement projects on garden, pet, art and psycho-physical therapy. (Regione Umbria).

Other gardens, apart from the one described in this paper, have also been set up; particularly noteworthy is the healing garden for Alzheimer's patients attached to the Opere Pie Muzi Betti Home in Città di Castello, laid out so as to respect the idea that a sensory garden represents a step forward in health care as it provides autonomy without abandoning the patients to themselves, thanks to pathways, rest areas and guides.

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#### **1.3 The Fontenuovo Residence for the elderly**

In January 2016 the Fontenuovo Residence inaugurated a ten-bed unit for dementia sufferers with moderate to serious behaviour disorders. The patients participate in specific treatment programmes such as healing baths, group or individual activities which make use of the 'sensory rehabilitation pole', i.e. the Snoezelen Room where the interaction among lights, colours, aromas, essences, sounds, objects and images helps to reduce behaviour anomalies, the Healing Garden which has a similar function, and the Train Room to stimulate recall of past memories (Ranfa *et al*, 2016). Moreover a multi-disciplinary team made up of a geriatrician, a social worker, a nursing coordinator, a psychologist, a trained educator, a physiotherapist and a health welfare coordinator plans evaluates the unit's overall activities and the individual treatment programmes. The team is responsible for individual treatment programmes which aim to improve patients' behaviour and general psycho-physical wellbeing.

### 2. RESEARCH METHODS

### 2.1 The Project Team

Landscape architects, engineers, botanists, doctors, therapists and environmental psychologists made up the project team; this multidisciplinary approach covered all aspects from initial design to psychological aspects, thus emphasising the garden's social value.

### 2.2 The *healing garden* project

When planning the healing garden, the three essential requisites based on guidelines set out in earlier studies were respected (Cooper Marcus and Barnes, 1999). 1. *natural mapping* (Norman, 1988); 2. *latent image elements* (Lynch, 1960) and 3. *housing zones* (Zeisel and Welch, 1981).

According to *natural mapping* (Norman, 1988) the layout was planned to be 'natural', with a clearly defined entrance, main pathway, and exit. According to *latent image elements* (Lynch, 1960), the five fundamental elements relative to the way in which the brain processes information, and which are particularly important for Alzheimer sufferers, were introduced. In his studies on the way in which the mind perceives and organises complex space so to get one's bearings and return to the starting point, Lynch defined five useful elements and demonstrated that if they are applied to garden layout they save the patients the stress caused by having to organise a mental map of the area, thus making them more autonomous and competent in their use of the garden.

The five elements are: *Paths* the walkways that people use, including a main pathway; *Edges:* 

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delimit two zones, for example a fence which can be clearly seen and which delimits the garden; *Districts*: the specific sections of a garden, such as the themed sections (five clearly defined sensory areas designed to stimulate the senses); *Nodes:* junctions, intersections, or areas of intense activity, such as meeting points or areas for communal activities, for example rest areas or hortotherapy areas; *Landmarks:* reference points such as signs, trees or doors (in the Fontenuovo garden they are represented by a pre-existing, large *Eryobotrya japonica* tree) (Ranfa *et al*, 2016).

The last principle is that of the *housing zones* (Zeisel and Welch, 1981), represented by welldefined areas with various characteristics, as Alzheimer patients' surroundings can strongly contribute to improving the symptoms, and a balanced combination of pharmacological and environmental approach can improve the patients' general health, behaviour and quality of life (Zeisel *et al*, 1994; 2003). These three organizing principles – overlapping and merged into a single healing garden plan – represent the major design principles for successful Alzheimer's reatment gardens.

The healing Garden of Fontenuovo is accessible directly from the activities hall, creating a continuity between indoors and outdoors, so as to avoid disorientation. The main garden extends around a circular footpath, thus guaranteeing a safe space for wandering. There is a main entrance (1) with a winding pathway without intersections or sudden changes of direction, which could cause disorientation and uncertainty. The patients can use the handrail which flanks the entire pathway as a support, and which reinforces their sense of safety and allows them to easily distinguish the various zones of the garden. There are no intersections or sharp angles and the path is paved with light-coloured, non-slip, antifreeze, non-glare material. Along the main pathway there are several rest areas (2) equipped with benches surrounded by perfumed plant species to make the pause even more relaxing and stimulating. There are also single seats which guarantee a personal, private space and a small wooden gazebo to encourage socialisation (2).

The central part (3) is characterised by two sensory tanks (4) for growing vegetables so as to encourage manual activity and direct contact with plants, and stimulate attention to, and observation of, growth and transformation. There is also a fountain for aural stimulation, as the sound of falling water can jolt the memory's archives, (5) and an aviary (7). The lighting was planned so as to avoid glare and excessive contrasts of light and shade and also to allow evening access to the garden. (Fig. 1). During planning, particular attention was paid to dividing the whole surface area into five sensory zones, thus encouraging further stimulation of the senses, as colours, perfumes and sounds reconnect Alzheimer patients with the outside world (Pomposini, 2004).

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Fig. 1 - The details of healing garden of Fontenuovo

### 2.3 Choice of plant species

Plant species were chosen mainly for the colour and perfume of the flowers and foliage, easy handling, and seasonal change, keeping in mind non-toxic, poisonous or allergenic properties, as shown in tab 1.

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# Table 1 – The plant species chosen for each thematic area.

	Scientific names	Family	Local name	smell	taste	touch	sight	hearing
white area	Achillea millefolium L.	Asteraceae	achillea				Х	
	Aloysia citriodora Ortega ex Pers.	Verbenaceae	erba cedrina	Х		Х		
	<i>Buddleja davidii</i> Franch.	Buddlejaceae	buddleia				Х	
	Buxus pumila 'Nana'	Buxaceae	pumila nana			Х		
	Cerastium tomentosum L.	Caryophyllaceae	Peverina tormentosa			Х		
	Deutzia scabra Thunb.	Hydrangeaceae	deutzia			Х	Х	
	Erigeron karvinskianus DC.	Asteraceae	Vittadinia triloba				Х	
	Fragaria vesca L.	Rosaceae	fragola		Х			
	Iberis sempervirens L.	Brassicaceae	Iberide sempreverde				Х	
	Mentha rotundifolia (L.) Huds.	Lamiaceae	menta glaciale	Х	Х			
	Myrtus communis L.	Myrtaceae	mirto	Х				
	Salvia officinalis L.	Lamiaceae	salvia	Х	Х	Х	Х	
	Stachys lanata Jacq.	Lamiaceae	stregona candida			Х		
	Thymus vulgaris L.	Lamiaceae	timo	Х	Х		Х	
	Viburnum tinus L.	Caprifoliaceae	viburno	Х			Х	
	Vitis vinifera L.	Vitaceae	vite		Х	Х	Х	
blue area	Ceratostigma plumbaginoides Bunge	Plumbaginaceae	plumbago blu			Х		
	Ceratostigma willmottianum Stapf.	Plumbaginaceae	ceratostigma			Х		
	Festuca glauca Lam.	Poaceae	plumbago cinese			Х	Х	Х
	Rosmarinus officinali s L. prostratus	Lamiaceae	rosmarino prostrato	Х	Х		Х	
purple area	Lavandula angustifolia Moench.	Lamiaceae	lavanda	Х			Х	
	Lavandula dentata L.	Lamiaceae	lavanda dentata	Х			Х	
	Lavandula hybrida Reverchon ex Briq.	Lamiaceae	lavanda	Х			Х	
	Lavandula stoechas L.	Lamiaceae	lavanda selvatica	Х			Х	
	Nepeta mussini Spreng. ex Henck.	Lamiaceae	nepeta	Х				
	Syringa vulgaris L.	Oleaceae	lillà	Х			Х	
pink area	Abelia × grandiflora (Rovelli ex André) Reho	le Caprifoliaceae	abelia				Х	
	Armeria majellensis Boiss.	Plumbaginaceae	spillone della majella				Х	
	Escallonia langleyensis Vilm. & Bois	Escalloniaceae	escallonia				Х	
	Gaura lindheimeri Engelm. & Gray	Onagraceae	gaura				Х	
yellow area	Hemerocallis fulva L.	Hemerocallidaceae	Giglio di San Giuseppe				Х	
	Hypericum calycinum L.	Clusiaceae	erba di San Giovanni				Х	
	Phlomis fruticosa Sieber ex C.Presl	Lamiaceae	salvione giallo			Х	Х	
	Santolina marchii Arrigoni	Asteraceae	santolina	Х				

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The five areas were planted with different species of the same colour, so as to stimulate the five senses (see Fig.2). Aromatic species such as *Rosmarinus officinalis* L., *Mentha rotundifolia* (L.) Huds. and *Myrtus communis* were chosen to stimulate taste. To stimulate touch, *Stachys lanata* and *Festuca glauca*, which have rough, or silky-lanate foliage, were chosen, while to stimulate the sense of smell, species such as *Lavandula dentata*, *Aloisya citriodora*, and some species of mint (*Mentha* spp.), which emanate their perfume when the leaves are rubbed between the fingers, were planted towards the outer edges of the garden, together with species whose perfume carries further. Running water from the fountain was planned to stimulate hearing, together with an aviary near the only pre-existing tree in the garden, a majestic loquat (*Eryobotrya japonica – see Fig. 1,8*), whose leaves rustle in the wind.

Alternating colours which change with the seasons stimulate sight, which is the fundamental aesthetic aspect of a garden.

The five sensory areas are as follows:

*The white area* (senses involved: touch, sight, smell and taste) This is the largest area which extends from under the large loquat tree and the gazebo, and is accessible from the main entrance. It contains various mainly white-flowered or tomentose species which give a whitish look to the entire plant. These include *Aloysia citriodora, Viburnum tinus, Fragaria vesca, Myrtus communis, Salvia officinalis, Thymus vulgaris, and Mentha rotundifolia, which stimulate mainly smell and taste, and Cerastium tomentosum, Buxus pumila 'Nana', and Stachys lanata, whose leaves are pleasant to the touch.* 

**The blue area** (senses involved: touch, sight, smell, taste, hearing). This is the smallest area, but as it lies along the path, it contains species which stimulate all five senses. These include *Rosmarinus officinalis*, and *Rosmarinus officinalis* '*Prostratus*' for sight, smell and taste, *Festuca glauca* for sight, thanks to the ash-blue leaves, touch, and hearing when the leaves are rubbed, and *Ceratostigma plumbaginoides* and *Ceratostigma willmottianum* whose abundant flowers stimulate sight.

*The purple area:* (senses involved: smell, sight). This area is characterised by the violet flowers of various species of lavander (*Lavandula dentata, Lavandula angustifolia, Lavandula stoechas* and *Lavandula hybrida*), as well as *Syringa vulgaris* and *Nepeta mussinii* whose strong perfume also stimulates the sense of smell.

The pink area: (sense involved: sight). This area includes *Escallonia langleyensis, Abelia grandiflora, Armeria majellensis* and *Gaura lindhemeri* which has pink flowers and also leaves

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with bright pink edges. It is set near a rest area and was planned to relax and stimulate sight thanks to the bright pink flowers. *The yellow area* (senses involved: sight, touch, smell). There are two yellow areas in the garden which contain yellow-flowered species such as *Hypericum calycinum* and *Phlomis fruticosa* whose tomentose leaves stimulate touch as well as sight, and also *Hemerocallis fulva* and *Santolina marchii*.



Fig. 2 – Details of the five thematic areas

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### **RESULT AND DISCUSSION**

The objective was to make a healing garden for Alzheimer's disease patients in a high-care residence as a pyschological support in patients' daily lives and to provide an area where they could also spend time with their families. The garden was planned to satisfy all their needs.

In the design of the garden there are no large empty spaces, as they too can cause anxiety. (Cannara et al, 2004). There are easily recognisable rest areas, either for socialisation, like the gazebo, or single benches some distance one from the other, for individual meditation. Reference points such as the gazebo and the door back into the main building help patients get their bearings outdoors (Cooper Marcus and Barnes, 1999). Intersections are important because they are a natural way of getting patients to gather or meet and so represent the fulcrum of group activities (Cooper Marcus and Barnes, 1999), such as the tanks for hortotherapy. The garden is clearly delimited for easy orientation and to avoid transmitting insecurity (Cooper Marcus and Barnes, 1999). Being in an inside courtyard overlooked by most of the bedrooms and the corridors has certainly encouraged patients to go out into the garden, because if they were unaware that a garden existed, they would of course never use it (Cooper Marcus and Barnes, 1999); furthermore staff can observe patients without their realising it. The presence of fixed benches, hortotherapy tanks, lights and the gazebo have roused patients' curiosity and encouraged them to go out into the garden, (Ulrich, 1984; Cooper Marcus and Barnes, 1999) and there is also access for the disabled. Last of all, but by no means less important, is the choice of plant species on the basis of different flowering periods, and the presence of the vegetable garden, which encourages manual skills and can also attenuate the tendency towards passiveness (Cooper Marcus and Barnes, 1999). The creation of the five sensory areas to stimulate the senses is essential to reconnect the patients with the ouside world (Pomposini, 2004). Furthermore the garden is also a place where patients can spend time with family and friends, indeed this is what the garden is mainly used for.

### CONCLUSION

In the course of history it has become increasingly apparent that access to some aspect of 'nature' is a fundamental human need, and that the natural environment is not only a source of food, but also of psycho-physical well-being. As stated by Barnes and Marcus, planning a therapeutic outdoor area results from the combination of two concepts, 'healing process' and 'space where the process takes place', and this occurs only when human needs and the results of scientific research go hand in hand. The positive effects that these spaces have on patients' health and on health infrastructure cost-benefit relationships encourage further studies in healing gardens as therapeutic supports for various pathologies. The awareness that the environment, and

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landscape in particular, can play a fundamental role in improving health, and perhaps prevent disease, has been slow, but there are unequivocal signs that changes are taking place.

A current problem in Italy is the need for funding, as often gardens are created thanks to private donations or financing which is not always immediately available, so other forms of public funding should be incentivated. These gardens could also be laid out in areas open to the general public and so become important social therapy centers outside the confines of traditional medicine. This would allow access to those who cannot afford to enter private care institutions.

In the following words *Adrian Burton* gives proof of how this scientific stance has been recognised: [...] *if* [gardens] can be shown to shorten hospital stays, reduce the need for pain medication or other drugs, hasten (and therefore reduce the cost of) the rehabilitation process, or reduce staff stress and burnout (as initial research suggests), financing bodies might look on them favourably.» (Burton, 2014).

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