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Demi Sec: Spanish Lessons for Australia in Managing Dry-Climate Historic Parks & Gardens

Stuart Read
The Pratt Foundation/ISS Institute Overseas Fellowship

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2.0 INTRODUCTION

2.1 International Specialised Skills Institute

We know that Australia's economic future is reliant upon high level skills and knowledge, underpinned by design and innovation.

Since 1989 the International Specialised Skills Institute Inc. (ISS Institute), an independent, national organisation has identified skill deficiencies through market research, then fills them through its Overseas Skill Acquisition Plan (Fellowship Program) and consultancy services.

The ISS Institute provides opportunities for Australian industry and commerce, learning institutions and public authorities to gain best-in-the-world skills and experience in traditional and leading-edge technology, design, innovation and management. Since 1991, the ISS Institute has set itself the ambitious task of gaining specialised skills and knowledge from overseas then transposing those capabilities into an Australian context.

The ISS Institute is known for providing exciting and unique opportunities for Australians to enhance their capabilities in-keeping with the world's best. The ISS Institute Overseas Fellowship Program creates and supports significant international and cross-cultural relationships.

The Overseas Fellowship Program is the means by which skill and knowledge gaps are identified and verified, and then matched to overseas organisations where the skills can be acquired. Australians travel overseas or experts travel to Australia. ISS is not replicating what already out here but skill deficiencies. Importantly, fellows must pass on what they have learnt through a Report and a wide range of ISS Institute education and training activities and events such as workshops, lectures, seminars, forums, exhibitions and conferences. The activities place these capabilities, plus insights (attitudinal change), into the minds and hands of those that use them - trades and professional people alike - the multiplier effect.

Individuals gain; industry and businesses gain; the Australian community gains economically, educationally and culturally.

2.2 The Australian Context - Nature and Current Situation of the Industry

The ‘industry’ of heritage gardens or parks is diverse and difficult to define precisely. Its participants are in a sense the wider community, on a production level (through making future and keeping existing heritage gardens), and on a consumption level (visiting them, recreation).

Gardening is one of the most widely practiced cultural activities in Australia, and garden visiting has become very popular (both historic and new gardens) through the Australian Open Garden Scheme and others. However historic gardens and parks are an under-appreciated resource as types of heritage places, compared to their place in European, American or Asian cultures.

While historic buildings or archaeological sites have a high public ‘presence’, level of understanding and thus to a degree funding, parks and gardens are less widely appreciated as the fragile, complex works of art and environment that they are. Their future is threatened by inappropriate changes based on lack of understanding, changing fashions and in some cases reluctance to learn lessons from the past and to evolve their management to better fit their particular places and climates.

Despite 216 years of European settlement and the evolution of many imported garden philosophies, styles, elements and plants, Australia still has much to learn about its own environment, and our ‘garden-making’ in it. Books and magazines carry a preponderance of English, American, ‘Tuscan’ and French garden imagery, along with resort and ‘Bali’/rainforest styles. These are widely and often inappropriately copied and maintained at some considerable resource cost, around Australia.

Media focus on ‘makeovers’ and a fashion-based nursery industry pushing new lines have not led to a deep, informed understanding of the vast range of environments in Australia, the poorness and great age of its soils, and its general aridity. The boom in domestic and international tourism including to ‘garden’ resorts with associated themed landscaping has opened Australians’ eyes to other styles, practices of gardening. Some of these are appropriate here, others not. Again most have been imported, copied and maintained, for good or ill.

The fact of living on the better-watered coastal strip of the earth's driest continent has not translated into a tradition of gardens shaped by the need to conserve water, designed and planted for drought-tolerance. Even the notion of the 'tropics' in Northern Australia is not often accompanied by a nuanced understanding of dry versus wet tropics, and the differences. Some are learning and have begun to adapt their gardens in response to increasing climatic and budgetary pressures.

Much of South-Eastern Australia and 2/3 of New South Wales is in drought, possibly the start of a 10-12 year cycle, and of 1 in 100 year severity. Metropolitan centres like Sydney and Melbourne have been on mandatory water restrictions for some time. It is no coincidence that the greatest overhaul of water management in Australia's history has also recently taken place – the National Water Initiative signed by the Council of Australian Governments on 25/6/2004, based on conflicting principles of sustainability and economic security.

The supply and costing of water for domestic gardens and public landscaping is something very topical in Australia and in overseas countries including Spain. Relative to other OECD countries, Australia has very low industrial water use (c.2% of total) and high domestic use (c65% of total) and Australians are ranked 6th highest OECD water users, per capita. The only countries with higher per capita consumption are Spain, Portugal, Italy, Canada & the USA. (Merrick, 2004).

Broader approaches to the long-term sustainable management of parks and gardens in public ownership or open to the public have a wide application in Australia, both in terms of management philosophy and practice, in actual works, replanting and replacing trees and plantings as they age, die or suffer climatic change.

Australia's historic gardens and parks have much to teach willing students, by their very survival (or at least that of parts: such as layout; structure and hardier trees and shrubs). Lessons in environmental appropriateness are starting to form the basis of closer study.

This is evidenced by the 2004 National Conference theme of the Australian Garden History Society – "*Browned off – Old Gardens for a New World*". I was on the committee who organised this and influenced the theme and visits. A quote from the conference brochure from 1839 (from John Thompson, Chief draughtsman to the Surveyor General's Dept., Sydney, writing to J.C.Loudon, celebrated garden writer, in London):

"The droughts to which we are so continuously subject render abortive all attempts at maintaining a garden in the English style; and point out to me, that stonework, and terraces, and large shady trees, the characteristics of Hindostanee gardens, are more suited to our climate than English lawns and flowerbeds"

This conference examined lessons to be learnt from surviving historic gardens in the Sydney Basin, and adaptations to its various microclimates, eg: abundant water in the east, and lack in the west.

In terms of professional services in advice on management, maintenance and management works, regulation through planning or other statutory approvals, the Heritage 'Industry' is smaller, ill-defined and part of a larger 'heritage' industry focussed on buildings.

In terms of historic gardens, parks and cultural landscapes the Heritage 'Industry' in Australia's capacity and level of development is limited and variable at present, in terms of education provision, scope of skills available (specialisation, experience in managing, demand) and standards (assessment, conservation and management). While the bulk of heritage 'work' has been and remains building-focussed, an aspect relates to the surroundings of buildings, and to spaces designed without buildings (cf structures) such as gardens, parks, and landscapes.

In terms of industry or practitioner training, most institutions offering heritage courses are architecture-focussed and generalist: covering building technology; architectural history; conservation of built fabric materials (timber, stone, masonry); some of which are applicable to horticulture/landscape management, but not covering plants or landscape in any detail.

Horticultural / Landscape Architectural education is generalist-focussed, and does not provide heritage-only or heritage-focussed training, to the best of my knowledge. Courses by necessity are general, covering plant identification, propagation, amenity and commercial production horticulture (eg: nursery trade, fruit growing, cropping), pests & diseases, garden design.

The situation in New Zealand, where I did my horticulture training (in industry/ polytechnic and at University) is similar. To my knowledge neither country has a specialist 'garden history' course per se, or courses on heritage gardens or landscape design, assessment or management. These skills are picked up casually by 'hands-on' experience of working with such places, conversations and debate with others doing the same: these from a range of backgrounds – owners, regulators, practitioners in construction, history, archaeology, horticulture, maintenance, design services.

National summer school courses formerly provided at the University of Canberra's School of Environmental Design have becoming economically unviable in recent years. This to my knowledge is the only such course in the country, open to all 'backgrounds' or disciplines working in heritage, and thus benefiting from this breadth although many had tended to focus on architecture and related issues, not on landscape.

Some universities include in undergraduate courses for relevant disciplines (architecture, landscape architecture, archaeology, museum studies, materials conservation) optional lectures or modules on garden history, focussing on design styles through time, as 'art history'. These do not as a rule focus on applied management. Others offer post-graduate courses (eg: University of Sydney's Masters Course in Heritage Conservation)(UNSW Faculty of the Built Environment, RMIT) but these often tend towards over emphasis on theory or hands-on site works focussing on buildings or archaeology. Landscape focus, beyond again the theoretical or analytical, remains little practiced, and little advanced.

Similarly planning and archaeology education courses appear to focus on either macro (landscape planning) or micro (site digs, focussing on built remains, rather than covering issues such as garden remains, pollen analysis, root castings (as used by Jashemski in work on Pompeii), soil stratigraphy, or heritage site management skills etc. Garden archaeology as practiced in the UK, Europe or USA, appears to be little used here, perhaps in fairness reflecting its cost and the level of fine-grain detail needed to do it at all well. This also reflects a low level of awareness and/ or valuing of this type of work, this type of heritage place or element.

Some TAFE institutions (eg: Sunraysia, VIC; Ryde, NSW) run horticulture and arboriculture training, although again this is generalist, rather than focussed on heritage or historic gardens and landscapes. Any heritage input in these courses is by necessity slight.

Further educational organisations (Workers Education Association, Centre for Continuing Education) run day or night-garden history courses, archaeology, history classes, some of which (depending on teacher interest/availability and 'demand') touch on garden history (eg: recent CCE course on Islamic Gardens, run in Sydney by archaeologist Maree Brown, University of Sydney).

On-the-job training in NSW at least is limited to periodic "Heritage Adviser" training courses in dealing with the planning system, development applications and approvals. Heritage Advisers working with Local Government are given one annual training day by the NSW Heritage Office. Given the overwhelming majority of listed heritage items are buildings, issues arising tend to focus on the built environment. An email network exists to share information between heritage advisers and this has spread to straddle the Victorian and in some cases South Australian borders, although again the majority of email traffic concerns buildings, building material queries, planning and tourism, not garden or landscape matters, and if so, rarely their management.

Specialist Heritage Organisations such as Australia ICOMOS (International Council on Monuments & Sites) provide conferences on changing themes, some relevant to landscape management, most of which are broader in focus, covering a range of issues – the most recent two conferences were on interpretation techniques and on disaster sites and complex place management. While landscape is undeniably a key part of both sites (Quarantine Station, Sydney, & former Port Arthur convict station) it was not the main focus.

Community groups such as the National Trust of Australia (especially where it is largest, in NSW & Victoria) provide training through sporadic conferences, workshops and seminars, some relevant to landscape and gardens, but to date these have focussed on identification and assessment and not on management, not on management nor specific challenges for it such as drought, water management and conservation.

Debate and conferences and seminars in Australia on cultural landscapes have focussed on the 'front end' of the process, ie: debating definitions on what such places are, identifying and classifying them. An expert charette hosted by the NSW Heritage Office in 2003 agreed what is needed are guidelines on managing such places, drawing boundaries around them, balancing conflicting values (land clearing, crop changes with economics

v historic landscape pattern and land use mixes) and models for managing them well, as does occur overseas. The Australian Garden History Society (AGHS) of which I am on the National Management Committee, have for 25 years published a journal and run conferences on some of these themes, although identification and classification remain dominant foci, over other more practical themes of conservation, change management and management. The latter are becoming more important recently, but as the AGHS is a membership body made up of diverse people (gardeners, academics, professionals, consultants, interested amateurs) its focus is the magazine and conferences/ publications, with some branches offering hands on events where 'learning' in a more structured sense can occur – eg: Victorian branch working bees in historic gardens.

As intimated above, in terms of managing such places, skills and the level of understanding is highly variable and generally, of a low order. Often managers have picked knowledge up as they go; similarly regulators making decisions about; and applicants, consultants and contractors doing works on such places have a range of knowledge, experience and sympathy, with predictably mixed results.

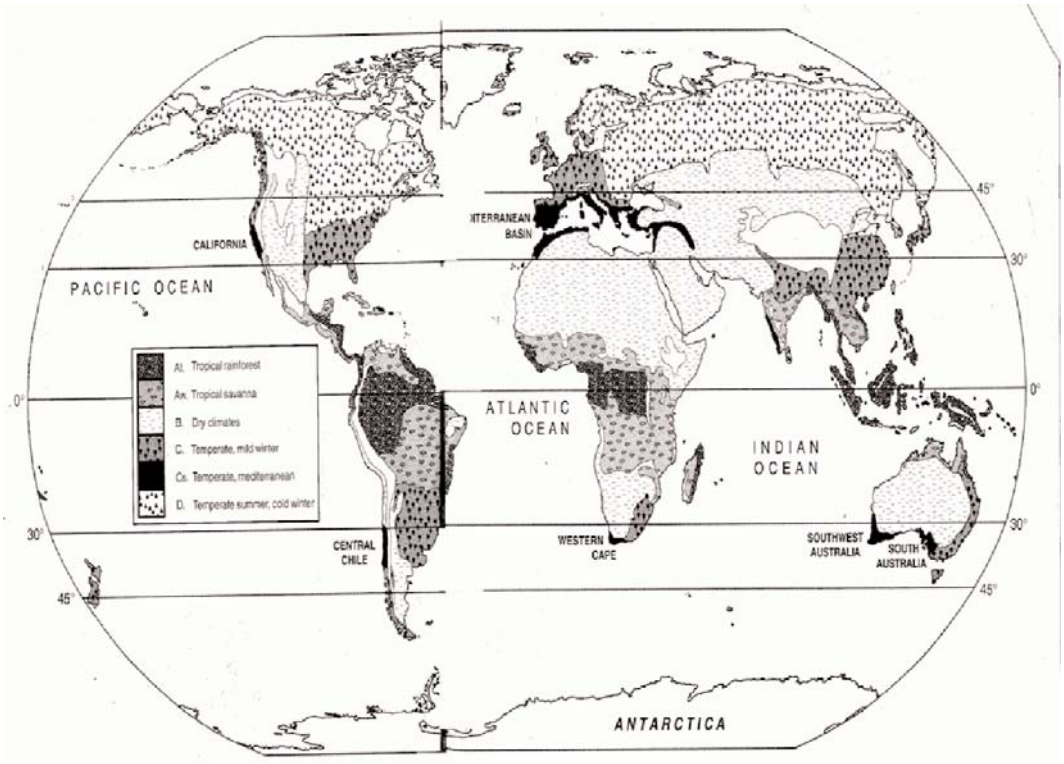
There is a gap in encouraging more sophisticated level of debate, higher standards and practice in Australia in heritage garden, park and landscape management. Europe and America seem some way ahead in this regard, perhaps reflecting longer unbroken associations with historic landscapes, more advanced debates with more participants than are occurring here as yet.

Management of such places in a world of spiralling water use and shrinking water supplies provides challenges. Many historic gardens are based on 'home countries' with far different conditions (eg; milder climates, higher rainfall, richer soils) than Australia, and have necessitated or encouraged adaptation of imported fashions of design and plant palette to survive drier conditions, rising water tables, saline water etc.

Since the 1970s an increasing environmental focus and global push for more sustainability in human settlement and development has led to a reappraisal of garden, park and landscape management, at macro (eg; land use capability, restoration of degraded landscapes) to the micro (re-planting gardens with more drought tolerant species, irrigation with 'grey' or used water).

While the media run articles on themes of water (particularly increasing in frequency with the current drought) and conferences and working groups are tackling the issue, this has not led to serious debate and learning in terms of historic gardens and parks, their sustainability and better ways of ensuring their ongoing good management.

MAP: world map showing climatic zones - Note the black areas which are all 'Mediterranean' ie: having wet winters and dry summers as a characteristic weather pattern (Source: Dallman, 1998)



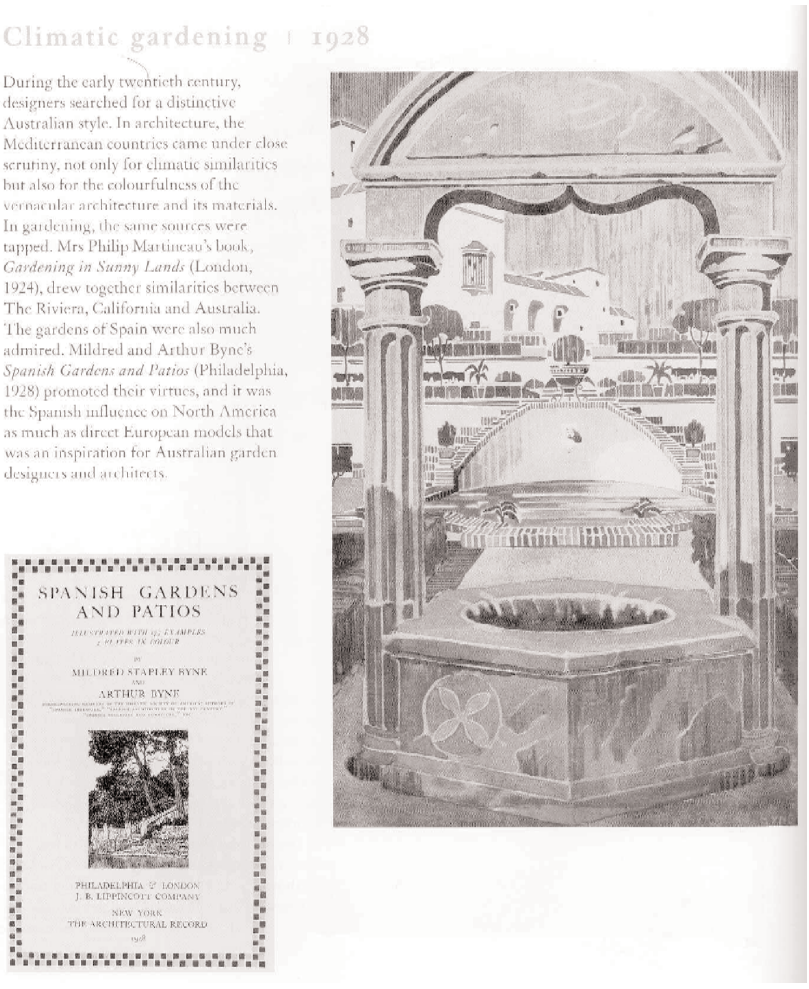
Rising water costs and tiny heritage budgets are necessitating some managers to seek to ‘re-wire’ designs, replant with more dry-tolerant species when plantings age and die. Often this is done in isolation, on a case-by-case and ‘merit-based’ personal assessment. Whether such decisions are based on knowledge of experiences elsewhere is debatable.

A number of books have been published since 1980 on Mediterranean / xeriphytic gardening, dry-tolerant gardens, succulents and cacti as landscaping material, and water conservation. These tend to be generalist as in ‘how to do it’ or ‘what plants to use’, rather than specific, in terms of how does this apply to heritage gardens or parks, or how can heritage values be balanced against a desire to use less water, be more sustainable?

The opportunity to study outside Australia, particularly in Mediterranean climate countries (The Mediterranean basin, Southern South Africa, parts of central Chile, Western California) is invaluable, as in these places lack of water is a long term symptom which gardeners have had to adjust to, some over some considerable number of centuries. Traditions of gardening have built up in some of these places (domestic, ornamental gardening cf commercial agriculture and horticulture, although of course here traditions have also evolved of necessity) which are worthy of closer study for lessons for Australia.

Australia has looked to ‘countries of the sun’ before in searching for a distinctive Australian style, house and garden design inspiration, and ways of indoor/outdoor living better suited to an often dry, warm climate. Popular house and garden magazines of the 1920s and 30s carried articles on Mediterranean, Spanish and Californian/Spanish Mission architecture and gardens, trying to influence public taste.

The rise of Hollywood movies to some extent led to such magazines showcasing the Spanish / Mediterranean’ influenced Californian (and Riviera) homes and gardens of early film stars. Not only the climatic similarities, but also the colourful vernacular architecture and materials used in Mediterranean countries attracted attention. Gardening books tapped these sources: Mrs Philip Martineau’s Gardening in Sunny Lands (London, 1924) and Mildred & Arthur Byne’s Spanish Gardens and Patios (Philadelphia, 1928) promoted their virtues, yet it was Spain’s influence on North America as much as direct European models that inspired Australian garden designers and architects.


Climatic gardening | 1928

During the early twentieth century, designers searched for a distinctive Australian style. In architecture, the Mediterranean countries came under close scrutiny, not only for climatic similarities but also for the colourfulness of the vernacular architecture and its materials. In gardening, the same sources were tapped. Mrs Philip Martineau's book, *Gardening in Sunny Lands* (London, 1924), drew together similarities between The Riviera, California and Australia. The gardens of Spain were also much admired. Mildred and Arthur Byne's *Spanish Gardens and Patios* (Philadelphia, 1928) promoted their virtues, and it was the Spanish influence on North America as much as direct European models that was an inspiration for Australian garden designers and architects.

Left) An excerpt from *Gardenesque*, (Aitken, 2003), featuring gardens influence in Australia via publications & writing c.1928

A quote from Australian garden designer, Edna Walling in the 1920s:

"*For sheer restfulness Spanish gardens with their sheltered cloisters, sombre evergreens, paved courtyards, refreshing water features...seem much superior, much more serviceable than Australian gardens*"
…which at the time were full of water- and labour-hungry lawns, standard roses and gladioli!

A quote from John Parry in ‘A Few notes on the Spanish Garden’ in *Australian Home Beautiful,* 1/7/ 1929:

" *There are many houses of the popular Spanish type in our suburbs. In some cases the designs are attractive, and yet it is surprising how much more admired some would be if only the garden were more in keeping with the architecture. In other words: A Spanish garden for a Spanish house*."

While some countries have been reasonably (or in the case of Italy, extremely) well-studied (Southern France, California) in terms of English-language books, conferences and writing on historic and recent garden-making history and practice, others are less so, such as the drier parts of Southern & Eastern Spain. A few English-language books from the 1920s, one from the 1950s, and the Marquesa de Casa Valdez's seminal 1987 'Spanish Gardens' are the sum total, with the one exception of her grandson Eduardo Mencos' recent 'Hidden Gardens of Spain'. However these tend to be general overviews, covering 'wet' as much as 'dry' Spain, as the former has the majority of Spain's gardens.

It is important here to mention scale and application of techniques and philosophy. Commercial agri-/horticulture and widespread landscape use of water (industrial scale irrigation) is not the same as domestic or urban scale park use. Often reticulated ground or rainwater supplies urban users, in variance to how farmers say get their water, on licenses, extracting from local rivers.

Similarly countries with advanced philosophy and techniques in broad scale landscape agri-/horticulture (eg: Israel; California, USA) may not offer the best or applicable lessons for domestic scale garden water use relating to historic parks and gardens. This is my fellowship's scope.

2.3 Organisations which have impact on your Industry/Occupation

A number of organisations have an impact on the heritage industry, not least the construction industry more broadly, where 'development' needs and aspirations bring changes to heritage sites and landscapes. Usually the bulk of these are negative, eg: subdivision, excisions off parks, insertions into historic gardens, additions to buildings and road realignments cutting into estates and gardens.

All Government agencies with care, control and management of heritage parks and some gardens have an impact as owners, managers, agents of change. Despite decades of Governments at all levels devolving ownership and responsibility and selling off such places, considerable numbers remain in public ownership, in all states of repair.

Some Government agencies have direct regulatory impacts (in decisions or actions affecting heritage places. Many also own significant heritage assets including historic parklands and gardens, examples being Departments of Health (old hospital complexes), Education (school sites), Housing (converted historic homes and gardens), Park Management Agencies (Parramatta Park, Centennial Park, Olympic Park in Sydney), the NSW Historic Houses Trust (running house museums many with gardens) etc. Heritage Offices (in most states and territories, and the federal Australian Heritage Council), Environment, Development, Planning Departments etc regulate approvals in relevant planning, development and major infrastructure projects.

Similarly Local Government around Australia has a huge impact as owners, managers and regulators of historic parks and gardens (including private) through approving development proposals.

Some environmental groups have an impact, directly (eg: Bush care groups wanting to 'weed' formerly fashionable exotic garden plant species from historic gardens and parks); or indirectly through lobbying.

A number of 'heritage industry' organisations have some influence and impact, including:
· Australia ICOMOS (International Council on Monuments and Sites);
· National Trust of Australia (Branches in each state and territory); and
· The Australian Council of National Trusts (mainly a national lobby group);
· Australian Garden History Society (national body and branches in most states);
· Professional Associations such as the Australian Institute of Landscape Architects, whose focus is mainly on private practitioners and new or recent work, rather than history or past works' survival, and the Australian Institute of Parks & Recreation;
· The Royal Australian Institute of Architects, through their heritage work (registers of 20th century architecture, some including landscape works);
· Industrial associations such as the Australian Institute of Horticulture, whose focus appears to be private practitioners support, training, accreditation and promotion;
· Universities offering 'heritage courses' eg: U.Sydney undergraduate courses on 'disciplines' like architecture, archaeology, post-graduate masters course in heritage conservation, components of RMIT and U.NSW courses on Architecture and Landscape Architecture; Planning & Archaeology;
· TAFE institutions offering horticulture and arboriculture courses and certificates;
· further educational organisations (WEA, Centre for Continuing Education) running day or night-garden history courses, archaeology, history classes;

· Parks Forum, a peak body for the parks industry in Australia & New Zealand;
· Botanic Gardens in each state and territory, some of which are very historic;
· Most Local Councils (152 in NSW) as either land holder/owner, manager, or change agent, some of whom employ historians (Sydney, North Sydney), most of whom have landscape architects and gardening staff employed, again the focus being maintenance;
· NSW Local Government heritage advisers, through an email support network and an annual training day, provided by the NSW Heritage Office (NB: some participants in this network are in other states, eg: Victoria, South Australia);
· Council tree protection officers and landscape architects, on a sporadic basis;
· Friends groups such as Members of the NSW Historic Houses Trust; Friends of the Royal Botanic Gardens Sydney (some 7000 total), through education programs and events;
. The Nursery trade to some extent, in terms of the selection of plants (and turnover in fashions) available to owners and managers, keeping plants 'in circulation', and influencing fashions;
. Arborists undertaking tree surgery and decisions about removal and replacement;
. Water supply and regulation bodies (eg: Sydney Water) in terms of granting exemptions from water restrictions for historic gardens which may depend on 'high water' to survive drought conditions.

2.4 Aim of the Fellowship

I wanted to study overseas lessons in managing and evolving historic parks and gardens, focussing on adapting these to better "fit" their place or environment. I wanted to study a range of places fringing the western and north-western Mediterranean, that region having long gardening traditions, and a similar climate range (to South-East Australia, and much of lowland NSW).

My aim was to travel to 'dry' and formerly 'Islamic' Spain (south and east) to gain lessons for Australia in dry/Mediterranean climate management of historic parks and gardens in:
· Water management, climate change, coping with drought
· Design, plant palette selection and re-working for better drought tolerance, weed problems
· Sources of funding, budget control, cost recovery
· Management documents, conservation management plans their general emphasis and use, managing conflicting values
· Public visitation, tourism issues management and impact- positive and negative, competing pressures for recreation space, excisions, subdivisions, public liability and risk management.

I sought specific knowledge on warm, dry-climate park and garden management, in a world with increasing climate change, scarcity and cost of water provision, urbanisation and tourism pressures and decreasing public budgets for heritage place management.

2.5 Skills Gaps

Heritage practitioners tend to be architects, historians, archaeologists or have backgrounds in museums. Heritage landscape practitioners are few and far between. Most multi-disciplinary heritage consultancy firms lack a specialist in landscapes, and 'buy in' expertise on a job-by-job basis, at the discretion of directors or clients. Most lack the skills to identify, assess, and make management recommendations for such places.

Government leadership has diminished with Australian Heritage Council (formerly Commission)'s role, grants program, and staff shadows of their former scope, skills and influence. State Heritage agencies all in theory 'cover' these types of places, but in reality the focus remains 'built'. Staff are focussed on statutory approvals of applications involving changes to places on State Heritage lists. Most include changing the layout, functions, intensity and nature of plantings. Most staff lack landscape architectural or horticultural training, and capacity to provide advice is limited. At local government level it is even more so.

Leadership on standards, guidelines and advice has come increasingly from lobbying and direct action by groups such as the Australia ICOMOS, the Council of National Trusts, Institute of Landscape Architects etc.

The lack of guidance and standards is a pressing challenge for these places and their increasingly challenged owners and managers. Many lack specific training in or experience with garden history, or heritage place management. Skills in identifying and managing conflicting values can also be rare -eg: juggling demands for more public access, parking, cafes, recreation and commercial events in public open spaces.

Cost cutting and devolution of management has meant shortages and gaps in funding, staff numbers and skills. Fewer staff are expected to manage more places, with less money, time or knowledge. This can only erode the resource, and put at risk the inadvertent or deliberate loss of their particular features and richness.

Some potentially beneficial structures exist, for example NSW's 'heritage adviser' network, who work closely with local governments and owners, share information by email, and annual training days run by the NSW Heritage Office. National forums like the Environment & Heritage Ministerial Council meetings have potential.

There is potential to raise awareness, standards of and funds for conservation management of such places through articles in industry and popular magazines, workshops, seminars, talks and conferences.

Specific skill gaps in this 'industry' that I have identified are:

- expertise in adapting historic parks and gardens to climate change and particularly increased drought frequency and intensity, diminishing water supplies and increased cost; expertise in dry-climate plant selection and performance;
- expertise in managing conflicting values in historic parks/ gardens (e.g.: water-dependent design/ plant palette v ecologically sustainable development management philosophy in a dry climate place, dry-climate plant palette and changing public or nursery industry fashions (e.g.: water-dependent species/ design, inappropriate styles or plant species for a particular climate, place, soil type etc);
- expertise in adapting garden sites to and managing (relative) mass tourism and impacts (eg; Alhambra and Generaliffe); means of 'hardening' and pragmatic management decisions;
- knowledge of emerging technology for improved water conservation, decreased use, soil water retention, e.g.: irrigation technology, soil additives, mulching equipment/materials;
- knowledge of lessons to be gained from traditional Islamic techniques of garden irrigation and water management to limit water need, maximise water efficiency and group plants requiring more water the nearest to water outlets – ie design issues to maximise water efficiency;
- knowledge of sophisticated garden archaeology including palynology (pollen analysis), stratigraphy (soil layer analysis eg: to establish soil levels in Roman/ Muslim Middle ages, plant species used, layout changes over time; landscaping, dimensions, materials (paths etc);
- knowledge gained in practical garden restoration and reinstatement based on garden archaeology – eg: Generaliffe garden of the water channel (Patio de la Acequia);
- knowledge of good gardening practices (modern) for Mediterranean gardens in a range of 'dry' climate locations – skills gained in plant selection, arrangement, design, watering techniques, water recycling;
- exposure to recent design work creating new gardens and parks or re-working older ones to make them more 'place-specific' and a 'better fit' to their environment and climate and water supply eg: Barcelona & Valencia's recent park networks, recent botanic gardens on the Costa Brava focusing on cacti and succulents and native flora to the Mediterranean.

3 THE FELLOWSHIP PROGRAM

3.1 Introduction - The nature of my program

Section 3.3 below is an itemised list of visits, including interviews I had pre-arranged (by email, telephone) with key stakeholders and managers of historic parks and gardens. I wanted to meet a range of managers, people who are 'hands-on' in terms of staff, decision making or direction of such places. I was lucky enough to get agreement from a range of people, from Government, private organisations (eg: Trusts such as manage Jardi Botanic Mar I Murtra in Blanes), and individuals.

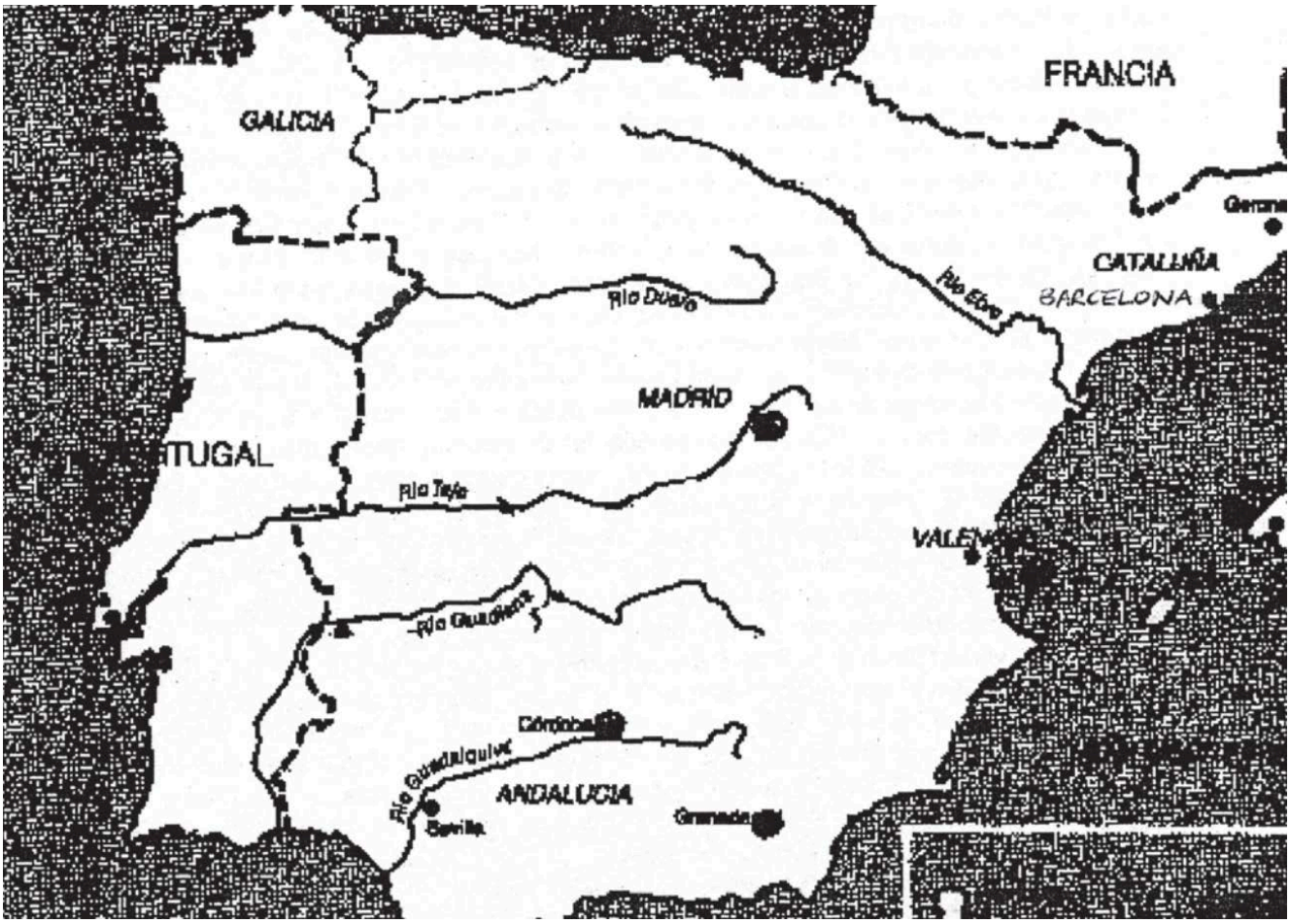
I was also keen to meet designers and managers of 'new' or recent work, particularly where this focussed on 'dry' tolerant plants or native species. I was also keen to meet people managing changes to historic parks and gardens, for example conservation or restoration programs, inserting new features etc.

3.2 Educational institution/Host organisations, a brief outline of each.

Owing to the number of organisations and places visited (in a two month trip, part of which was the fellowship's three weeks period), and that all were effectively 'hosting' me from a minimum of an hour and a maximum of a day, I have left brief outlines for each individual entry that follows.

3.3 Programme Content - Places visited, people met, other events attended:

Below: Map showing places visited: Mallorca, Barcelona, Madrid, Cordoba, Seville, Granada and Valencia



1. 14/3/2005 – arrived in Barcelona, Catalonia, NW Spain.
2. 17/3/2005 visited Heidi Gildemeister, Torre d'Ariant (Tower of the Arab), Northern Mallorca: garden tour;
3. 18/3/2005 Jardi Botanic de Soller (Botanic Garden), Soller, northern Mallorca (1985+)– interviewed Director, Josep Lluis Gradaille, tour;
4. 22/3/2005 visited Parc de la Ciutadella, Barcelona (1869, modified 1888 and 1917); first of 2 visits, and Parc del Clot (1986, former railway yards, now a mixed park/recreation space);
5. 23/3/2005 visited: Jardins de Mossen Costa i Llobera, (1970, internationally significant cactus and succulent collection, & palms); Jardin de Aclimatacio (early 20th c. acclimatisation gardens, now a (neglected) park, (Jardins del Teatre Grec & Laribal/Font de Gat, (1916-28, gardens by J.C.N.Forrestier, all on Montjuic;
6. 24/3/2005 – visited Jardin del Laberint d'Horta (garden of the Laberinth), Horta, Barcelona (former private estate garden from 1791/1800s; park since 1897, and Palau Robert (modified rear garden a public park)
7. 25/3/2005 visited Jardines de la Universitat/ university, 1859 city complex including scientific collection of trees, open to public since 1995, and Parc Guell, 1922 public park, major tourist icon;
8. 27/3/2005 visited Jardins del Joan Maragall (1970, on site of 1929 Internatnl. Exhibition Pavilion), Montjuic;
9. 27/3/2005 – visited Jardins de Mossen Cinto Verdaguer, Montjuic (1970 thematic park with collections of bulbous and aquatic plants), Jardines del Palau de Pedralbes, (former gentry orchard estate, modified 1929 as visiting Royal Palace, now public park & museums), and Parc de Cervantes – Rose Gardens (1965, revamped and expanded 1998);
10. 28/3/2005 – visited Parc Putget, Barcelona (1917 part of forested green belt, 1970+ steep hillside with dense shrub and woodland style planting), Parc de la Barceloneta (1996 waterfront industrial renewal site);
11. 30/3/2005 – visited Jardi Botanic (Botanic Gardens), interviewed curator Nuria Membrives, (first of several visits), visited Placa de les Glories (1992 post modern park within major motorway circle);
12. 1/4/2005 – visited Parc de l'Espanya Industrial, former industrial site, since 1985 a major open space adjoining regional railway interchange, Parc de Joan Miro, same (1983) but with more sports facilities; and interviewed Bet Figueras, Landscape Architect;
13. 3/4/2005 – visited Sitges, coastal town/beach resort to south, 'garden suburb' part of central area with park alongside, landscaped seaside mall;
14. 4/4/2005 – interviewed Conxa Monras & Alba Fransi i Gallart, Barcelona Parks & Gardens Department, on

management systems and philosophy; also toured 'Viver de Tres Pins' 1993+ Departmental Nursery;
15. 6/4/2005 visited Jardi Botanic Mar i Murtra (Sea & Myrtle Botanic Gardens), Blanes, Costa Brava, interviewed curator and Trustee;
16. 7/4-15/4/2005 – stayed with landscape architect, author and photographer Eduardo Mencos in Madrid, author of *Hidden Gardens of Spain*, 2004, and member of the Valdez Ducal family with various estates around Spain, his grandmother the Marquesa de Valdez wrote *Spanish Historic Gardens* in the 1980s, the classic), picking his brains about contacts, visits and gardening culture; visited his country estate outside Guadalajara (sculpture garden and (mostly) locally indigenous flora on a very hard, exposed, very high, cold site);
17. 9/4/2005 – interviewed landscape historian Luisa Roquero, Madrid; visited Parque de Buen Retiro;
18. 10/4/2005 visited Parque del Fuente de Berro, Salamanca district; Parque Juan Carlos 1, near airport;
19. 12/4/2005 interviewed Juan Armada, Director, Living Collections, Royal Botanic Garden, Madrid;
20. 13/4/2005 – interviewed Maria Maroto Cotoner, landscape architect in Madrid; had dinner with Katherine Greenberg, President of the Mediterranean Garden Society, California (fresh from leading a wildflower tour in the mountains around Granada, and with long experience of living in Spain & California);
21. 14/4/2005 interviewed Maria Medina Mura, heritage landscape architect advising Patrimonio Nacional (National Heritage Body managing Royal Palaces and estates); met Xavier Marietegui, member of International Dendrology Society, Madrid, and organiser of two recent IDS tours of central Spain, currently organising another tour for 2006; discussed Spanish biodiversity, forest cover, arboreta and climatic variability;
22. 15/4/2005 visited Palacio del Pardo, Royal country estate outside Madrid and in 20th c. General Franco's;
23. 16/4/2005 visited (with Luisa Roquero & Soledad Martinez Munoz) La Capricho de la Alameda de Osuna, Barajas, outer Madrid and Royal Palace grounds and outer rural and orchard estates of Aranjuez;
24. 17/4/2005 first of several visits: Patio de las Naranjos, Mosque, now Cathedral, Cordoba;
25. 19/4/2005 visited Alcazar de los Reyes Christianos gardens, Cordoba, Diocesan museum (former Islamic palace, adapted for bishops, with patios), and Archaeological museum;
26. 20/4/2005 visited Medinat al Zahra, ruined former Palace/City outside Cordoba (936-1010), Casa Andalusi (12th c. house museum with typical small patio, in Jewish Quarter) and Palacio de Viana, Cordoba;
27. 21/4/2005 visited Fine Arts Museum, Cordoba (combined 19th c. mansion and former 15th c. hospital, with typical patio and Botanic Gardens, (1983, thematic collections including Iberian endemics (using traditional flood irrigation), ethno-botanical plants, ornamentals, economic species;
28. 22/4/2005 – visited Patio de las Naranjas (Courtyard (sahn) of the oranges) Seville Cathedral (remnant with minaret of former Almohad Mezquite/ mosque, c.1172; (the rest was destroyed by construction of 15th century cathedral; only one of its external walls & 2 gates survive);
29. 23/4/2005 visited Reales Alcazares, (Royal Castle/Palace), Seville (first of two visits);
30. 24/4/2005 visited Parque Maria Luisa, Seville;
31. 25/4/2005 interviewed Jose Maria Cabeza, Director of Patronato (Regional Heritage Body), Reales Alcazares, and toured the gardens on the one day a week they are closed to the public);
32. 26/4/2005 visited Casa de Pilatos, Seville; interviewed Susana Freytas Bernal, assistant to the Director;
33. 27-31/4/2005 attended Conference *Gardens of al-Andalus* (Islamic Morocco, Spain & Portugal) run by University of Granada: 2nd session (of a series of conferences: *The Medieval City in Western Islam*);
34. 28/4-3/5/2005 - Visited the Alhambra and Generaliffe gardens several times, including site museums and interpretive displays; visited Carmen de los Martires, 19th c. orchard estate and pleasure garden, now public park; visited House museum of Federico Garcia Lorca, now within an eponymous modern Granada city park;
35. 2/5/5 - Visited sites 'uphill' of the Generaliffe including the major water channels/ acequias reales, palace ruins and a rainwater cistern to understand the water supply for the Alhambra, Generaliffe and Medina/city;
36. 4/5/5 – visited Botanic Gardens, Valencia, with Julio Lacarra Lopez, heritage landscaper/ horticulturist (first of 3 visits) and La Jardin de las Hesperides, a post modern park next door;
37. 5/5/2005 - visited Museo Ben Lliure, an artist's house museum in Valencia, including one of few remaining typical 19th c. city (rear) gardens; visited Monforte; visited Jardines de Real, formerly Las Viveros (nurseries) originally a Royal recreation farm estate of Moorish King, converted to Christian palace and grounds by Jaime 1st. This was the first zoological garden in Spain from 15th c., with various changes esp. 19th and 20th centuries to a landscape style public park); visited Paseo de la Alameda (riverside avenue, Valencia's oldest public park (over 1km long, first plantations (poplars) from 1694, with several re-plantings and modifications; Jardines del Turia, series of new linear parks, both sports/ recreation facilities and planted sections, all in former bed of Valencia's river, diverted in 1980s after serious 1950s floods;
38. 6/5/2005 – With Ximo Sanchez, landscape architect, visited Parc de la Rambleta; visited Parc d'Ayora; interviewed Jose Bernardo Polomar Martinez (maintenance & irrigation section), Santiago Uribarrena (GIS database inventory) and Ximo Sanchez, all from Valencia Regional Government's Parks & Gardens Department about their urban tree management program and inventory;
39. 7/5/2005 - Visited Parc Marxalenes; and Parc Municipal Benicalap, popular suburban parklands;
40. 8/5/2005 – visited a private terraced rural garden near Gandia south of Valencia, belonging to Julio Lacarra Lopez & Ximo Sanchez, using traditional irrigation and lush planting, experimenting with plants;
41. 11/5/2005 – interviewed Patrizia Falcone, Barcelona, heritage architect; visited several local park spaces within high rise city blocks in the Esquerra-Eixample & Eixample districts (c.1890-1930s), where the Council

has a recent program of reclaiming and landscaping block cores for park /green space;
42. 12/5/2005 – visited Parc Cervantes again, annual International Rose Competition (for best new rose variety) on; visited Turo Parc (1934, formal and woodland park by Nicholas Rubio i Tuduri); Jardins de Rubio i Tuduri (1909, restored 1966); Jardins de Villa Cecilia (1986) and adjoining Jardins de la Villa Amelia (1970), two 19th c. city estates, now adjoining suburban parks;
43. 13/4/2005 - visited Parc de Joan Brossa, Montjuic (former 1929 theme /attractions park, remodelled, 1980s, recently replanted), Parc de l'Estacio del Nord (1988, landscape art/ceramic sculpture and major green space on old railway yards), Parc del Bosquet dels Encants (1995: tiny urban space on rehabilitated site recreating a natural Mediterranean woodland);
44. 16/5/2005 – returned to Australia

3.4 Outcomes of the program: places visited and lessons learned for Australia

1) Heidi Gildemeister's garden, Torre d'Ariant, near Pollensa, northern Mallorca.

NB: generally Mallorca has 420mm rainfall average/year, & a temperature range of 2C (min.) -33C (max.).

This is a wonderful 4 ha private 'sheep park' and homestead garden, created over the last 20 years by a founder member of the Mediterranean Garden Society, in a sheep farm on top of a limestone mountain chain with thin vegetative cover and soil and little natural rainfall. Awarded the Diploma 2002 for best Spanish garden, it is considered one of the best gardens in the Mediterranean, and included in various publications.

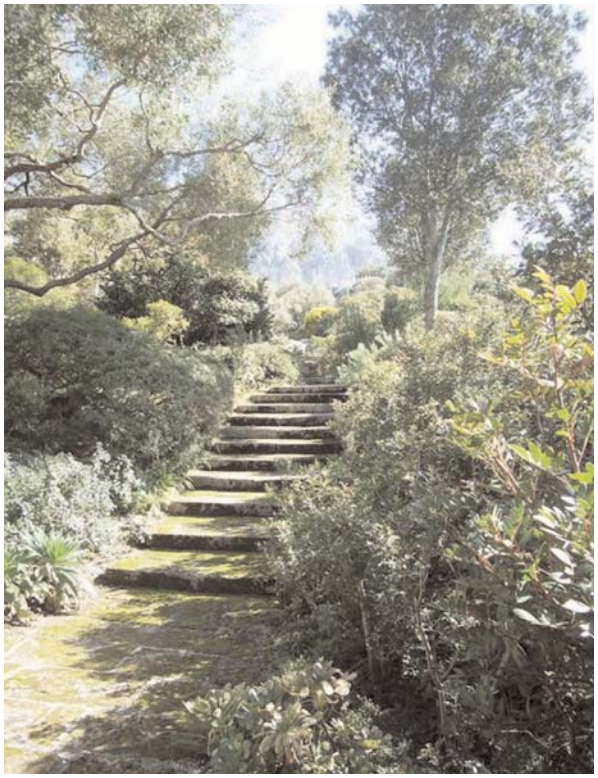
Above) General view. Note the limestone protruding through the lawn, native cypress, olive and evergreen oaks. Below grow drought tolerant native mastic bushes (pruned to give shape and structure, and emulate natural grazing), plus succulents such as *Yucca* spp. and hardy plants, many native. Areas of lawn have been reduced and replaced with greater areas of ground-covering plants requiring less water and maintenance.

Heidi has used it as experiment ground in her own authorship of two influential books *Gardening the Mediterranean way – practical solutions for summer-dry gardens, and Mediterranean gardening: a waterwise approach*. I was lucky to be able to contact her through Trevor Nottle in Adelaide, a similarly influential Australian gardener and author on these themes.

Lessons I learnt were:

a) the value of observing and adaptation to local conditions (climate, site, aspect, soil, rainfall) eg: using local indigenous plants as a 'cue' to what will grow, particularly in 'hostile' areas;
b) the importance of retaining existing vegetation especially trees, for shade, shelter, organic material, look;
c) the environmental value of trying to strengthen and replenish natural climax (mature state) vegetation, eg: evergreen oak forest, by both interventionist methods (pruning to get trunks; planting seedlings, transplanting) and by allowing some natural seedlings to remain to ensure future tree cover;
d) the value of experimenting and supplementing with other (exotic) plant material that may or does share a

similar climate / hardiness – while monitoring for potential weediness, hardiness to pressures like frost, drought, animal grazing, fire;
e) the need to be flexible with plant use and location as conditions change (eg: shade);
f) the need to plan for revegetation / succession of tree cover (see (b) above);
g) the value of considering local views / vistas in garden design, placement or training of canopy trees, features, larger shrubs in particular – borrowed landscape;
h) the importance of creating a smaller scale in large landscapes: garden 'rooms', a sense of enclosure, shape and shade, even if the garden appears natural;
i) the low cost of long term maintenance with little/ no watering (beyond the first summer or two, for 'delicate' plants, widespread use of mulches, no chemicals or fertilisers, building up depth of soil / organic matter on top of rock – ie: the overall sustainability of this type of gardening, especially in 'marginal' or difficult areas;
j) the opportunities such gardens bring for in-situ and ex-situ conservation of locally endangered or threatened species, seed banks and reintroduction into the wild of 'lost' native populations; benefits of working with local botanic gardens;
k) the educative potential of such places, using selected opening, publication of books, Mediterranean Garden Society magazines and website and conferences;
l) the potential tourism value of Australian 'versions' using locally native Australian plant gardens, or combinations of native/exotic, designed gardens as both educative tool and visitor attraction – something 'unique' or at least a local variation – the growing level of interest in this kind of locally 'appropriate' gardening approach.



left) View within the garden showing extensive use of shade and layering to increase the range of plants it is possible to grow, mulching and careful plant associations (in some cases mimicing nature) to create an oasis within a fairly parched, open landscape.

Right) dramatic view of a fenceline between the 'sheep park' and garden sections of the property, showing what an impact grazing has, as well as mulching (practiced in the garden, less so in the sheep paddock. Plants tolerant of grazing, poisonous or less-favoured, or rapid to respond are what grow 'outside' the fence.

2) Jardi Botanic de Soller (Botanic Garden), Soller, northern Mallorca

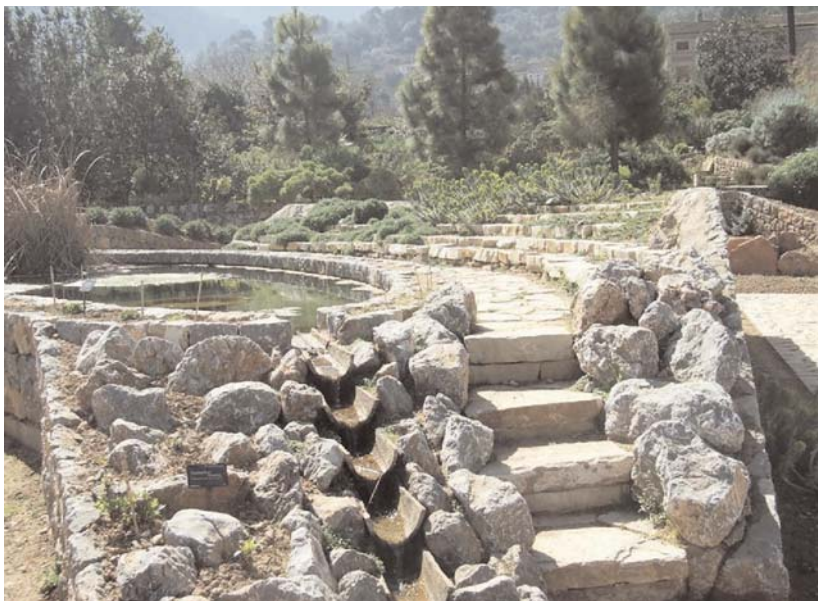
This is a 1985+ garden in an adaptively reused former 19th c. orchard estate, open to the public since 1992. It is Government supported but run since 1997by a private foundation, with a small friends group.

left) general view of the garden in its stunning valley setting. Note the mature date palms and deciduous lime tree, dating from the previous orchard/garden. Note also the raised beds with rock-loving mountain flora in the foreground. The garden is divided into areas representing distinct habitat ecosystems, eg: coastal, alpine, montane, endangered species, Canary Islands flora etc. Colour in the foreground is provided by spurges (*Euphorbia spp*.) and *Euryops spp.* daisy bushes.

A fee is charged for entry, and it has had 10,500 visitors in 2005. The majority, in order of magnitude, are German, English, Spanish and then Mallorcan. 30-40% are older visitors, with some in wheelchairs, and access is level/ there are ramps through the gardens. The goal is a maximum of 75-80,000 visitors/year. A cap is wanted to keep the emphasis on research, conservation and education. The gardens have a ten year plan focussing on education, promotion (especially re forestry), and ex-and in-situ conservation (in the wild).

Altitude: 60m ASL, annual average temperature: 17.6C (winter average 10C, summer av. 25.7C (max.32C last summer), snows are rare (they did get snow this winter, and regular February frosts, rainfall 750-879mm/year, calcarious (limestone) clay soil, pH 7.2 (basic). Artificial fertilizers are not used, compost is produced on site: the aim is to replicate natural growing conditions. Has 12 staff; 6 gardeners, 6 office staff.

Its focus is endemic Balearic Islands (Mallorca, Minorca, Ibiza) and western Mediterranean islands' flora particularly rare and threatened endemic species, as well as traditional cultural plantings such as ethno-botanically important plants, eg: food/fibre/medicinal use crops and old-fashioned/traditional varieties. This latter aspect intrigued me, taking a wholistic view of the islands' flora, and acknowledging long human occupation, plant introductions, modification.



Right) Area with aquatic and water-loving plants, mimicing natural habitat conditions and also full of ideas for home gardeners, and traditional techniques for moving water around (inverted roof tiles).

For example the Romans introduced olives, vines/ vineyards and fields of grain to the Balearics, from their occupation in 123 BC. The Moors from North Africa occupied the Balearic Islands from 902-1229 AD, introducing key crops such as the apricot and almond, and their ingenious irrigation systems (terracing, water channels, water wheels and in places aqueducts),

which remain in use in places today. Almond orchards in particular are a prominent feature of springtime Mallorca. A huge rise in the number of introduced species has occurred since the 1950s with increased tourism and migration from Northern Europe. (Seeling, C. & Landau, C., 2003)

Large areas of Mallorca were wooded, and later deforested for shipbuilding and construction. Introduced animals like sheep and goats and fire used to 'clean up' have inhibited natural re-vegetation, along with low rain. This has left either cleared fields/ orchards, and on hill country erosion and soil loss, resulting in scattered tree cover and two types of scrub (maquia = where woods burnt/felled, dominated by shrubs and small trees; garriga (French: garrigue) = left when maquia has been heavily grazed, mainly small shrubs, herbs and bulb species). More recently population growth by immigration and tourism and urbanisation pressures further endanger some flora types here.

The botanic garden has an active herbarium, laboratory, Germplasm seed bank and research program with a conservation biology focus, in partnership with a network of Ibero-Macaronesian biogeographic Botanic Gardens (this bio-geo-region covers all of the Iberian Peninsula including Spain & Portugal, the Balearic Islands, Canary & Azores Islands, Cabo Verde, and a small part of coastal Morocco/Western Sahara).

Left) Area of woodland, featuring evergreen/ holly/ holm oaks (*Quercus ilex*), white flowered laurustinus (*Viburnum tinus*), and typical understorey such as winter or lenten roses (*Helleborus spp*.).

A key goal is educating visitors about the flora of the Mediterranean basin, focussing on rare and endangered species, and re-introductions into the wild where possible in future.

Learnings were:
a) the easy integration of (desired) indigenous flora and existing 'heritage' including both structure/layout and exotic plantings pre-dating the establishment of the Botanic Garden, (eg: remnant trees of the former garden estate, lime tree, Magnolia grandiflora, fruit trees, vegetable and cereal crops, date palm 'avenue', drive(s), potted topiary (re-interpreted using indigenous species, eg: lentisc, Pistacia lentiscus, evergreen /holly/holm oak, Quercus ilex, buckthorn, Rhamnus alaternus) – a mature and integrated design approach to local heritage and a new use, also a non-purist (but concentrated) brief – interesting featuring of traditional crop and orchard plants of Mallorca including introduced, exotic plants, lost or forgotten varieties/cultivars – telling the economic and cultural history of this collective 'biodiversity';
b) clever adaptation of traditional terraced orchard estate structure to the new garden, with compartments featuring different thematic collections, eg: bioregions;
c) adapted, extended use of traditional Moorish irrigation system of an on-site well, a network of acequias /water channels, but used creatively as part of aesthetics also eg: 'waterfall' version using zig-zag pipe sections and 'leaks', rectilinear, other layouts;
d) clever design approach full of ideas for visitors in making parks/ gardens – general approach of recreating distilled natural habitats of the plants concerned (bogs, riverside, orchards, fields, coastal, woodlands, rockeries, mountains), but in an aesthetic way to also best display and allow access close to plants: steps, seating;
e) clear priority focus: 1. education: 2. promotion: 3. conservation as opposed to being a public park/ tourist attraction – they want interested visitors, emphasis on learning/value added visits (entry fee, structured learning programmes, no dogs, picnics, food not sold on site, limited car/ coach parking);
f) focus on didactic role: publication, website, on site learning programmes;
g) focus on practical conservation biology: in-situ and ex-situ conservation, seed bank, study of habitats of flora and growing needs;
h) focus on research and growing the number of students/ PhDs, international & local.

While most Australian Botanic Gardens do these things, the challenge for them might be in boosting their scientific or conservation focus and activities to have equal or relatively greater weighting (and explaining this well to the public and the politicians/funding bodies).

While there are spectacular exceptions (Arid Lands Botanic Gardens, National Botanic Gardens, Canberra, native annexe gardens in Sydney and Melbourne), it would be fair to observe that in Australia all Botanic Gardens also balance fairly major local/regional recreation and tourism uses, with expectations of free access. This pressure is intensifying with increasing urban densities and thus pressure on existing open and green spaces, meaning that science and conservation are probably losing out in management/ funding weightings.

Further, there may be opportunities to boost the educative potential of the gardens and their scientific programmes to the visiting public, thus boosting support and funding.

3) Interview with Bet Figueras, Landscape Architect, Barcelona

Bet was chief designer of the new Barcelona Botanic Gardens (see separate entry). She was also involved with the project to rejuvenate and redesign Parc Cervantes' rose garden, which changed its former modern hybrid tea rose displays into a more comprehensive collection of species, hybrids and cultivars telling the whole story of the genus Rosa, and its long association with humans, in trade, cuisine, medicine and perfumery, and garden ornamentation. Today the park has over 3000 varieties and species of roses (cf. it's former 170 hybrid tea beds and only 8 cultivars in its 1964 form), and this has been a 5 year project only completed in 2004.

Part of the park is dedicated to an annual rose competition, where citizens and visitors vote for their favourite new rose cultivar, and the winner is allotted space in the garden on a permanent basis, rather than just in this changing annual display. This competition has proven popular with the public and has raised awareness of roses in gardens, their variety and general hardiness. (In Australia on the sites of ruined house gardens or neglected areas such as old cemeteries often one of the few historic plantings to survive and thrive are old forms of roses, testament to their hardiness).

I questioned Bet about her new work and if any themes were emerging for her or in what clients ask for. She noted an increasing interest in ecological/ more native-plant based landscaping, particularly in non-urban work, noting that in some situations exotic plants work better, for instance citing Australian species bottlebrush (Callistemon spp.), lilly pillies (Eugenia spp.), she-oaks (Casuarina spp.), and Brachychiton spp.. NB (& this is my theory): This 'do better' moniker may be due to the relative absence of pests and diseases exotic species may enjoy in Spain, or to some Australian species' adaptation to depleted soil fertility, low moisture...

She noted how some Australian species are weeds in the Iberian peninsular, citing Portugal's banning of Acacia cyaniphylla, and Galicia's problems with Eucalyptus spp. (E.globulus and others much promoted for agricultural and forestry use for erosion control on hill country, which have 'escaped').

Spaniards are coming to a greater appreciation of their own flora, and to the loss of natural landscapes and poor management of many. She noted that some of this attachment could be a nostalgia for species people have loved or known in their youth, eg: rosemary, lavender, Spanish broom (Spartium junceum), as well as interest in lower water use and conservation.

NB: (Just on Spanish broom, Julia Lacarro Lopez, landscape historian/designer in Valencia, calls this species ‘Genista autopista’, mockingly, after its widespread use on motorway embankments)!

Left) Barcelona’s new Botanic Garden designed by Figueras, and significantly featuring native flora, and flora from other Mediterranean climate zones from around the world.

Figueras cites admiration for American landscape designer Steve Martino, active in the USA's southwest, New Mexico etc, doing large scale motorway and road-related works with a keen appreciation for the intense local light, strong colours, architectural plant forms, an ecological approach to plant palette and use or arrangement. These aspects might similarly describe her work, a current example being a resort hotel complex in inland Catalonia which intends to group buildings around a completely reconstructed native flower meadow with natural drainage, which might have preceded the existing buildings' existence on a formerly rural site.

She considers that perhaps a lack of horticulture in new or recent parks reflects a low or decreasing appreciation or knowledge of horticulture in general, explaining that Spain is on the whole highly urban (some rural regions have massive depopulation continuing, having started in the 19th century and intensifying late 20th). Most Spaniards have some rural connection in their family or recent past, to their pueblo (village) or farm, but a lot of that is a negative association with rural struggle or poverty, which was left behind to go to the city. This is in contrast she noted to the English people's (general) strong positive association of rural landscapes as both scenery and as national identity-maker. She notes this is changing.

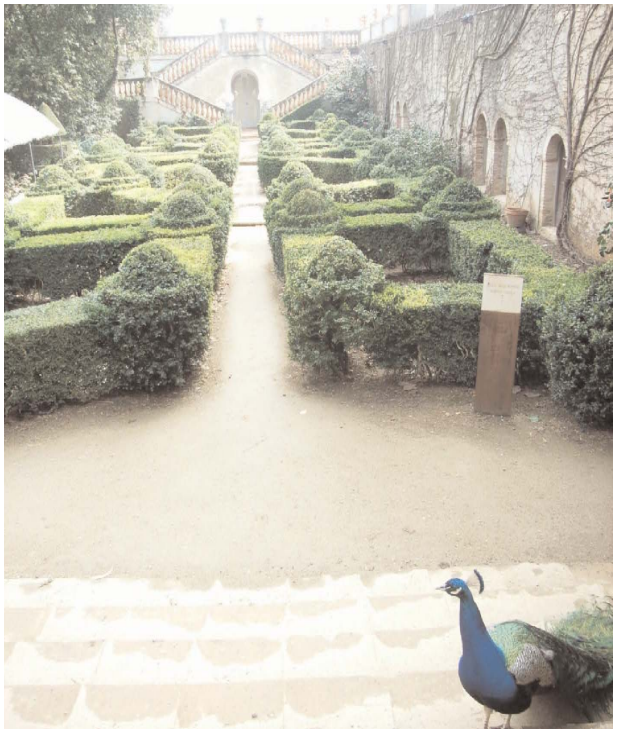
Figueras considers that the Spanish have not finished experimenting with exotics for the Catalan coastal climate, for example Australian plants. While green lobbyists have given eucalypts a bad name for some in Portugal and Spain (particularly the moister north-west), this of course is not the eucalypt's fault but its planters and promoters! Plenty of other species have wide application and uses in the right location. (NB: the same sound advice applies in Australia, particularly to street tree use of eucalypts, where tall forest species such as *E.globulus* have been inappropriately planted in streets below electrical wires, where a smaller growing species (eg: Mallee forms) might need no pruning for height.

4A) Jardin del Laberint d' Horta (Garden of the Laberinth, Horta), Barcelona

Right) the labyrinth at the park's centre, from one of the two temples keeping watch over it. A range of park areas from formal and open to completely wild and informal, eg: pine and oak forest above, make up the park, much to the delight of visitors.

This is a former private Baroque country estate garden from 1791/1800s. It has been a public park since 1897, having been restored in 1971 and 1993-4, and its setting is increasingly suburban today (with a University campus and high-rise flats). The main learning from this wonderful place is the fragility of private gardens, inevitable risks in their changing function to become public parks, and the subsequent need to regulate and monitor visitation to conserve the place as an 'attraction'.

The park has a set 'capacity' of 750 visitors per day, and monitoring of wear and tear. An entry fee is charged (<A$4) and hours are restricted to protect the park. The same is the case with Jardines de Joan Maragall on Montjuic hill, although more recent. These are free to enter but only open on Sundays. See next section for observations on Barcelona Parks & Gardens Dept. management system for more.



It is important to have enough resources to be able to respond to damage quickly, eg: to fence off/close areas to allow their careful repair, (rather than its exacerbation, inevitable public negative reaction and the downward spiral of vandalism).

Sections of the maze of cypress (at the park's heart and its most popular feature)are quite liable to foot and other damage, with sections fenced off to allow re-establishment of hedges, path restoration, de-compaction, gap filling etc. Thus they require constant monitoring and high staff levels to keep in good condition, and open.

Left) A formal box hedge parterre garden section of the garden near the 'castle' is currently closed to the public, although it can be viewed through locked iron lacework gates, and signs explain it is too fragile to withstand visitation. This compromise seems sensible.

Historic gardens need higher number of staff with site-specific training. For instance staff may need to be made aware that they should not necessarily use the same techniques and materials, or seek the same results as they might elsewhere in modern parks. See (4B) below.

Artesian (underground) water is used for irrigation, and signs note to park users that the water is not potable (drinkable) except in specified locations from drinking fountains. This same system appears to apply to most if not all Barcelona parks.

4B) Barcelona Parks System, general observations

Barcelona's climate is Mediterranean coastal, at latitude 41 degrees, with dry summers (30% of the year is normally dry), long days and high radiation. Normal rainfall is 590mm, mostly falling in winter-spring. Frosts are not common, for instance from 1987 until now there have been few, although this last winter has seen many frosts and even a brief snowfall - damage being notable throughout the city on tender plants (indeed throughout Spain, as it later proved). Average minimum temperature for Barcelona s 9.4, maximum is 24.4 degrees C.

The City Parks & Gardens Department has an plan of management for the whole suite of lands administered, the Plan for Green Spaces, prepared by a mixture of technical staff and directors. This covers a range of issues (water, plants, soil, beaches, fauna, uses, studies, promotion of flora and fauna/ natural values, sustainability and Agenda 21 compliance). In 1994 European countries including Spain held a conference/ Towards Green Space, which set a model strategy and principles for green space management, a 10 year plan. This guide is used, along with Barcelona's Green Spaces plan, to revise shorter term local park/ garden plans when needed.

The general concept of gardening is very different from that of northern Europe's, with different (lower) levels of maintenance, lower water use, the types of space provided, an emphasis on recycling and organic pest and disease management, mulches etc.

The Department have 3 models they apply according to different climates and situations, being:
1) Mediterranean; (based on traditional Barcelona, Spanish, Southern French and Italian gardens);
2) Atlantic; (higher rainfall, cooler species);
3) Continental; (hardier).

The City has an extensive system of 67 parks, which include hard paved urban plazas, designed green spaces and parks, planted motorway and street medians, planter boxes and urns in laneways and plazas, and more.

Parks and public gardens are classified into four types, with differing levels and types of management accordingly. These are:
1) Historic or thematic parks;
2) Suburban and urban parks, roadside plantings, urban plazas;
3) Forest parks and sloping sites (eg: Parc Putget);
4) Small parks, small plazas, street trees.

Right) An example of a thematic park: Jardin Costa i Llobera - a world-renowned collection of cacti and succulents, with many palm species and Australian plants such as brachychitons and callistemons, on the side of Montjuic Hill overlooking the port. Note *Aloe* flowers (orange) in foreground. The garden's elevation and aspect allows a milder microclimate than the city proper, which means more tender species can be cultivated here. Despite this, a harsh and long winter has meant some frost damage this year.

Left) Parc del Clot - an example of recycling of former industrial sites in mid-ring Barcelona for much needed open space. Note flats in rear right. A former munitions factory was demolished, retaining this one wall for a water feature. Plantings are mainly native plants, and hard paved areas allow walking, ball games, dog-areas etc for inner city residents.

The Department gained ISO 14000 certification (International Standard) in 2003 for its system of reclamation, cleaning up, reinstatement and integrated management of the City's public beaches, and its system of open/public green space management.

Active current priorities include seeking to:
- increase the use of freatic/subterranean water for irrigation;
-decrease use of potable water;
- replace aging street trees with species better suited to the climate and situation;
- increase overall areas of green space, particularly in parts of the city with none/little.

An example is that the Gothic Quarter and former industrial /working class suburbs which have the least overall green space (and highest densities).

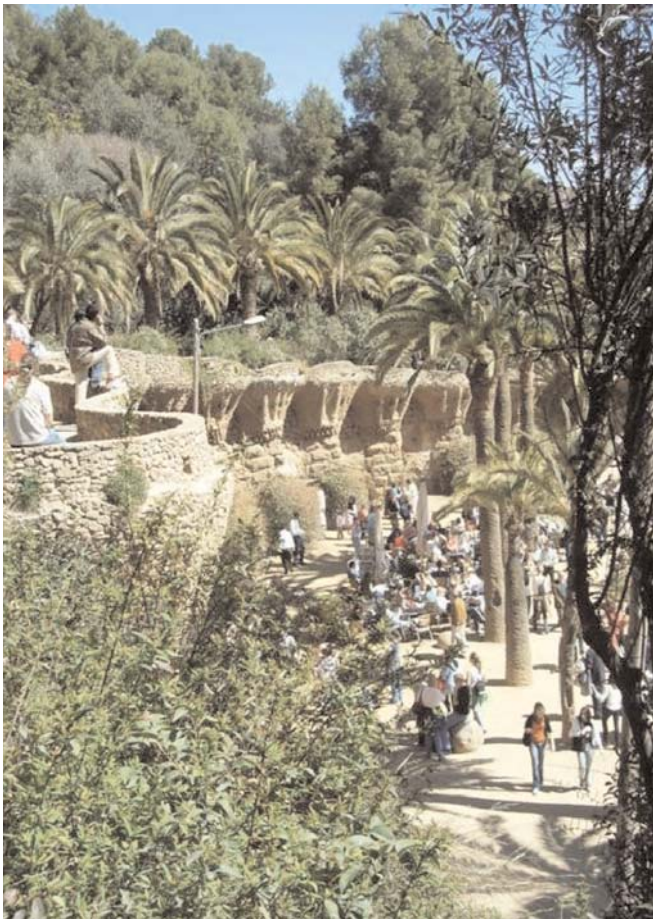
From 2002-3 some 30 hectares of green space were added, an increase of over 2.8% overall, much of this being the massive 13 hectare park created on former industrial land in the Nou Barris suburb in the west (an 8% increase in green space in that suburb).

For detailed learnings on Barcelona's Park & tree management issues, see **Appendix A**.

Park Guell

Park Guell is the best and most famous example of Art Nouveau landscape-architecture, and a World Heritage Site. Count Eusebi Güell, a wealthy businessman, conceived the project as infrastructure for a speculative garden suburb on what designer Antonio Gaudi described as 'the treeless mountain'.

It was unsuccessful in attracting much investment (with only a few sections bought and private houses built), and the only parts to be completed, before worked stopped in 1914, were a grand entrance, two houses, 3km of paths, a large open terrace and the hippostyle hall under it, planned as an underground market. Both men intended that the project would express the spirit of Catalonia as a potentially independent nation.



Right) detail of Park Guell's 'front' end which features large paved areas for strolling, sitting and views back to the city. Gaudi made a series of ramped roads and tracks up the hillside, allowing interesting views out across the valley, into and across the park itself. Distinctive rockwork, plantings and detailing (eg: extensive sculptural supports for elevated paths, and mosaic work on bench seats, walls and signs make the place great fun.

The site is set into the hills overlooking Barcelona. Its design has an obscure symbolic content.

Left) Climbing the park's ramped roads, the 'front' areas of more urban form and more exotic plants give way to what is actually a large, sloping nature park. This has been revegetated from a relatively bare hill to an almost natural wild pine and oak forest, with wild lavender, viburnum and rosemary under-growth. For residents of a densely packed city to have ready access to such 'wild' areas close by is a wonderful thing. Whether such an outcome might have happened had sales of housing lots succeeded and private owners with different ideas, is food for thought. A failed housing estate is today a much loved urban park.

Shapes and colours were inspired by natural forms which Gaudi, a devout catholic, saw as instances of divine craftsmanship. Serpentine terraces, seats, galleries and arcades run up the mountainside. They are decorated with polychrome mosaics of broken stone, ceramic pots and old tiles. The bright colours are reminiscent of traditional azulejo tile work. Quoting elsewhere, the design has an energetic brilliance which belongs more completely to the twentieth century than any other public park made in Europe pre 1950. (www.gardenvisit.com/ge/guel.htm).

The site was acquired by the City Council and turned into a public park in 1922. Thanks to heavy tourism promotion, proximity to the city and good transport, this place is reputedly now Spain's most popular tourist destination, outstripping even the Alhambra. My observations in several visits were that most visitors do not go beyond the front 'architectural' parts for any distance, and here high levels of paving absorb foot damage, and plantings are either absent or perimeter trees only.)

Away from the 'front' area the park is huge, climbing a hillside with forested more natural areas, threaded with walking tracks and lookouts, far less heavily used.

Right) View of the new Botanic Garden from the entry building, with Montjuic Hill behind. Designed by Bet Figueras.

The Herbarium and exhibition building is at top right. Diverse habitat zones are provided, with aquatic plants, olive and maquis woodland, alpine and montane flora, and sections from Mediterranean climatic zones around the world.

In mid distance is the Canary Island flora section featuring C.I. date palms (*Phoenix canariensis*), C.I.pines (*Pinus canariensis*) and much more.

5) interview with Nuria Membrives, curator, Botanic Gardens, Barcelona

This is a recent (1999), purpose-built botanic garden on the eastern side of Montjuic hill, focussing on Mediterranean climatic zone floras from around the world (SE Australia, S Africa, W California, W Chile, the Mediterranean Basin), which has effectively replaced the historic garden.

The old Botanic Garden was begun in 1930 by Dr. Pius Font i Quer, in abandoned quarries on Montjuic's west. In 1940 Dr Antoni de Bolos began to add new collections from the Pyrenees and the Balearic Islands.

Left) sign showing the Mediterranean Basin (conca), the main focus of a large section of the new garden. Number of botanical species and percent of endemic species (found only here) are given. A focus is education on appropriate plants for Barcelona's climate, with hot, dry summers, and cold, moist-wet winters. Another is conservation of native flora. Each different climatic zone (eg: Chile, Australia) has similar signs. Other signs point out which season, and for how long, the characteristic period of water-deficit is, noting that this is a normal part of the climate, not an exception. somthing people form better-watered zones may not appreciate.

The gardens have played an important role in preserving biodiversity, with plant re-introductions to the wild where populations have been lost.

Their stability was seriously affected by construction of elevator accesses to the new Olympic stadium in 1986, and they were closed down in 1992. This led to impetus to build a new garden as a centre for conserving Mediterranean flora in Catalonia. Key strategies include the living collections, a germplasm (seed bank) and activities for schools, universities and the public.

The garden's design is to be a natural museum. The institute is part of the Heritage Department (along with museums). Other drivers are the Botanical Institute, a research centre focussing on Mediterranean flora, the herbarium with some 750,000 dried specimens in three sections: historical, general and cryptograms (lichens & mosses), an extensive library and the Salvador Natural History Cabinet Museum, compiled over the 18th and 19th centuries by a private Catalan family (extensive library and herbarium).

I asked what the intention is for the old gardens, now bisected by public elevators to the stadium. Half is currently open to the public, with some new plantings, weeding and interpretive signage. Some of the largest, oldest trees in Barcelona are here, perhaps because it is well sheltered from winds with its own microclimate. Plantings are a mixture of Mediterranean and exotic species. The other half is not open to the public, has a two storey building in the centre and a range of plantings.

The plan currently is that the two gardens will be maintained and will have complementary functions and programmes. Efforts are being made to increase the use of the old gardens for educational activities and events, eg: plants useful in cooking, perfume, medicine, painting etc. There will be less of an emphasis on intensive horticulture (as was the case in the 20th c.).

A partnership with a Barcelona Gardening School is being explored for an active horticultural area within the old botanic garden, for compost making and other activities. One problem is that their 'clients' are students, who are absent for 3 months each year, so summer maintenance is difficult.

With the new botanic gardens the future goal is to be self sufficient with water, and have no irrigation (using Mediterranean zone species which require little water). At present new plantings are irrigated, by hose and drippers, or in periods of droughts of over one month, trees and shrubs are watered also. There is some need

for a trade off in watering new/ailing plants, in running a garden open to the public who perhaps expect a certain standard of plant 'presentation'.

The garden's altitude is c.150m ASL, with a 50m range on site. Summer maximum is 35C, winter minimum 0C, and this last winter has been late and hard, (-7C) with snow (1st time in 20 years) and frosts causing damage to more tender plants. Rainfall normally is 600 mm per year, equal to Canberra's. The University of Barcelona has set up a meteorological station on site to monitor weather but no data is available to comment on my questions about climate change, as yet.

Right) view within South-African section, showing Veldt daisies (*Dimorphotheca spp.*).

A prominent stone pine (*Pinus pinea*) with typical flat top, has been retained from the site's former orcharding use. This species is native to the Mediterranean, and much loved.

Note also the use of corten steel as retaining walls, ramped paths for ease of access, and minimal clutter, which typify the design detailing here.

Site exposure is an issue, with it on a hill top (effectively), particularly drying winds from the east. There is little natural shelter, the soil is calcarious (limestone) and formerly was poor people's housing, orchards and a rubbish dump. European Union funds were used to rehabilitate it and remove up to a meter thick layer of buried rubbish in places. Some mature fruit trees (olives, almonds, figs) have been retained, both for shelter and interpretive purposes. Plants requiring acidic conditions have had their soil replaced, and retaining walls added to build up soil level or large planting holes with good soil used to speed establishment.

Natural site rock has been widely used in retaining walls which give the site some of its character, particularly in the Canary Islands and Australian flora sections where good drainage was important. On-site made compost is widely used at planting, and a programme of ongoing fertilisation is used, especially for acid-loving plants (iron chelates are used to neutralise what is naturally a basic/limestone soil).

Irrigation is limited, with drip-systems targetting needy plants or newly planted areas.
Irrigation water is artesian (underground), pumped up from La Rambla (Barcelona's most famous street is actually paved over an occasional water course (the name's meaning in Spanish is just this), stored on a large on-site tank. Rainwater is not collected. Reticulated water is used in the lake, as the artesian water has micro-organisms and algae in it which cloud the water. A collection of bonsai trees (a political donation) uses distilled water strictly.

The Gardens are working in partnership with a network of Andalucian botanic gardens on a project about ethnobotanical plants (eg: used for food, medicine etc), and a section of the gardens is devoted to this area of research, with plant material sourced from this network.

Each section represents a Mediterranean-type climatic zone (California, Sth. Africa, Chile, SE Australia). These are based on Ms Membrives' travels and liaison with colleagues in these regions, sourcing plants, seeds, studying plant associations so that these can be replicated in the Barcelona garden. Some sections are new and little-developed, depending on funds. For example the Chilean section exists, but a large extension to it awaits future funds. Design students from Barcelona University have been used to design its layout and features. The Californian section will similarly be extended when funds permit.

Weeds are a problem, on a large site bordering less cultivated areas where seed of weeds can easily spread. Mulches are much used, and whipper-snippers to control 'turf/meadow' height, and areas are mulched with gravel where necessary (cacti), or bark/composted material.

The City Council provide the budget, and entry fees go to the Council. Ms Membrives could not provide information on the amount. (Later observations (see interview with Patrizia Falcone at (28)) would suggest funding is political, with up-front funding for new parks/makeovers liberal, and follow up funding minimal.

The garden's staff is small, with 12 maintenance staff, 6 technical staff, 2 specialist botanists and 2 agronomists, the latter two 'types' both shared with the Botanical Institute on site. This body has a mix of local Council and Regional Government funding.

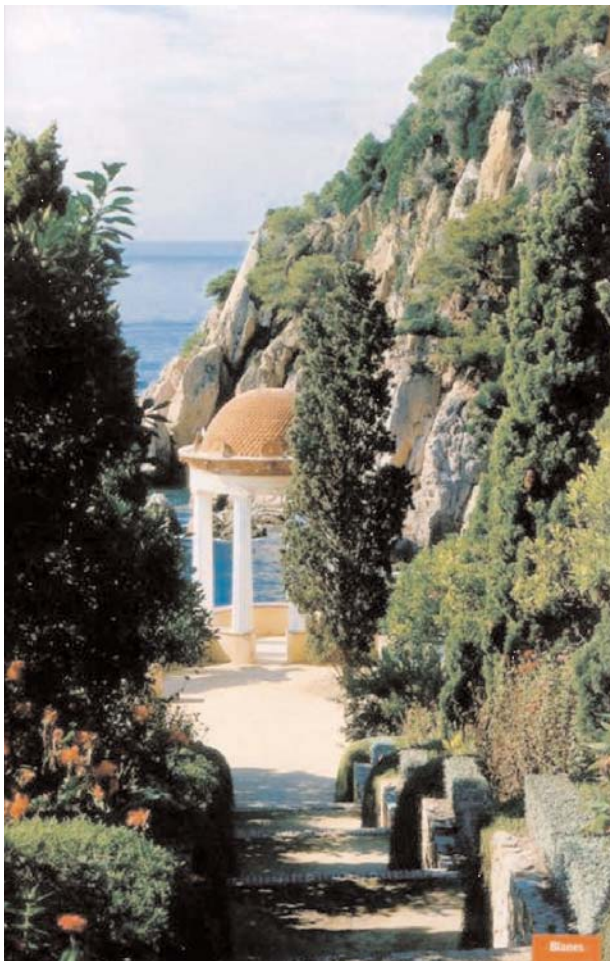
For more detail on learnings from the Botanic Gardens see **Appendix B**.

6) Jardi Botanic Mar i Murtra (Sea & Myrtle Botanic Gardens), Blanes, Costa Brava

This is a scientific garden (its formal name is Estacion Internacional de Biologia Mediterranea) on a private estate assembled (from farms and vineyards) from 1920 by German industrialist Carl Faust, with plantings from 1952 on. It is run by a private Trust set up under a deed from Faust's will. Mar I Murtra is a Mediterranean zone thematic garden, with a large area of indigenous nature reserve (16ha/40 acres with 150 species, some in danger of extinction, which is a conservation and study zone, non-accessible to the public), and collections (6000 species) from similar climatic zones around the world.
These include SE Australia (featuring mallee eucalypts),

Sth. Africa, W California, W Chile, the Mediterranean Basin), including cacti and succulents from America and Southern Africa, in two rock garden areas, a collection from China & Japan, another of bamboos, and another of Araucarias or southern conifers, including Australia's Bunya Bunya pine (*A.bidwillii*). The garden has a magnificent collection of cacti and succulent plants from around the world (Africa, America).

Worryingly the Director that I had previously arranged to interview had just left the gardens, after a management restructure with the Trustees putting in an administrator and revising both their role under the Trust Deed and current gardens priorities. What appeared to be unfortunate circumstances where there might be no-one I could meet, was not so as it turned out.



Right) view down key axial path in lower garden to a small temple to Linnaeus, father of botany. Note the site's dramatic topography, tumbling down to sea coves. Note also careful species selection, including in this area Mediterranean cypresses, mandarins, silver germander (Teucrium fruticans), and trailing ice plants (Lampranthus deltoides) covering raised planter beds. Much of the site's higher land is a dedicated nature reserve, off limits to the visiting public. (Photograph Source:a Tourist Brochure produced by the JBMM garden)(image was taken in high summer)

Luckily through Nuria Membrives at the Barcelona Botanic Gardens, I got to meet and interview the long-time curator Ms Amparo Ardanuy and Trustee Christopher Witty. They were as interested to learn from me as I from them, particularly about similar places in Australia and New Zealand, forms of management and especially similar Trust arrangements, priorities for management/ curation, roles and activities of "Friends" groups, public advocacy and recruitment of support etc. I have sent information on these topics in return for their generous hospitality.

The focus is on studying and conserving plant species found in restricted ranges or under threat. The gardens have a Seed Bank, to facilitate exchange among botanic gardens. An old quarry site has been converted into an aquatic garden area.

The whole site is itself an attraction, being on the edge of the town of Blanes, on a very steep series of hillsides tumbling into the Mediterranean, with spectacular coastal views, both long and short, to small coves. The gardens exploits these, with a series of lookouts perched on the cliff tops, and some plunging walks with steps and avenues (eg: of cypresses) leading down to these.

A small open temple dedicated to Carl Linnaeus, Swedish father of modern botany, is located in the most spectacular lookout spot, at the base of a long series of steps, framed by an avenue of mandarins, cypresses and weeping ice-plants in retaining walls). This forms perhaps the best known view of Mar I Murtra.

Faust's will required that the trust be comprised of people of more than one nationality to oversee the garden. A trust with 10 trustees (5 German, 3 Spanish, 1 English, 1 Swiss) works with a director and 13 staff (plus 5 casuals), under statutes which have lasted until 2005 and have just changed (in March 2005). The primary aim is scientific, along with education and other goals. The staff are a mixture of specialists in Mediterranean plants, palms, cacti and gardening in general, education staff and conservators responsible for the technical aspects of garden care.

Clearly the recent departure of a long-term director and appointment of a provisional director had ruffled some feathers, which will be worked through with a new director and Trustees. Previous Trust Presidents have apparently been over-dominant in decisions, and not very democratic. Little past effort has been directed to looking hard at the Statutes and attempting to change them (eg: skills based Trustees, and Trustees not appointing their own successors/family members!).

The provisional director is spilling all positions and setting up a committee to consult outside the Trust/gardens staff on the future directions/priorities for the Trust. Clearly some refocus may be needed of strategic directions, role of trustees, type of director wanted (botanist, manager, educator, strategist), type of educational audience/ visitors wanted, future goals/ priorities etc - for discussion over the short and medium terms.

Christopher Witty the Trustee I met was keen to hear more about "Friends" groups and Trusts of a similar nature in Australia, and I have sent him information on the Royal Botanic Gardens Sydney Trust, and Centennial Parklands Trust and a number of similar Trusts in New Zealand.

Mar i Murtra Botanic Gardens gets approximately 120,000 visitors per year, mainly from March -April, or between October and November. It claims to be the most visited garden in Spain. Visitors to date have mostly been foreigners, or wealthy Spaniards on holidays, there seeming to be little local interest until recently, which could be due to a relatively low level of culture about gardening (cf the UK). A goal is to increase the number of school group visits up to 9 times the current level, and to increase the number of guided tours/visits held on the site.

Right) Two old friends, for whom I was a gardener when at high school in New Zealand. They typify the changing demographics of the Costa Brava, having retired to Barcelona and later to its coastal hinterland, seeking warm climate living, close to Europe but kinder in terms of winter. Note the steep site, with plunging avenue walks leading to look outs over the coastal coves. Trees are Mediterranean cypresses, understory is mostly *Aloe* species succulents from South Africa, and palm frond is a jelly palm (*Jubaea chilensis*). The garden has a rich and diverse plant collection, arranged thematically, including Australian mallee vegetation.

The Costa Brava is an area traditionally rural and thinly settled, which in the 20th century has seen a large increase in tourism, seasonal and permanent living (retirees and commuters) with improved rail and road links to Barcelona.

Local populations have grown in numbers, social make up and complexity, and so gardening culture

is changing with a slow increase in interest, wealth and disposition. This is happening across Spain, although in purely economic terms, Catalonia, Madrid, Valencia and the Basque regions are Spain's strongest growing.

In Southern Europe in the past the wealthy lived in the large cities like Madrid and Barcelona, and smaller cities and towns were provincial, local Blanes for instance having no secondary school until the 1980s. (I noted a brand new library had almost opened in Blanes on my way to the garden).The Middle class in Spain pretty much post dates the 1960s, unlike many industrial revolution nations to its north. Spain's youth are interested in travel, and exposed now to many other influences, such as environmental and conservation movements in other countries.

The garden's altitude is only 40-60m above sea level. Blanes' climate is thus generally mild, with July maxima of c.40C but frosts are not unknown in January-February with minima of -2 or -3C every 4-5 years, eg: 1984, 1987 and 2005. More severe frosts of -8 or -9C over a week are known every 20 years or so (much frost damage was visible on tender plants in my visits). This last winter has been uncharacteristically late and severe. The soil is silicacious or sandy, making it well drained, but pH neutral, suited to many plants, with appropriate moisture retention additives. Staff experiment with mulches and chemical additives to increase moisture retention.

Areas of the gardens are devoted to particular regional 'Mediterranean' floras such as Cretan flora (*Phoenix theophrasti*, a date palm species from Crete the only other palm species native to the region, apart from *Chamaerops humilis* the fan palm) and the rock rose Cistus incanus ssp. creticus with red flowers. Other areas feature Canary Island, North African, Iberian peninsula flora, as opposed to Californian, South African and Australian 'Mallee' flora.

Staff try to avoid using chemicals (eg: herbicides), making hand weeding of problem species such as *Oxalis* spp., *Freesia* bulbs and onion weed (*Allium roseum*), all a challenge in places.

Plantings are mainly climbers, creepers, annual and biennial shrubs, and bulbs, with some trees although trees are not the focus. Some of the oldest plantings date to the 1920s, and include large specimens of the succulent *Beaucarnia*, gums/mallees (*Eucalyptus spp.*), araucarias (including Bunya pines & Brazilian species), and Canary Island pine, (*Pinus canariensis*) and a collection of palm species. A large Australian tree fern (*Dicksonia antarctica*) survives from the 1950s with some sprinkler assistance (amazing in this climate, cf cool, damp valleys or forest floors in south-eastern Australia).

Mar i Murtra Garden Trustees are in discussion with the owners of two private gardens in the Costa Brava, Pinya de Rosa at Lloret del Mar and one other, and Barcelona's Jardin Mossen Costa i Llobera (cacti and succulents), about possible collection increases or interchange in the future. I had hoped to visit Pinya de Rosa but was told there was noone I could meet to discuss its management, so declined.

For more detailed learnings from Mar I Murtra, see **Appendix C**.

7) Observations from interviewing art historian and landscape historian Luisa Roquero, & landscape architect Soledad Martinez Munoz, Madrid:

These two women are co-authors of two 2001 books for Ministry of Education, Culture & Sport (National Government body responsible for heritage), *Patrimonio Paisajistico Espanol (Spanish Landscape Heritage), a brief colour overview of the resource,* and *Proteccion de los Jardines y Sitios Historicos – normativa, analisis de la situacion, (Protection of Historic Gardens & Sites – standards, analysis, status)*, a critical analysis of the history and current state of understanding, protection and management of Spain's collective resource of gardens, parks and cultural landscapes);

Ms Roquero talked much about the loss of traditional irrigation systems, and how tourism and pragmatism have led to the unfortunate loss or conversion from traditional Moorish systems of acequias/canals and flooding of beds, to sprinklers and drip irrigation. She noted how the Alhambra and Generaliffe gardens have been compromised in their management and presentation for mass tourist (pressure to have gardens looking permanently at their best, year round), and noted how the Botanic Gardens of Valencia have put in a modern irrigation system, although their old system may still be seen.

She talked about how north-western Spain (eg: Galicia) and Portugal, with its Atlantic climate of higher rainfall, has a strong gardening tradition much like northern Europe, and how Southern and Eastern Spain likewise from the Moors have a strong agri-/horticultural tradition, eg: balconies and patios, as well as huertas or

productive 'orchard-estates' or farms. She noted that the rest of Spain does not have such a tradition (or so strong a one), with a much harder, more extreme climate, and accordingly economic development. A garden is still seen as a thing of relative luxury to most Spaniards.

The wealthy are interested in gardens as settings (cf for food or horticultural enjoyment), sites for parties etc. A rising market for magazines (Casa y Campo, Casa y Jardin/House and garden) are putting some pressure on for 'makeovers' and copycat northern European styles of gardens, but again predominantly with a 'lifestyle' bias, often full of paving, seating and entertaining areas. Immigrants to Spain are bringing with them other ideas (northern, well-watered ideas) of gardens with lush lawns (never a real possibility in much of Spain) after the English fashion.

Friends groups do exist (Royal Botanic Gardens Madrid, La Romeral garden, home of (deceased but clearly influential in terms of historic landscape education) landscape architect Leandro Silva in Segovia), but these are small in number (about 30 for La Romeral, about 600 for Madrid Botanic Gardens, cf 7000 for Sydney's!).

Ms Roquero noted how the Barcelona Parks Department run a good programme of education and training for staff and the public, which is perhaps unique in Spain.

She noted how plant supply is difficult in Spain, with most nurseries in France or Italy or Holland, growing garden plants in any quantity or quality. Native plant nurseries are quite rare, although there is now some demand for indigenous plants, just little supply. She added that there is no Spanish Nursery Association. Apparently France has a nursery, some 20 years old, specialising in native plants to the Mediterranean region, which is very good.

She cited little debate in Spain about changing irrigation systems, updating gardens, plantings etc, mixing of old and new plantings in historic gardens. While there is a level of debate and understanding and this is growing, it is still small, in comparison with, say the United Kingdom. Accordingly standards of gardening, horticulture, etc are generally lower in Spain.

Ms Roquero invited me to attend a talk she gave to a group of landscape architects, of about 20 people, on Chinese gardens, based on a recent tour of that country. This appeared to be a rare chance in Spain, with little opportunity otherwise to see such 'exotic' treatments etc. I was lucky enough to meet both Julio Lacarra Lopez, (see later, under Valencia) and Soledad Martinez Munoz at this talk, and receive a copy of the book Ms Martinez & Ms Roquero wrote assessing the current status of historic garden, park and cultural landscape conservation for Patrimonio Nacional, the central Government heritage agency managing ‘Royal’ properties.

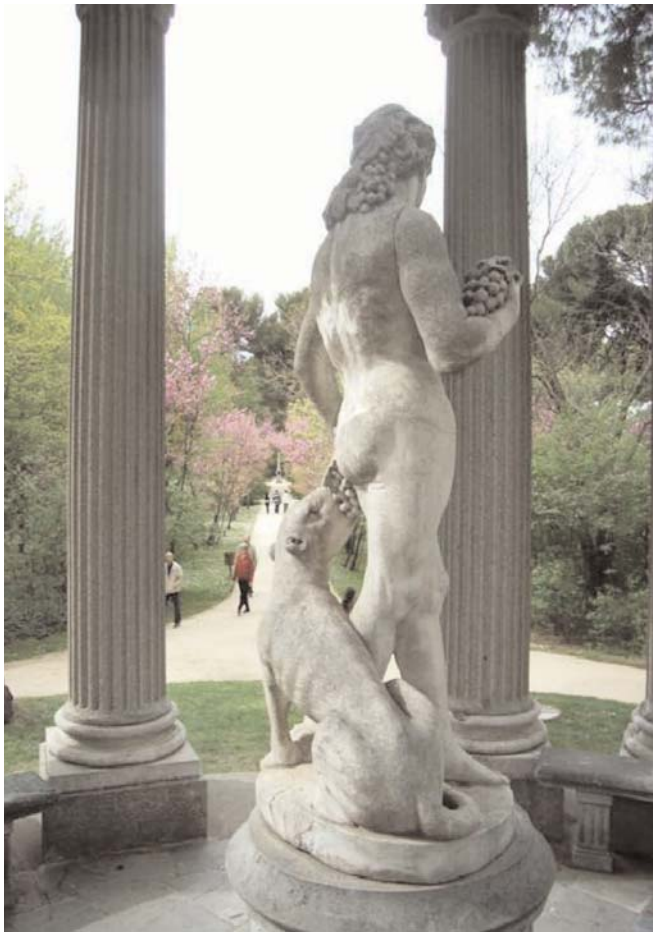
Soledad Martinez Munoz (left) and Luisa Roquero inside a lilac ‘wood’ at Capricho de la Alameda (poplar grove) de la Osuna, outside Madrid. I was lucky to meet these women and hear of their important work in undertaking a critical review of Spain’s system, the needs for better recognition, protection and management of itshistoric landscapes, parks and gardens. They were generous with their time and information, for which I am very grateful.

This review was extremely interesting to me, giving a history of heritage legislation and protection in Spain, which for historic gardens and cultural landscapes predates similar moves in Australia (national parks excepted). However clearly theory is one thing, and practice is another, in terms of having: widespread actual heritage listings across the various regional Governments; broad understanding of the type of heritage and its conservation needs; integration of such needs into regional planning and development decisions; practical conservation based on historic research and authenticity; high and agreed standards of maintenance and care…

The actions recommended are equally applicable for Australia, where despite years of debate in conferences on cultural landscapes, few are given any real form of statutory listing or real legislative protection, and much confusion remains over both the 'front' end of the process, ie: identification, let alone clarity about the 'rear' end, in terms of active conservation, protection and integrated planning decisions to care for these places.

For a copy of the summary recommendations of this review, see **Appendix D**.

7A) Capricho de la Alameda de Osuna, Barajas, Madrid



This is a 17th c. Ducal country estate, with a modified 18th and 19th century garden, a public park since a 1945 restoration). A spring visit was very well timed, the gardens featuring a 'wood' of pink flowered Judas trees/trees of love (*Cercis siliquastrum*) and Persian lilacs (*Syringa persica*). This is a romantic 19th century garden, overlaid over older more formal gardens, on Madrid's outskirts, open to the public on Sundays only. It was a private garden created by a remarkable woman, the Duchess of Osuna, in a pastoral style typical of the Enlightenment in 18th c. Spain.

The garden is entered by a circular plaza, and linear walks leading to the small palace pavillion, flanked by paths melting uphill into romantic woodland paths of a more sinuous nature, with various 'caprices/capri-chos' such as rustic hamlets, pavilions, statues scat-tered throughout.

A series of 'features' includes an artificial lake with funerary island and fancy boathouse, round dance hall, Apiarium (where glass hatches allowed inspection of the bees making honey), rustic her-mitage, rustic house, labyrinth, and play fortress, in brick. Statues in key axial places imbue playful symbolism to the grounds, for instance Bacchus, god of wine and sybarism being contrasted with death at the other end of an avenue – the 'wages of sin'…!

One of the garden's many 'caprices'/caprichos/ jokes, a temple to Eros, keeping a willing and ready eye on nearby Venus down the avenue. The garden has 'one of everything', imbued with mythological ideas and prompts. The pink blos-soms are Judas trees, which the Spanish call 'arbol de amor'/tree of love, after its heart shaped leaf.

Near the palace pavilion is a geometric garden realised by Javier de Winthuysen in 1945, (a landscape historian who worked for the central government in the mid-20th century surveying Spain's historic garden classification and providing conservation/ restoration advice).

7B) Aranjuez Royal Palace grounds and outer rural and orchard/cropping parts of (1580-1775) estate of Aranjuez/ Huertas historicos del Picotajo

I visited Aranjuez thanks to the kindness of Luisa Roquero & Soledad Martinez Munoz, who expertly guided my around and explained the place's complexity. Without these two women I would have remained unaware that it was more than the Palace complex & adjacent city.

Aranjuez - is listed on the World Heritage List as a cultural landscape '*the coming together of diverse cultural influences to create a cultural landscape with a formative influence on further developments in this field...a seminal stage in the development of landscape design'.*

The original palace grounds created for Phillip II were renowned for their green tunnels and rose hedges, but were transformed in the 18th c. when the avenues of Oriental planes (*Platanus orientalis*) were planted.

Left) Aranjuez from the air - where the Palace (white/fawn) and town can clearly be distinguished, as can the palace's original system of orchards and farmlands, with radiating 'stars' of roads, lined with plane-tree avenues. This wider landscape setting remains, although unfortunately is not managed nor promoted as an integral part of the whole complex, where its food and fibre came from, and carriage rides were taken.

Four main gardens make up the central complex, the King's, Parterre, Island and Prince's garden. Proximity to the Tagus River means good soil and ample water, and the trees reach a great size.

It also means productive farmlands, and Aranjuez was and is also a much broader landscape complex (like Versailles) with fields, and orchards (huertas), and hunting grounds. Remnants of this system remain, and with my two able guides, I was treated to an introduction to this forgotten cultural landscape of farms and orchards (huertas), and its finer detailed features.

These are the historic orchards and farmlands providing foods for the Royal table, surrounding Aranjuez palace and its formal gardens, forming its immediate and wider landscape setting over the Tagus River.

Realised in 1580 by Felipe II after drawings of Juan Bautista de Toledo and developed over the following centuries, being completed in 1775 for Carlos III. They are on a fertile plain with alluvial deposits, between the rivers Tajo/Tagus and Jarama.
Their elements include radial roads with plane tree avenues lining rural roads between fields (and glorietas or 'plazas' where stars of these roads converge). This whole pattern predates most of the more famous French examples of such grand scale axial avenue landscape art.

Right) ground level view of one of the 'crow's foot' intersections of avenues, showing roads, adjacent fields and avenues of plane trees.

A sequence of arrival to the estates and through them to the palace is staged, with circular 'intersection' walls, with gates etc - today alas many of these are in disrepair, some posts lying on the ground, and under threat from roadwork upgrades.

The avenue plantings on closer inspection turn out to be double avenues (two rows on each side of the road), with original or in cases modified water channels (caceras) between the two rows ensuring water supply. Acequias or water channels feeding adjacent fields and orchards and farmhouses were still in use, albeit modified with concrete, and in one place we visited the remains of a large aqueduct, water wheel (noria), and overseer's house on a nearby hill.

This land is privately owned now and (unlike Aranjuez Palace and inner gardens, part of Patrimonio Nacional/National Heritage and fairly well funded and protected/managed) under no form of legal protection. My guides were anxious to point this out, and their books on Spain's landscape heritage feature this landscape as a key cultural landscape, neglected and forgotten, but seminal in the history of landscape design, as it predates most French equivalents.

One of their conclusions in these books is that although the theory of cultural landscapes as a key part of landscape heritage is understood or allowed for in Spanish heritage legislation, in practice they are not well or widely appreciated, and remain under threat without appropriate recognition, planning controls or management systems to conserve them.

A later flight into Madrid allowed me to photograph the 'birds foot' radiating avenues from the air, where their patterns are quite clear to see. Their similarity to such systems of irrigation and field arrangement in Persia clearly demonstrate Spain's Islamic inheritance from the 8th c. and traditions passed down to Christians from Moslems between the 12th and 16th centuries in particular, and from centuries of coexistence and cooperation. They also demonstrate clearly Mannerist ideas about subjugating nature and landscape, and having ordered and productive 'nature' close to hand for the enjoyment of man.

8) Parque de Buen Retiro, Madrid

Covering 120 hectares in central Madrid, this was formerly the gardens and grounds of a 1630 palace for Felipe IV. From this era still remaining are the Estanque de las Campanillas & the Estanque Grande (two large artificial lakes. From the times of Felipe V is the Jardin del Parterre (Parterre garden) (near the palace).

After Napoleon's invasion, Fernando VII opened the gardens to the public, reserving only a portion, between the parterre garden and Calle Alcala with 'caprices' such as an artificial hill, the fisherman's cottage, and the contraband house, which all remain. After the 1868 revolution, the gardens were opened to the public in total, ending the 'reserve' of the Royal family.

Left) remains of the Retiro Palace, facing the city, and formal gardens at its front. This section gives a clear idea of the former private pleasure gardens role of the Retiro, as an urban retreat, replete with everything a cultivated gentleman needed. Strolling grounds, carriage drives, walks in woods and more natural woodland areas of almost natural simplicity, to remove the cares of urban life. Rolling programs of upgrade works are underway (installing recycled water irrigation, fountain networks, improved pavements, renewed avenue plantings and woodland walks will ensure this park remains one of Madrid's most loved and used open spaces.

At the end of the 19th c. a coach drive was opened for aristocrats and dandies and Velazquez palace were built for exhibitions. Later features were added in 1936 including a large rose garden, recently rebuilt and planted.

Surviving early elements include a 1887 Palacio del Cristal (crystal palace) (see photo on previous page) built to house a collection of plants from the Philippines, and a 1915 Rose garden/Rosaleda - strangely with no labels anywhere on any rose bed/climber!

A rather unfortunate 'remodelling' in 1970 has trivialised the gardens, making them more like an English park, with grand meadows, not really respecting its own particular history. The tree cover overall is relatively well conserved, and horse chestnuts (Aesculus hippocastanum) are the dominant tree species. Due to its heavy public use and popularity, the garden is poorly conserved. A programme of installing recycled water irrigation lines, and sprinkler irrigation was underway when I visited.

Carmen Anon, one of Spain's pre-eminent garden historians and long time representative on ICOMOS's Scientific Committee on Historic Gardens and Cultural Landscapes, is apparently advising on a current project on Buen Retiro, which is a very encouraging sign.

For a list of key plants, see **Appendix E**.

9) Parque del Fuente de Berro, Salamanca district, Madrid

This local park originated in a 1630 farm acquired by Phillip IV for its water supply (a fountain/ fuente is on the spot of a natural spring within the park). The Duque de Frias y Conde de Haro had bought various farm properties in the area of Miraflores including this. In 1641 the huerta (orchard farm) was ceded to the Benedictine Order of Monks, who'd been expelled from Montserrat in Catalonia. They were here for only two years. In 1703 it was bought for the Adelantada de Costa Rica.

The oldest trees existing now date from c.1920s. In 1948 it was bought for the City of Madrid to be a public park, an area of 7.9 hectares. A series of shaded curving walks follows the sloping contours of the site down from a former small palace/palacete near one of the top gates, and the park is richly planted in coniferous and other trees, the most notable of which are labelled as part of a tree walk. The former small palace is used as an exhibition centre and local meeting place. Childrens' playground areas have been made within open areas of the park on its lower slopes.

The area of Salamanca adjoining the park is an early 'garden suburb', laid out with two storey duplex houses for workers with small gardens and street trees (Siberian elms), but now highly desirable real estate in central Madrid. This may have been the first use of a mass-produced housing type in Spain. Other suburbs surrounding the park are high-rise flats.

For a list of key plants, see **Appendix F**.

Right) sign saying that the City Government are installing extended systems of drinking water fountains within the Retiro and Fuente del Berro parks. Other signs marked installation of recycled water irrigation, an increasingly common technique seen in parks in Madrid, Barcelona and the cities of Andalucia in the south.

10) Parque Juan Carlos 1, Barajas, outer Madrid

This large park dates only from c.1990, was very much ‘designed’ by an architect, and is a huge circular open space near the airport in outer suburban Madrid. On one side is a business park/commercial area, on two others are areas of high rise flats, which sadly are ringing Madrid on former farmlands and orchards. On the fourth side the park abuts the historic garden, Capricho de la Alameda de Osuna, rather sharply contrasting with that place's historic trees and romantic woodland feel.

The park is predominantly open space, much paved, grassed with plantations of trees, with a number of 'feature' gardens, (Moorish, Rose, Pine groves, an olive plantation, winter-garden (with shade house), playgrounds, picnic areas, lakes, and a good deal of variety of plant material and slowly developing areas of character (Madrid's high altitude cf the coast, cold winters and hot summers need to be born in mind).

A range of large modern sculpture is scattered throughout the park, and some of its water features are sculptural, playing with levels and falls of water of different height and width.

Generally plants are treated in a very 'painterly' way typical of landscape architects, with large blocks of one species, drifts of one or two species, going for overall effect and massing. Shrubs and ground-covers are also much used, and to a lesser extent pergolas and climbers on walls. Irrigation is with recycled water, signs abounding noting the water is not drinkable except from nominated drinking fountains. Mulch is widely used, both bark and gravel. For a list of key plantings, see **Appendix G**.

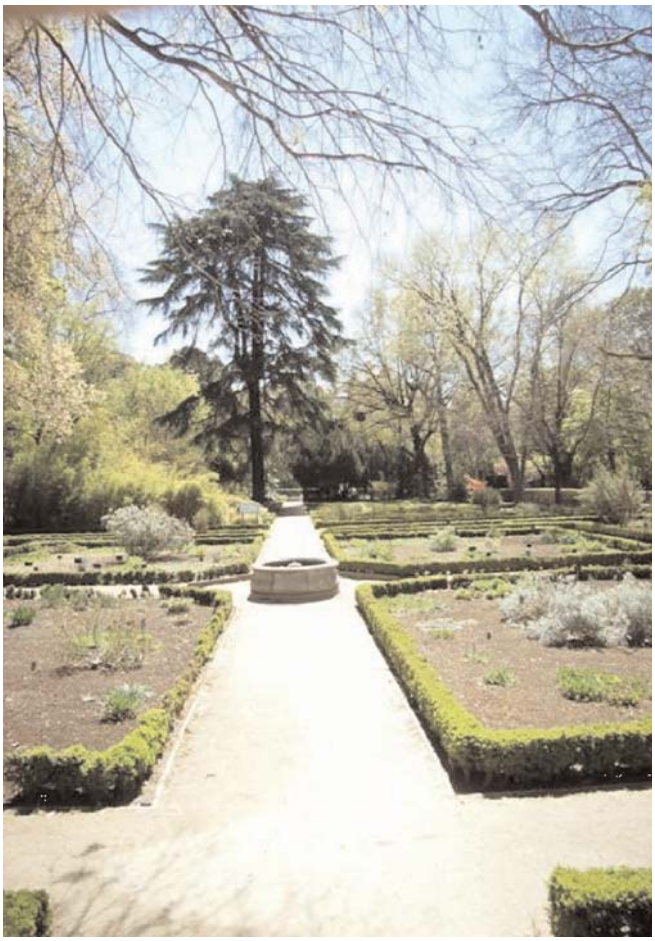
11) Real Jardin Botanico, (Royal Botanic Garden), Madrid

Madrid's first botanic garden was set up in 1755 on the orders of King Fernando VI, at La Huerta de Migas Calientes, near the Manzaneres River, and held more than 2000 plants collected by the Botanist Jose Font i Quer from trips all over Spain, and exchanges with other countries.

This garden was moved in 1774 under King Carlos III to its current position in Paseo del Prado, and inaugurated in 1781. In charge of the design of the 'new' garden was Sabatini, the King's architect, and Juan de Villanueva, who was also responsible for the Prado Museum, astronomical observatory and other works. They laid out the original three terraces on a sloping site, and arranged plant collections according to the leading Swedish botanist Carl Linnaeus's sexual classification system, the progenitor of modern botany.

Still remaining from that original phase are the iron grilled fence around the garden, arbors and greenhouse (now called the Villanueva Pavillion and used for exhibitions), which includes the lecture room in which botanist Director Antonio Jose Cavanilles taught his classes from 1801-4. Plant hunting expeditions from here included many to the Americas, much of which were then under Spain's control.

Spain's war of independence in 1808 brought years of neglect, although Mariano de la Gasca helped maintain the garden's work within the European scientific mainstream. In 1857 under Mariano de la Paz Graells the garden had significant renovations still obvious today, including the addition of the Graells greenhouse to one side and remodelling the upper terrace area



Above) part of the bottom terrace, showing formal garden layout, central fountain (part of the original irrigation system, symmetry and mature tree collection (including many conifers, such as this Himalayan cedar). This section features medicinal plants and herbs. This garden received many thousands of new species from botanist Cavanilles’ 5 year expedition to the New World (America).

Left) view from the top, rear-most terrace, showing one of two original water tanks supplying the gardens, glasshouses from the 18th, 19th and 20th centuries housing cacti, subtropical and tropical plant collections, an 18th century iron pergola housing a collection of grape vine varieties from all over Spain, and the end of the main building in the gardens, once a glasshouse, now an exhibition space and offices. Note the density of planting, mature trees, and adjacent tall housing.

(into fashionable romantic curving style paths, as opposed to the geometric two lower terraces). A zoo was established in the garden, then moved 12 years later to Buen Retiro Park nearby.

From 1880-1980 the garden suffered significant setbacks. 2 hectares were lost in building the Ministry of Agriculture offices on one side, reducing its total to 8 hectares. In 1886 a cyclone destroyed 564 of its most valuable trees. Before 1930 mycological research (fungi) was established, specialising in microfungi studies.

After decades of neglect they were closed to the public in 1974, restored under direction of landscape architect Leandro Silva, recovering much of their original design layout, and re-opened to the public in 1981. Although they don't 'fit the layout', many large, notable tree specimens (some interrupting the clean lines of straight paths, steps etc in places) were retained.

A new glasshouse was added in 1993, adding to the two earlier ones remaining and containing tropical, temperate flora, cacti, orchids etc).

The gardens are broadly trapezoidal in shape, with grand gates to the north and east, a formal grid layout over three large terraces, with system gardens on the lower two terraces arranged in a grid of squares, each with central circular water tanks/fountains also on a grid.

Two of the three terraces (the lower two) are laid out in the (reinstated) neo-classical style of the 18th century, and the highest terrace was laid out in 19th century under Graells in Romantic 'Isabelline' (named for Queen Isabel II of Spain) style, with curving paths and beds of trees and shrubs edged by hedging. A central pond and statue of Linnaeus was added in 1859.

The middle terrace displays taxonomic collections of plants arranged by family and phylogeny (similarity of form), around 12 fountains. These pass from the most primitive to the most highly evolved forms of plants as one progresses along.

The gardens have about 1300 trees, some quite old, although the level of shade cast leads to problems cultivating plants below.

Right) Linnaeus' statue in pride of place on the upper terrace in front of the original glasshouse.

Large coniferous trees, and species such as Canary Island date palms and more 'temperate' and 'soft' species survive in the gardens, despite harsh winters, with frosts and snow not unknown. A mcroclimate has arisen with the maturation of large trees protecting smaller plants beneath.

A 1975 tree survey led to the decision to lower the amount of repetition (when specimens age and die and need replacing), and to plant new species as replacements in such cases.

Outstanding (and some of the oldest) tree specimens include a *Zelkova carpinifolia*, some 120-30 years old, a Siberian elm and Mediterranean cypress both c.200 years old. Some plane trees are enormous although much younger, only about 80 years old. Also notable are several large southern nettle trees (*Celtis australis*), Himalayan cedars, (*Cedrus deodara*), two large River red gums (*Eucalyptus camaldulensis*), horse chestnuts (*Aesculus hippocastanum*), London planes (*Platanus x hybrida*) and Siberian elms (*Ulmus minor)*.

A collection of olive varieties and cultivars from all over Spain is in one corner, some quite rare.

A series of glasshouses from 18th, 19th and 20th centuries contain tropical and subtropical species. A pair of curved steel arbors/pergolas from 1786 displays a collection of grape species from all over Spain.

The gardens have had major changes over the centuries, (eg: the original central glasshouse (Pabellon Villanueva) at the centre of top terrace had a second storey added in 19th c., and today is used as exhibition space (currently featuring the Amazon's flora and threats to biodiversity),

Perhaps Spain's best known landscape Architect Fernando Carruncho designed the revamped upper terrace with bonsai collection behind the Villanueva pavillion, which is looked after by contractors. Underground function and conference centre facilities are incorporated. Interestingly some of these bonsais feature native flora such as incense junipers (*Juniperus oxycedrus*) and Phoenician juniper, *J. phoenicia*). Original irrigation water tanks are still visible here, although the original irrigation system has been much modified over time.

The bottom terrace also contains collections of old rose species/ varieties, cultivated food and fibre plants, ethnobotanical plants, and 'flower displays' eg: tulip beds. I was surprised to see quite a number of Australian bottlebrush species (*Callistemon spp*.) surviving Madrid's harsh winters, (central Spain can have winter minimum temperatures of up to -18C and around Madrid of -7 to -12C) as well as a few other Australian plants such as *Hakea* and *Melaleuca*.

The rainfall is 600mm (as is Canberra's), temperatures vary from 40-42 C maximum in summer to -5 minimum in winter with snows rarely: more usual is 35-36C and 2C. Soil is basic (limestone) with much sand and peat used to acidify and neutralise the soil for acid-loving species.

Mr Armada pointed out that soil levels have risen c.0.5 meter or so over the last 200 years, with this visible in places, such as the now 'sunken' fountains on the upper terrace, and areas of steps between terraces.

The original irrigation was gravity fed from the Retiro Park ((uphill) side downwards, using the natural slope. c.1850 there was still no running water, with two norias/water wheels (run by animals) lifting ground/well water into two large surface tanks, and feeding into a series of canals/acequias and public fountains throughout the gardens, from which hand watering was done. These fountains still remain, although today connected to reticulated water since 1974.

The gardens have 350,000 visitors a year, some 50,000 being school children, and some 600 "Friends". A series of courses on botany and gardening are run for Friends and the public.

The gardens have 20 staff, being 4 technical and 16 gardeners, as well as contractors eg: bonsai collection care and tree pruning. The Scientific research staff number 100, the herbarium/library and botanists about 15, phD students about 20. The publication of a *Flora Iberica* is a major ongoing project. More information is available at www.programanthos.org and www.gbif.es , where collections are searchable by species, there being some 8000 total (Ministry for the Environment). Historic information is available at www.rjb.optuma.com/historia and www.csic.es/.

Most of their budget is from Government, about 3m Euros, through the Ministry for Education, Works and Environment. About 250,000 Euros/year is gained from entry fees (2.5 euros/$5).

A conservation plan for the garden's heritage values is not written down for managers as such, although research plans for botany and mycology are. The current Director is a mycologist (fungi specialist) so is placing priority on herbarium work.

For more learnings from the Botanic Gardens, and a list of key plantings, see **Appendix H**.

12) observations from interviewing Maria Maroto Cotoner, Madrid

Ms Maroto Cotoner is a landscape architect ex Mallorca, mainly doing new work, private gardens about recent and current trends, garden ‘culture’ and lifestyle/aspirations re private gardens;
Ms Maroto has been practising for 12 years, mostly designing private gardens on a small scale although also has done some resort projects in Mallorca, Granada and Portugal, from what I saw.

Ms Maroto noted that gardens are seen as a relative luxury in Spain, but that with recent economic progress, and rising middle class, there is some growing demand. Magazines featuring 'house and garden' spreads, travel and 'lifestyle' markets, mean more awareness of indoor/outdoor entertaining and living, and desire to make improvements in these areas of life.

Landscape architects however are both scarce (about 70 total for Spain!) and the public apparently has a fairly low level of consciousness about the industry, and what they do or can do. Climate is a factor, and landscape architects in Spain are very conscious of the tradition of garden making, eg: the Islamic gardens, patios, and particularly so with decreasing water supplies, and the need for shade in what is mostly a hot climate. Some are moving to revive traditional garden design techniques, layouts and elements into modern work.

She noted that there is considerable media and other pressure from outside Spain, eg: France and England, via books and magazines, and Spaniards travelling more and bringing back ideas. Some ideas such as lush, manicured lawns are not sustainable in much of Spain, without expensive irrigation systems, high water demand, and labour.

13) observations from interviewing Maria Medina Muro, landscape architect, Madrid

Ms Medina Muro has done much work advising Patrimonio Nacional (National Heritage Body managing Royal Palaces and estates eg: La Granja, where she is advising on reinstatement and management standards of Royal Palace/estate of Aranjuez. In addition she is also a member of the Medinaceli Ducal family who own extensive estates around Spain including Pazo de Oca, Galicia & Casa de Pilatos, Seville (see # 28)) on garden and conservation culture, standards of conservation, maintenance, planning, tourism pressures etc;

Ms Medina observed that water is a major issue in Spain, especially in the drier, hotter South, pointing out that regulation of water through Government Ministries, licenses etc is a recent thing.

She was critical of key historic gardens where traditional irrigation systems have been 'updated' or changed (to drip irrigation, etc) eg: the Alhambra (in part), rather than relying on traditional systems of acequias/water channels, fed off the hillside/gravity from the nearby mountains. She noted that Spanish culture was by and large pragmatic, and lacked a strong consciousness of the need to save water, conserve and use it wisely.

Similarly she was critical of the lack of compost making, with common practices of sweeping soil/leaves and organic matter off, bagging and dumping it off site, rather than piling it up to rot down as compost, or mulching it in situ. I certainly observed this practice around Spain, and wondered at its wisdom, or sustainability.

According to Ms Medina, design is little valued except as a means to sell plants, she noting that the Spanish don't design with trees as a key element in the composition.

Right) a newly created garden, part of the Palacio de la Almudaina, or Muslim palace complex in Palma de Mallorca. While inspired by Moorish gardens in design and some plants (*Citrus*, cypress), the garden is a new city park, with some innovations, part of an evolving tradition.

She lamented the current fixation on 'low maintenance' (landscape architect Eduardo Mencos concurred), lack of understanding of the many benefits and key roles of trees in such climates, such as providing essential shade, retention of humidity, cooling of the air, and creation of a 'frondoso' /full, lush traditional garden effect or character. This character also reflects the natural ecology of Spanish forest/woodland and is well-adjusted to the place/region, although, again, little understood.

Ms Medina noted that plant availability/use/fashion is dictated by Italy, with its large commercial nurseries. For instance she cited that Madrid has a good climate for conifers, with cold, long winters and hot, dry summers, and yet, these are little used today, or poorly used. This is partly due to advertising pressure and availability of other species, promoted in their place.

Governments of the various regions are subcontracting out garden maintenance work, with poorly written contracts, poor contract supervision, and a bureaucracy that is proving slow to acknowledge the need for and to make changes where these are needed. Standards of horticulture, monitoring and quality control are low.

Ms Medina has spent some time advising Patrimonio Nacional, the national heritage body, which manages and presents to the public/tourists a range of 'Royal' properties around Spain. Many of these are palaces with extensive gardens.

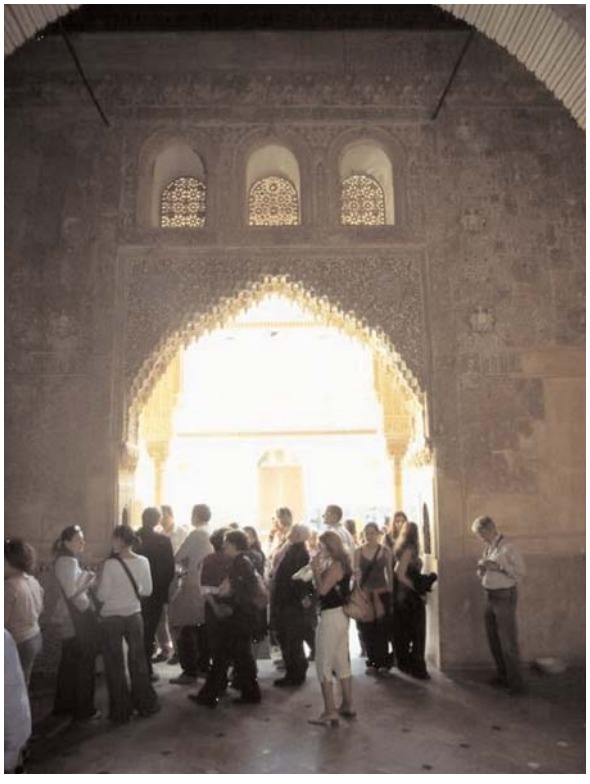
These include in Madrid: the Royal Palace and gardens of the Campo del Moro (Field of the Moors) and Palace of La Pardo. Around Madrid province they include the Palace/City of La Escorial, Royal Monastery of the Holy Cross, Aranjuez' Palace and gardens. In Segovia province they include the Palaces of San Ildefonso, La Granja palace and gardens and the Palace and Forest of Riofrio. Palma de Mallorca's Royal Palace of the Almudaina, Valladolid and Burgos' Royal Monasteries and Convents are also part of this collection. She was critical of several regional governments managing other properties (ex-Royal palaces) which should be managed by Patrimonio Nacional, eg: the Alcazar in Seville, and Alhambra/Generaliffe in Granada.

Ms Medina noted that although she advises this body, they lack qualified experienced staff with knowledge of landscape architecture, garden history and horticulture. This means that at times her reports are not necessarily followed up, or their recommendations followed through in full. A recent example with some success has been a report on improving the approaches to the Alhambra/Generaliffe complex in Granada, although here she was critical of implementation also. She noted that Patrimonio Nacional has a far better track record of maintaining 'its' properties than the Ayuntaments (Regional Governments) have, with some relevant personnel (historians, archaeologists, etc), but that there is room for considerable improvement.

Particular areas of criticism were the lack of criteria for maintenance, or reconstruction, and the way these were carried out, which was not carefully done, or in some cases, particularly authentic to traditional gardening practices, thus changing the character of the places being 'conserved'.

An example she illustrated in a recent report (8/2001) on restoring La Granja's parterre (formal) gardens. From research she found that these were laid out using a French unit of measurement, the toesa, which is 1.949metres in today's units. Knowing this, the proportions used for paths, walks, beds, spacing between trees etc all make sense, and putting back missing elements or replacing dying ones, can be done with great accuracy using the toesa, and not modern metres.

This makes quite a difference, meaning elements actually begin to line up/align again, where they may have been replaced (using metre measurements) at some point in the past 300 years - axes, view lines, paths etc start to re-meet, line up with their desired 'target' views! These seem small things, but have a huge cumulative contribution to its authenticity and character, as experienced into the future.



Right) typical day at the Alhambra - mass tourism of some 6-8 million visitors per year, means the experience of these spaces, many quite intimate in scale, is affected. Efforts to regulate in-flow, entry times and pricing, are having some effect.

Research covered original plant species used, method of use, spacing, training (eg: clean trunked trees up to a certain height, then let to branch above that, so the view is clear below that height of canopy, perforated only by straight trunks. Species used such as hornbeam (*Carpinus betulus)* rather than (the later-favoured) beech, (*Fagus sylvatica*), make a fine-grain change of character to the place, although to the unversed perhaps these differences are subtle. Pleached trees on trunks rising out of hedges are replanted in the same line as the hedge, not outside it, even the exact heights of clear trunks up to the canopy.

Ms Medina has spent a lot of time writing specifications for replanting, ground preparation, maintenance, pruning heights, forms and effects wanted, planting patterns, densities, spacings, irrigation, fertilising etc. She has changed to more pictorial reports as these are more successful in terms of being used by the gardening staff.

Examples of the reports she has prepared include:
· *Trees in the City - fundamentals of environmental policy on Urban Trees* (1992), Jose Martinez Sarandeses, Maria Medina Muro & Maria Agustina Herrero Molina, Ministry for Public Works, Transport, Water & Environment

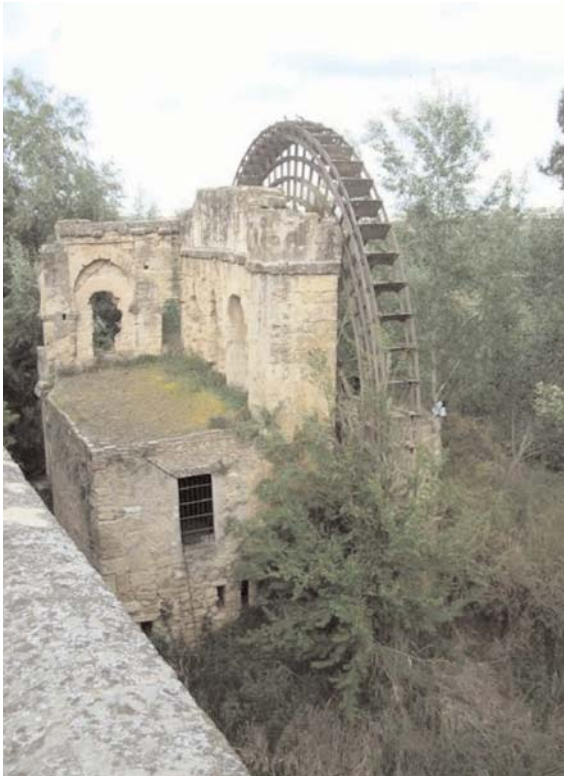
· *Recreation and increasing environmental quality in the accesses to the Alhambra & Generaliffe*, (11/2001) Maria Medina Muro, Jose Martinez Sarandeses, Patrimonio Alhambra/Generaliffe, Council of Culture, Government of Andalucia

· *Guide to Urban Design*, (1999), Maria Medina Muro, Jose Martinez Sarandeses, Maria Agustina Herrero Molina, Ministry for Fomento, Director General of Housing, Architecture and Urbanism.

Tourism is having massive impacts on historic gardens, not least the Alhambra and Generaliffe, with millions of visitors per year (6 or 8 million I read in different sources).

She noted that in her view the Alhambra is now spoiled, as is La Retiro Park in Madrid, from over-use, and loss of atmosphere.

Ms Medina has just finished a design of a new garden for the Picasso Museum in (his home town of) Malaga in Andalucia, which has been highly acclaimed as a tranquil oasis in that city. Unfortunately I did not manage to visit Malaga and this garden.



Above) A reconstructed water wheel in the Guadalquivir River in Cordoba, minus its small clay pots for water, but otherwise intact.

Left) Same location from the other side of the river. At the lower left is the remains of a water mill, one of a string on islands in the same river, below the Roman bridge. These mills both lifted water for the city's supply, and used its power to grind flour. In the foreground is a riverfront walkway under construction, in paost-modern sytle, part of a program of urban renewal underway by the regional government.

14) Patio de las Naranjas, Mezquite (mosque/cathedral), Cordoba

As general background Andalusia is a large region which contains both Spain's highest (and well-watered Sierra Nevada) ranges and driest (Almeria's semi-desert) places. If it is possible to generalise, an average temperatures for the region are minimum 4 degrees C, maximum 37.5 degrees C, average rainfall is 521mm.

A separate Muslim state was established by Emir Abd-al-Rahman, from 756-788, breaking away from Abassid Iraq's Caliphate, and this continued under other Caliphs in Cordoba until 1037 when Cordoba fell to the reconquering Christians.

Above) aerial view clearly showing former mosque with courtyard/ patio, mosque building and minaret. After the reconquest a Christian cathedral was built inside the mosque, and the minaret converted into a belltower (Photo Source: Post card).

Under the Muslims in Andalucia the irrigation systems established by the Romans and Iberians were retained and refined. Agriculture reached enormous success, bringing wealth and stability to the area. This was achieved by highly developed and precisely regulated soil irrigation. In the Caliphate water use was monitored by an independent 'water court' which extracted and distributed this precious resource.

On agricultural land most irrigation was by underground water channels (as it had been in Persia and the Middle East for some time). Colossal water wheels (norias) regulated how much water was extracted from rivers (such as Cordoba's Guadalquivir, or 'great river' (quoting Hattstein, M., 'History' (of the Spanish Umayyad Dynasty), in Hattstein, M. & Delius, P. (eds.), *Islam – Art & Architecture*, Konemann, 2000.

The Patio de las Naranjos is reputedly Europe's oldest living garden, thought to date from the earliest phase (748) of the central mosque's development, under Abd al Rahman I. Also thought to have included planted elements from the beginning (an innovation cf: mosque courtyards in Omayyad or Abassid Syria and Persia), with pomegranates, cypresses or palms.

The current plantation of 98 Seville orange trees (a few date palms and a cypress and one olive), is thought to date from the late 18th c. The space is a walled courtyard of 50x30m, divided in three parts each with central Renaissance fountain (replacing older fountains required for Muslims to wash before prayers).

Right) inside the courtyard a simple grid system of planting is supported by irrigation channels to each tree, with simple 'locks' to stop water flow to fill a section, then release it on. Paving is pebbles with brick edging. Planting is mainly Seville (sour) oranges, but some other plants such as Mediterranean cypress, date palm and olive, survive. Planting inside Mosque courtyards was relatively unknown practice before this, although all mosques have courtyards and water fountains for washing before prayers.

What is intriguing about this space is its relative peace, amongst the hub of the city, ringed by streets full of taxis, tourists and trucks. Even the high tourist and school children numbers inside are absorbed by a huge space, and shaded by its veil of orange trees, lulled by their scent.

It is perhaps a public square rather than a garden, but it is instructive how powerful a simple planting (basically orange trees) can soften a large space. A lot of tourists simply sit in it for long periods of time, soaking up the atmosphere. This was also the case at Seville's cathedral/Patio de las Naranjas, but that space is smaller, and more shaded by the monolithic cathedral rising out of it. The social role of such a 'relaxation' space, or even lounge room, in the middle of a densely packed historic city core, with little open space, is perhaps a factor in its success also.

15) Alcazar de los Reyes Christianos gardens, Cordoba

This was a Roman then 11th c. Islamic Castle, modified in the 13th c.+ for Christian Archbishops and Kings), then a Diocesan museum, with planted patios. Its parkland is a 20th century makeover of an older orchard garden / huerta estate.

This is a key Cordoba tourism attraction, whose most interesting feature (of many) was the large huerta/ former orchard gardens, walled but outside the walled castle/palace complex. These have been adapted to be more of a pleasure garden now than perhaps in their heyday.

However despite a high degree of 'ornamental' maintenance with avenues of citrus trees and cypresses pruned into

Right) view into huerta/ former orchard gardens entering from Alcazar. Note on left one of two water tanks supplying the gardens, and a series of ponds taking water down and through to cultivated terraces and ground below. he main trees visible are Seville oranges.

Left) one of the many channels /acequias taking water through the garden, on gravity-feed. The flat area at the end of this channel is a covered water tank, and pipes lead supply down to the lower terrace to hedged beds, some full of flowers, some herbs, some vegetables. All are fed by smaller water channels, with moveable 'doors' to let water in, direct it, stop flow when a bed is flooded. Most beds have ridged soil and plants in rows, again to ease water movement, others are more informally planted with carpet-effect flowers, like a meadow-garden in a Medieval illuminated manuscript. Water staircases of brick 'steps' and small pools and fountains enliven the spaces, and bring attention to the water, both for its sound, and for its pyschological cooling effect.

distinct ‘bell’ or ‘column’ shapes, it retains its traditional gravity-fed watering system of tanks, channels, flooding of beds, pools and fountains and much bedding.

Moreover its overall species used, manner of planting (formal structure (reflecting irrigation arrangements) and informal planting with a mass of relatively informal floral ‘carpets’ in beds resembling Medieval illuminated manuscript ‘meadow’ gardens in cloisters) including some remnant fruit species (citrus, figs, apricots etc), herbs (borage, etc), profusion of flowers and water features including fountains still speak strongly of traditional productive Islamic gardens.

For a list of key plantings, see **Appendix I**.

16) Medinat al Zahra archaeological site, Cordoba – observations from visit:

Above) location shot of the Palace complex’s three huge terraced gardens, in Omayyad style paralleling similar complexes in Syria & Iraq, elevated above the river plain where the city of Cordoba lies, to the left. Flat pasture land was also walled fields and orchards servicing the Palace/sity complex, part of an elaborate whole.

This is a large archaeological site, dating from 936-1010 to 1013 when it was sacked by Berber soldiers and abandoned). It had served as the model for all subsequent Islamic Palaces/ cities in Spain, built on elevated sites with views over cultivated lands. It is partly open to the public (a World Heritage Site) although part is a reserve still very much actively being researched. After some 100 years of digs, only about 1/10th of the city’s area has been explored, and attention has focussed on the palaces and monumental buildings. More modest housing areas, field and orchard systems that supported them, have not yet had anything like the level of attention.

What struck me was its site elevated on the foothills of a range of mountains (Sierra) outside Cordoba and distance from a river (unlike Cordoba itself, on a sharp bend in the Guadalquivir River). Subsequently it cast

Left) closer view of the middle terrace showing myrtle hedging, cypresses, and large drops to side terraces.

The central reception rooms faced this terrace, with three enormous water tanks reflecting the buildings, and modifying their interior climate. Water channels fed each garden bed.

While some 100 years of archaeological investigations and reconstruction has been undertaken on this site, only some 1/10th of it has been worked on to date. A huge site offices complex is under construction some distance away, and much more work is yet to be done, studying the more humble buildings, town planning and organisation, social structure, and operations.

a wide network to provide for its water supply, reaching deep into that range of hills and valleys, with a number of 'supply' lines of reservoirs, aqueducts, acequias or water canals and wells feeding water into the city's tanks and fields, from far afield.

Aerial photographs have mapped this system, and photo-boards and guide books showed detailed elements of it such as bridges and aqueducts. In addition a network of roads and bridges allowed access to and maintenance of these facilities.

Military attack was one reason this city fell, and I wonder if one strategic weakness was its water supply, and blocking this off. Internally the city had a network of lead pipes conducting water into suburbs/quarters/houses and buildings, feeding gardens, tanks, troughs, pools, fountains. The most important houses as well as the palaces had their own internal (patio) pools, basins, fountains, for decorative as well as functional uses.

17) Palacio de Viana, Cordoba

This is a 14-16th c. Baroque urban palace formerly belonging to the Viana family, with 12 courtyards of all sizes, and a walled rear garden. It is now a museum.

The succession of patios is (quoting UNESCO) exceptional testimony to a way of living in Southern Spain, which continues the Persian tradition of a garden as intimate, private space for meditation and delight of the senses. Access between patios is often by small side doors/gates, playing with a sense of mystery (and preserving privacy). Some are enclosed with high perimeter walls, others have fountains and pools with small tricklers.

The gardens maintain their hydraulic system with acequias (water channels) and flooding of beds. Plantings feature cypresses, palms, orange and lemons, climbers such as *Bougainvillea*, Banksia roses, jasmines and other perfumed flowers like roses, and myrtle hedges.

This place was an object lesson in small garden ideas, good design and management, and despite its age, full of inspiration for modern Australia, coping as it is with increasing urban densities, poor quality design and a long, deep cultural tradition of gardening.

Above) principal (first) patio entered off the street, with date palm, creepers such as Banksia roses, *Bougainvillea,* clivias and cinerarias in pots.

What first strikes is how little is visible from the streets (2) surrounding it. With the main front gates open the main first courtyard can be glimpsed, and if the shutters are open, a second courtyard adjoining the street. Other than these, no gardens are visible. High

Right) smaller more intimate patio to the rear, with oranges, *Wisteria*, myrtle hedges, central fountain and pool. Most patios act as outdoor rooms, even in inclement weather 'playing' to the adjacent rooms of the house (on two levels), with racks of plants facing windows.

walls give complete privacy, no doubt culturally and defensively important.

This, also a feature of Islamic private gardens in Spain, is in marked contrast to the Australian norm of open front gardens, full of public display! It is however increasingly relevant in a world of medium-high density living, to provide much wanted privacy and screening of more personal spaces, from public or perceived public or shared spaces. Copious use of metal grilles, screens (eg: terracotta tile), walls, and planting to separate and filter views, and sound, is one solution.

Modern, car-dependent Australian suburbia is producing similar, but ugly, walled streetscapes of double garage and security fences, allowing no view in or out. While crime and security consciousness are increasing, this need not result in ugliness, as Cordoba points out elegantly.

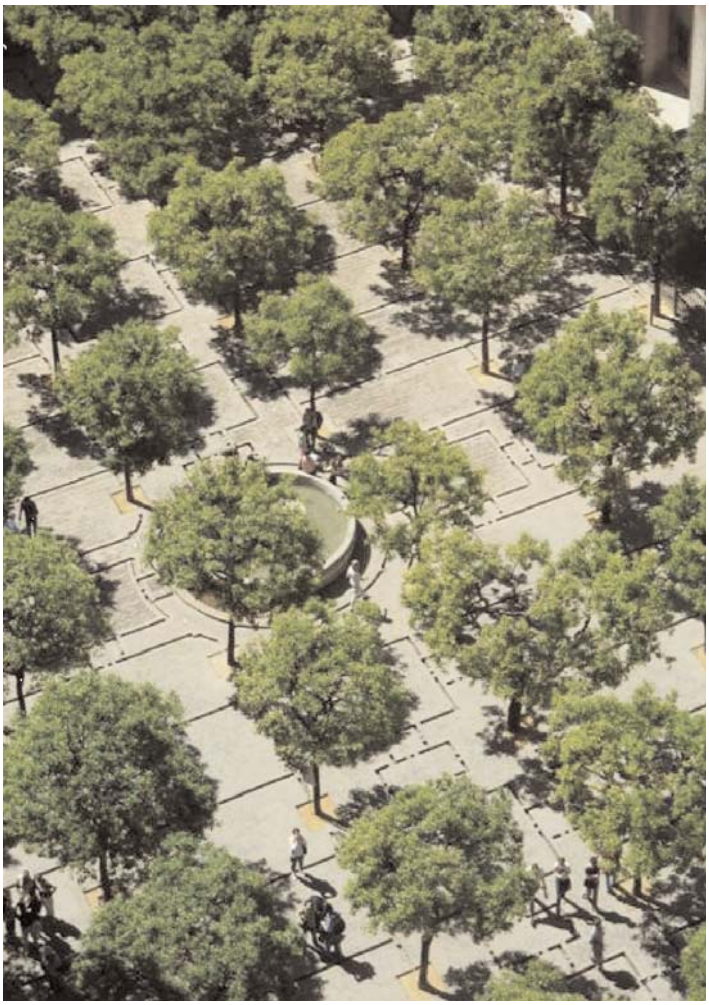
Courtyard design tends to be formal, with paved spaces centred on an object such as a fountain or statue. Water plays a key role, albeit subtly, in each. Given the hot, dry climate this makes good sense. Walls also play a major role, but their design potential is also highlighted and celebrated, with plantings of climbers, trailing shrubs, espaliered trees, wall-mounted statues and fountains, glazed tiles providing decorative relief and colour. Plain internal walls, where they exist, often highlight the decorative effect of overhanging branch shadows, reflected water etc.

The range of plants was also interesting, being restricted, but indicating what will grow well in this climate and situation. Flowering and scented plants play a major role, as do potted displays, some modest, but making great impact in small spaces. For example, a simple composition of four pots of flowering geraniums or silver foliaged *Centaurea sp.*, centrally placed on the edges of a well head or a small pool makes features of small spaces.

It is also easily changed with the seasons. A small 'work' area out the back of the Palace, with glasshouse, potting shed and container area, allows for new stock to be raised in readiness for such transfers.

Climbers and trailing semi-shrubs are widely used, with *Bougainvillea, Plumbago capensis,* yellow Banksia roses (*Rosa banksiae 'Lutea'*), climbing roses, jasmines *(J.officinalis & J.fruticans*) featuring.

The cooling effect of dark greens in contrast to blazing white plaster and blue sky and trickle of water from a fountain, have a deliberate effect, calming and cooling the recipients. Walls to screen street noise aid this. In the main 'garden' area, beds edged with box hedging also mean that the overall effect is lush green, for those months when no rose or other flowers exist. Lawns would be quite impractical in such a climate, and such tiny spaces.



18) Reales Alcazares, Seville

Seville's Cathedral/Mosque, Alcazar/Palace and Archive of the Indies are listed on the World Heritage List as 'a remarkable monumental complex in the heart of the city. The cathedral/mosque and the alcazar - dating from the Reconquest of 1248 until the 16th c. and imbued with Moorish influences - are an exceptional testimony to the civilisation of the Almohads as well as that of Christian Andalusia.'

Right) detail of Orange tree courtyard in Seville cathedral / former Mosque, this time with brick paving, and larger fountains. Much less of the mosque survives. Only one wall and gate, the minaret (modified) and this patio remain, alongside Europe's third-largest cathedral. This in turn adjoins the Alcazares/ Palaces complex, and Archives of the Indies.

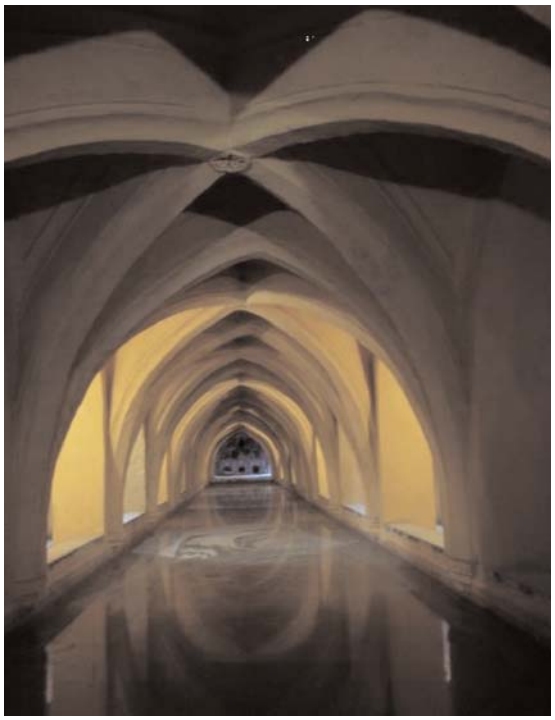
Left) outside of the Reales Alcazares, from behind the cathedral. Originally a Muslim fortress, much modified by Christian Kings, although again much in Mudejar or Muslim-

The Alcazar was a 10th c. Islamic Castle/Palace, with 12-13th c. modifications including extensive 1350 Mudejar gardens made for Christian King Pedro 1 using Muslim gardeners, labourers and skill. It also has had major 17th c., 19th & 20th c. changes/additions in styles fashionable in those eras, eg: a 19th c. 'English' landscape park area outside the inner walls with scattered, informally planted trees and lawn.

The gardens of the Alcazar form the most extensive Mudejar garden in Spain today. The complex was built at the same time as the Alhambra in Granada, by Granadine craftsmen. Felipe III made the greatest changes in the Renaissance era, turning the outer orchard gardens into a pleasure garden with central pavilion (huerta de la Alcoba), magnificent Grotesque gallery (a 2 storey arcaded wall walk with grotto work on the outside), squared pleasure gardens with fountains, statuary, and hedged beds. It displays considerable use of water, retaining in part its original irrigation system (by acequias (water channels), caceras (channels) flooding individual beds.

Unfortunately I was not able to visit the Patio of the Casa de la Contratacion, which has an intact 'Crucero' or cross-form garden, with raised paths, and sunken planted quarters with orange trees fruiting and flowering at eye/hand level. This is not now open to the public, apparently. While Morocco still has such sunken gardens, or at least intact archaeological remains of them in some cases, in Spain they are now very rare.

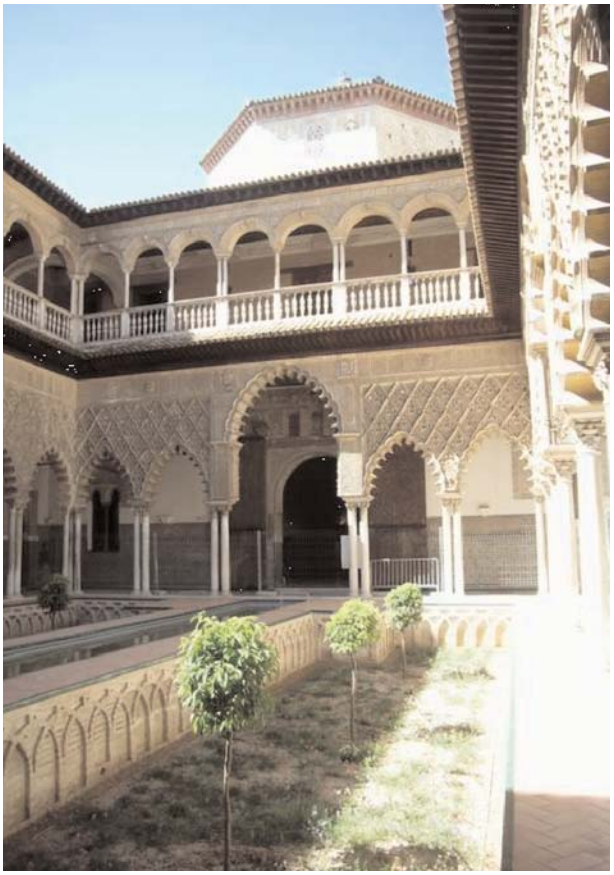
But the Alcazar has a further 'crucero' form patio. In the underground 'crypt' layer (below what today appears to be ground level, but is actually a 'piggy back' courtyard with its 'ground' level one storey up) the Patio de Dona Maria de Padilla has a crucero courtyard garden of the Almohad era, which from descriptions in the 17th c. had orange trees in it. With its original ground level 5m deep/ below the raised paths, the orange flowers



and fruit would have been at eye/hand level when walking on the raised paths. It was unfortunately filled in under a raised courtyard during the 18th c. due to fears that the surrounding buildings might collapse.

Historically and archaeologically this space is fascinating, with its Islamic structure kept intact, 'gothicised' by Christian Kings with pointed arches in its walkways and porticoes, later hidden.

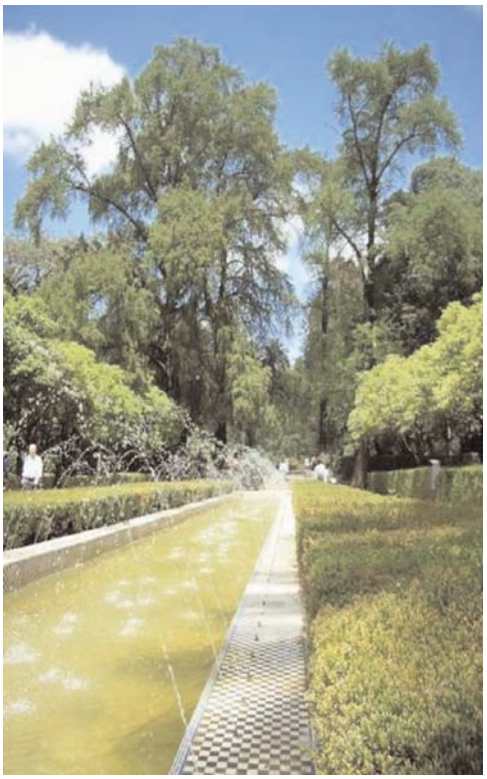
Clues of its structure can still be gleaned at upper level today, as a 'hole' in one corner of the infilled raised patio shows the greater depth to the natural ground level below. Open grilles along the central path let light into the 'crypt' space below (photo below left).



Right) Patio de las Doncellas, after 'peeling back' the baroque layer to reveal an older Muslim era sunken patio garden below. Note raised central water channel, interlacing brickwork arches, matching forms used above, later. Meadow planting below citrus trees completes the picture.

Visitors can also go around and under the palace through a tunnel into the 'basement' level of this patio, which is now a kind of 'water cathedral' to Maria de Padilla, one of the King's mistresses (see photo below right). Here the original depth, structure of elevated walkways and arches can be easily appreciated. Whether this patio might ever be 'peeled back' to its original crucero structure makes for intriguing speculation.

A third sunken courtyard has recently been revealed, in the 'reinstatement/ reconstruction' since 2002 of the smaller Patio de las Doncellas, in the centre of in the palace. c1600s marble paving has been removed to reveal an earlier (c1200s) Islamic lower courtyard, with central raised water tank running longitudinally, and flanking sunken flower gardens, with their 'walls' clearly showing interlocking brick arches from the Islamic era. This work was clearly contentious from debate amongst heritage professionals at the conference I attended in Granada (see (22) below).



Whether the earlier layer is worth more than the later, or whether all layers should be respected and conserved, is the issue, along with the level of evidence justifying such decisions. Of course no restorations/reinstatements take place without some destruction – in this case removal of the paving and fountain so well known from most photographs of this courtyard from the 20th century. I would argue that the older layer is worth revealing here.

For more learnings from interviewing its director, and a plant list see **Appendix J**.

Parque Maria Luisa, Seville

Left) Parque Maria Luisa, pond with fountains in centre of park. Note enormous size of trees thanks to rich riverside flood plain, the central use of water and of brightly coloured tiles (azulejos). This park is heavily used, has a number of attractions including museums, and is near the centre of the city.

This large park was a former riverside Royal estate, modified late 19th century and again in 1929 to become a public landscape park created for an inter-colonial exhibition. The designer was French gardener Jean-Claude Forestier who also worked on many Barcelona Parks.

The park has a collection of notable trees marked for a self-guided walk, a number of museums and attractions within its large area. Highlights are large figs (*Ficus dealbata*, and *F.macrophylla*), Australian she oaks (*Casuarina equisetifolia*), camphor laurels, planes and other subtropical species of great size (the site is on the floodplain of the Guadalquivir, the major river feeding Seville and Cordoba. Other features are a series of

Left) Casa de Pilatos: principal garden patio, with Italian style loggia, collection of palms, including *Kentia* palms from Lord Howe Island, dates and American fan palms. Note citrus trees reflecting older huerta/ orchard use, climbers including roses and *Bougainvillea*, myrtle hedging and richly planted understorey. This grand space is surrounded by the house on all sides, open to a number of rooms, cooling and scenting their air, with breezes, water from fountains and perfumes.

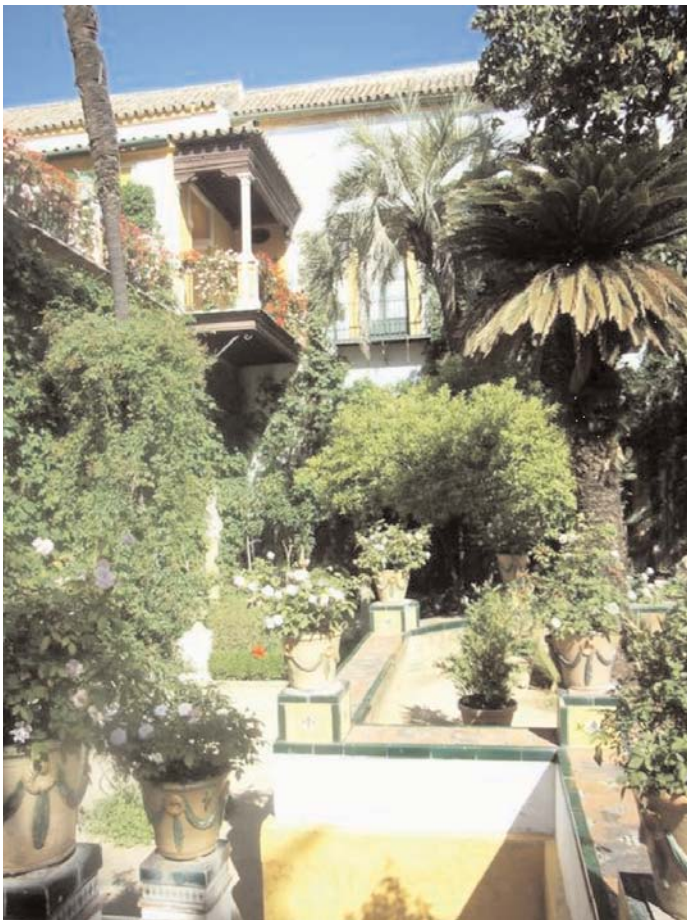
parallel walks or avenues, formerly carriage drives popular for strolling, a series of smaller formal garden areas centred on pools, paved areas, rose gardens etc, all with highly decorative glazed tiles in yellow and blue, popular in Seville.

For a list of key tree plantings including common Seville Street Trees, see **Appendix K**.

20) Casa de Pilatos, Seville

The Casa de Pilatos is a city palace built for the first Marquis of Tarifa from the 15th c., today belonging to the Medinaceli family. The Viceroy of Naples made major changes and expansions in the 16th c. in the Mudejar and Renaissance styles to house his collection of Roman statuary. In scale and form it is more imposing than the earlier Palacio de Viana in Cordoba.

It has three large internal patios/courtyards, the first visible from the square/placa outside (which itself once belonged to the Marquis' family, and was able to be closed off at night for festivities). That the entry courtyard could be clearly seen from a public place through a high arched entry (with grilled gates) was unusual at the time for Seville/Andalusia, with its widespread older Muslim (and Roman) tradition of closed off private internal spaces not visible from the streets. This change made the palace influential in the city at the time.



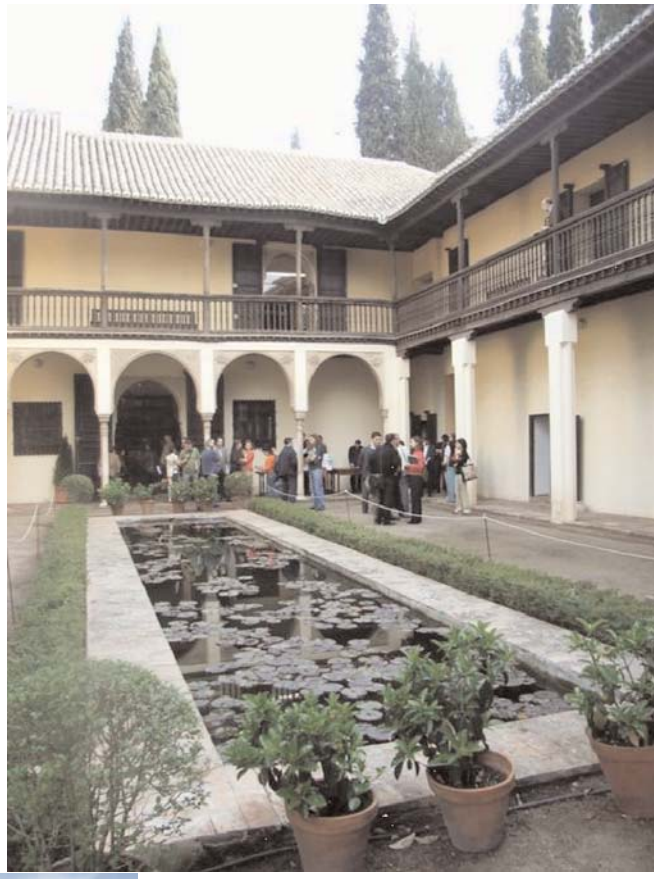
The second internal courtyard contains only paving and statuary, with no plantings. The 2 rear garden patios are richly planted and quite a lush retreat from the densely built streets outside. Jardin Grande (Large garden) was reformed in the 19th c., Renaissance in style with open loggias, statuary and a richly plantings in Muslim style, based on an older orchard (huerta) garden. Edging hedges are myrtle.

The Jardin Chico (little garden) (photo at right) dating from the 20th c. is divided into four spaces with differing levels and a large rectangular water tank. One interesting observation on my visits here was the gardener was undertaking soil fumigation in the garden, injecting the garden beds to combat soil fungi, which apparently are a problem with Seville's humidity (and perhaps with enclosed patios). He also noted that his grandfather was the gardener who planted out the Jardin Chico (the newest) patio in 1913.

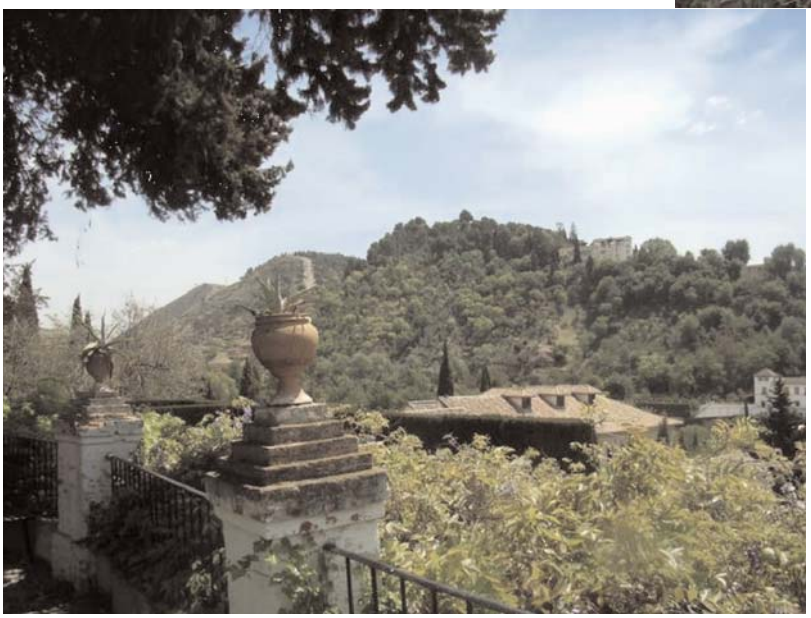
A large *Bougainvillea* creeper on the back wall, and large white cedar tree drape over the external wall enlivening a rear laneway dramatically. For a list of plantings, by patio, see **Appendix L** .

21) Observations from (attempting to) visit former World Expo Site 1992, Seville

I was particularly interested to see the Expo site's Riverside Park of the Americas. This area, promisingly sporting dense tree planting, is disappointingly fenced off and appears completely neglected now. Seville has apparently been unable to find a use for much of the site since the Expo, and it presents a rather sad sight. Nearby an historic monastery remains a tourist attraction, as presumably other more 'built' facilities along the river do also. This phenomenon is not unknown in single 'event' facilities such as Olympic Games complexes, and points up the need for greater thought to the sustainability of such resource use, and for finding and giving such places an ongoing, meaningful life and uses.



Right) venue for the conference was a traditional Muslim house, now the Centre for Arabic Studies, part of the Granada University. Delegates gather in one of the patios, this one with a view at this end towards the Alhambra (see photo below, The house has a typical 'carmen' garden, being terraced to take advantage of the views, while providing privacy from the street. The white building on the hill is the rear of the Generaliffe summer palace, uphill from the Alhambra complex.



22) Observations from attending a conference, Gardens of al-Andalus*, Granada

(part of an ongoing series of conferences on the Medieval Islamic Cities in the West, being run over some years).

*Al Andalus was the Moors' name for Islamic Morocco, Spain & Portugal. This conference was run by University of Granada, and included experts from Spain, Portugal, France, Morocco, Italy, England and the USA reporting on the latest research, archaeological excavations and in places, garden restorations. (fields represented included archaeology,

medieval literary sources, ethno-botanical studies, palynology (pollen analysis), architecture, spatial and urban analysis, decorative arts, philosophy and religious symbolism, multidisciplinary approaches to work, interpretation). I felt very lucky to get in, let alone understand!

Included were guided visits to the Alhambra, Generaliffe, Carmen de la Victoria (former orchard estate now part of the University's properties), and the former Cuarto Real de Santo Domingo, the archaeological site of a 14th c. pleasure garden in formerly large gentry orchard estates.

See **Appendix M** for Observations from visiting the Alhambra
See **Appendix N** for Summary of paper given by Jose Tito Rojo, expert in Islamic Gardens
See **Appendix O** for learnings from visit to Cuarto Real de Santo Domingo, Granada

See **Appendix P** for learnings from Book launch: *Trees & Shrubs of al-Andalus,* Granada
See **Appendix Q** for learnings from visiting sites 'uphill' of the Generaliffe & Granada
See **Appendix R** for learnings from visiting the Parque Federico Garcia Lorca, Granada

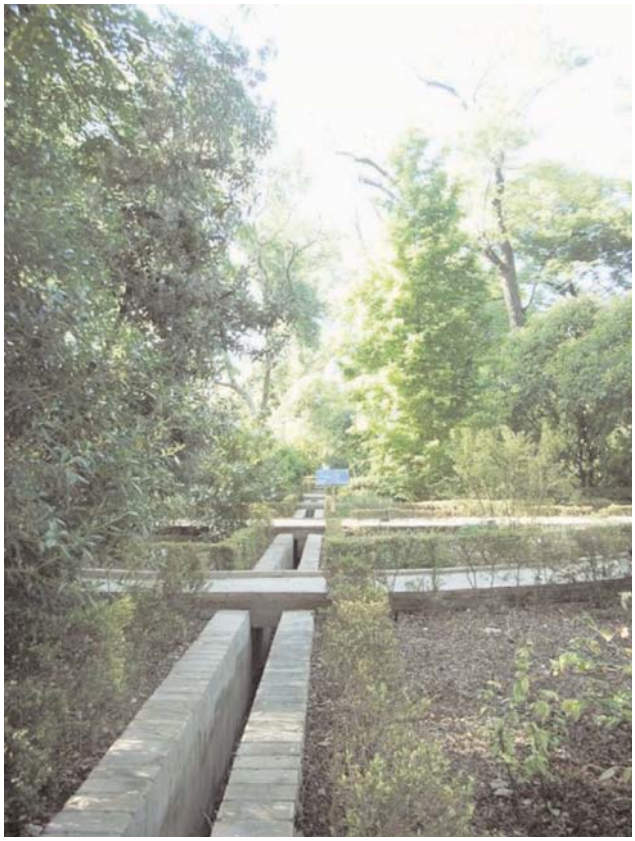
23) Botanic Gardens de la Universidad, Valencia

By way of background, the Valencia region has a temperature range of 10.5 degrees C (minimum) to 37.5 degrees C (maximum) and an average rainfall of 420mm per year.

NB: una/la huerta = an orchard/vegetable garden/area for food production - eg; the large agri/horticultural plain surrounding Valencia City
un/el huerto = a walled precinct, often with fruit trees, and a house adjacent.

I was lucky to meet and be guided around the garden on my first visit by Julio Lacarra Lopez, a landscape historian and practitioner in Valencia, who I had met in Madrid via Luisa Roquero. He outlined for me the importance and history of water management on the fertile plain on which Valencia sits, and more broadly its regional economy. Valencia's huerta retains its traditional irrigation system of acequias/canals and flood irrigation, tapping its natural delta of river/rivulets into a broader fan of irrigated cultivation, one of Spain's richest. Rice, introduced by the Moors, and silk/mulberry, and citrus production are key industries here still.

This system of irrigation is efficient, promoting deep soaking in of water, and quotas of water/access to the acequias for diversion onto particular lots of land are monitored by a system of regional and local water courts, and allocations. Disputes over water access/quota/supply are famously still regulated outside the cathedral in central Valencia, much as they have been since the Middle Ages. Some critics suggest these are now more for the tourists today, but they still go on.



Right) detail inside Valencia Botanic Garden, showing traditional irrigation channel and crossing path. Flood irrigation has been suspended in favour of a drip system, which unfortunately has killed some of the magnificent trees here.

Huertas exist both outside and inside the city's medieval walls, and example of the former being the botanic gardens, and of the latter being the Viveros/Jardin Real, once part of the Palace.

The Botanic Garden was first founded in 1567 (a medicinal plants collection in another location), and has been on its current site since 1802. The garden was a walled traditional huerta/orchard estate, located outside the medieval city walls (which were removed in the 19th century. It was damaged during the Napoleonic invasion of Spain, when his troops set up a military camp there.

After neglect during the 20th century, the garden had a major restoration undertaken by Valencia University in the late 1990s, and reopened to the public in 2000.

The garden has a formal layout/ orthogonal grid structure of hedged rectangular/ square beds displaying its wide collections by botanical system, including Valencian regional flora, Mediterranean basin flora, industrial, medicinal, orchard and fruit species. It also features an 1861 tropical glasshouse, 1900 steel shade house)

Beds were originally hedged in *Ruscus hypoglossum*, a traditional species for this use. Unfortunately the restoration works replaced these with box (*Buxus macrophylla*), which seems less likely to do well in the shady conditions. Another regrettable action in the restoration (which was done under the direction of an architect from Madrid) was to replace the original irrigation system (of acequias/canals and flooding of the beds with one of drip and sprinkler irrigation.

This has led to many deaths of mature trees in the collection over 4-5 years. The reason is that sprinkler/drip irrigation does not promote deep soaking in of water applied, and thus roots seeking water tend to concentrate near the surface/dripper - older established tree root systems which are deeper are not being watered effectively. Also problems of salt and chemical (fertiliser/impurities in the water supply) can concentrate in the soil/top soil and lead to problems of scorching/toxicity and /or fungal problems with tree roots from increased topsoil humidity. Despite this change, the traditional system is still visible, with sunken brick lined acequias running through the beds, and pump houses/outlet director 'joints' notable at the end of some paths.

Left) rear section of the garden featuring Florida fan palms (*Washingtonia robusta*), and succulents (a dazzling display of South African aloes is a current feature).

Valencia has a long history as one of Spain's great ports, an entry and exit point for many new plant species from the new world and distant trading partners, and its collection reflects Spain's rich and varied history.

Mr Lacarra Lopez pointed out to me the wonderful mature tree collection, many of which are of enormous size, being on fertile rich flood plain silt from the nearby river, and well irrigated. Notable specimens of trees included Caucasian elm (*Zelkova carpinifolia*), floss silk tree (*Chorisia speciosa*), southern nettle tree (*Celtis australis*), maidenhair tree (*Ginkgo biloba*) with a girth of 1.2m, a *Yucca australis* over 2 m tall (rare), *Podocarpus neriifolia* some 15m tall and many more.

Shade is a management challenge in the garden, the trees being so huge and contiguous, and over the 20th century, high rise flats having ringed the garden on all sides but one. Some trees were removed in the 1990s restoration to let more light in.

Mr Lacarra Lopez pointed out that southern nettle tree berries were traditionally fed to domestic pigs, along with evergreen /holly/ holm oak acorns, in the production of the famed 'jamon serrano iberico', some of the most highly flavoured and expensive 'mountain cured ham' produced in Spain. Traditionally this only came from one or two specific areas, although today it has many imitators all over Spain. Pigs were fed on acorns/berries exclusively in their last month of life before slaughter, this giving the meat a distinctive flavour.

Traditionally the Garden has been one devoted to acclimatisation of new plant species and varieties from Spain's colonies, and growing of plants for the East India Company staff, eg: malaria-cure plants, and greens

for sailors. Again to Mr Lacarra Lopez's dismay, this former policy has given way to greater pragmatism in the 1990s with cultivars of plants only being now introduced, and more 'populist' feature areas of the garden introduced, such as a herb/medicinal plant area, playground area, huerta/orchard cultivated plants area etc (ie: non traditional).

The climate is varied, with winter minimums of 2-3 degrees C normally, although this last winter has seen frosts and ice forming on the pond, which has not happened here in 50 years!

A number of flowering and other shrubs have been introduced/ reintroduced in the 1990s. Australian species were present, eg: river red gums, Bunya and Cook's pines (*Araucaria bidwillii* and *A.columnaris* of some considerable size), honey bracelet myrtles (*Melaleuca spp*.).

The c.1900 shade house, a beautiful half-cylindrical structure of iron laths, has been rebuilt in its original form. Another feature is a collection of original 19th century glasshouses, some small, housing a varied collection of tropical, alpine plants, ferns, bromeliads and carnivorous plants.

Some low key but effective interpretation was given, pointing up plants found and identified by de Rojas Clemente Rubio, a botanist and favourite student of famous botanist Cavanilles, who made a transect across Andalucia from the sea up into the Sierra Maestra Mountains to Spain's highest peak, noting carefully what plants grew where. Small perforated 'outline of his portrait' signs were located next to plants he had found/identified, along with quotes from his diaries/notes about the plants' habitats or characteristics. These formed a small walk through the garden.

The soil is calcareous, ie: limestone-based and alkaline, which is a challenge to grow some coniferous trees in, needing the addition of acidic material to neutralise the soil's pH.

Right) Botanic Gardens collection of citrus varieties, which feature also in the adjacent modern Jardin de las Hesperides. *Citrus*, introduced to Spain by the Muslims, were one source of Valencia's agricultural wealth, eg: Valencian oranges, along with other crops like rice, still a staple product today.
Originally citrus came from China and Asia, and were traded down the Silk & ocean routes with Arabic traders.

24) La Jardin de las Hesperides, Valencia

This is a post modern Valencian park next to the Botanic Gardens, celebrating the role of the *Citrus* family in Spain (*Citrus* were introduced in the Islamic era, and remain one (along with silk, another Muslim introduction) of the Valencia region's sources of agricultural wealth)), with a collection (8 groups; 50 varieties, arranged in a very modern 'architectural' way but also a version of the ancient 'hortus conclusus' or walled garden

25) Jardines de Real, formerly Las Viveros (nurseries), Valencia

Ximo Sanchez works as a landscape architect for Valencian City Government's Parks & Gardens, Landscapes and Trees Department, along with 4 other landscape architects. He was kind enough to host a day of touring these for me, visiting several old and new parks and green spaces in the city, and pointing out a number of management challenges they are facing, and solutions being applied.

This city park was originally a Royal recreation farm estate of Moorish King, converted to Christian palace and grounds by Jaime 1. First zoological garden in Spain, from 15th c., with various changes esp. 19th and 20th

centuries to a landscape style public park); visited Paseo de la Alameda (riverside avenue, Valencia's oldest public park (over 1km long, first plantations (poplars) from 1694, has had several re-plantings and modifications, two monumental towers with blue tiles from 1814, 2 fountains from 1861, and 1878) a treed promenade.

26) Jardi d'Ayora, Valencia

This is a public park which used to be a private huerta/garden estate in the inner city. It retains its house c.1900, now a child care centre, in a densely high-rise area. The estates walls have been removed (one remains). Traditional irrigation system has been changed to drippers and sprinklers, although the beds (Japanese-pittosporum hedged) remain lower than the path system, hinting at the original flooding technique.

Trees include Cook's pines, river red gums, impressive Moreton Bay figs, silky oaks (which seem to be naturalising!), Hill's figs, Port Jackson figs and a maidenhair tree. Flowering shrubs are a dominant feature in beds, including: sky flower (*Duranta plumierii*); mock orange; angel's trumpets (*Datura /Brugmansia*);Chinese hibiscus (*H.rosa-sinensis cv.s*); queen of the night (*Cestrum nocturnum*) and feijoa (*Acca sellowiana*).

Ground covers and herbaceous perennials were also much used, including: spider plants; bearded iris; *Crinum spp*.; nutgrass/papyrus (*Cyperus rotundifolius*); cast iron plant (*Aspidistra elatior*); periwinkle (*Vinca major*); kaffir lily (*Clivia miniata*) ; *Ruscus hypoglossum;* elephant ear (*Bergenia cordifolia)*; bear's breeches; Nile lily (*Agapanthus orientalis)*; Indian shot (*Canna indica cv.s)* and *Muehlenbeckia spp.*

27) Monforte, Valencia

Dates from 1860-70 when existing orchard estates (huertas) were transformed into neoclassical style gardens around a small palace, near the city. Has three distinct zones are the Parterre Viejo (old parterre) with hedges and statues, Parterre Nuevo (new), with cypress hedges and myrtle making squares around the patio of the fountains, and the Bosquete (wood), of a natural character (and including an artificial hill and small

Right) knockout pergola at Monforte garden, Valencia, covered with *Bougainvilea*.

Left) artificial lake and wetland system at the heart of Parc Marxalenes, Valencia: now a natural science study centre, and a welcome oasis from high rise urban housing.

Developed in consultation with the neighbourhood, the park is a highly successful venture, with a radical ecological underpinning, seeking to interpret Valencia's natural systems and agricultural irrigation system to city dwellers.

Native plants and long-cultivated species of exotics are featured.

lake. Also has a rose garden and gallery of climbers. The gardens have a large collection of statuary, fountains, and now an oasis in a very high density area of flats and offices. (see photo on previous page).

28) Parc Marxalenes, & Parc de la Rambleta, Valencia

Parc Marxalenes is a recent park using traditional irrigation system and indigenous species (mostly), and Parc de la Rambleta, (2001) is similar, with a more radical ecological concept/ layout using natural drainage and emulating major biotype floras of the Valencia region).

These parks were exciting to visit both in terms of heritage and modern design. Both are recent, both use traditional irrigation or natural drainage techniques to manage on site water supply, and both interpret the landscape history of the irrigation, drainage and horti-/agricultural management of the vast, fertile plain and swamps of the Valencia region, one of Spain's powerhouses.

Intricate canal and water diversion systems have been the key to this fertility over time, with Roman, Islamic and later adaptations and refinements. Sadly this rich history is under some threat from burgeoning urban sprawl/ expansion, short memories and competition/ fashion of drip/ sprinkler irrigation systems.

For detailed descriptions and learnings from these two parks see **Appendix S**

Above) Parc de la Rambleta, bringing nature back into the city, with re-created natural drainage and irrigation, plantings based solely on natural Valencia region ecosystems, and yet providing all the services expected of a modern urban park: childrens' play areas, dog exercise areas, etc.

29) Observations in talking to Valencia Parks & Gardens about tree management.

Valencia is an independent region of Spain that largely governs its own affairs, and with regard to urban planning, parks and trees, there is a 1987 General Plan on Urbanism that is the main legal instrument. In addition there is a 2002 Ordinance or regulation.

My observation is that the Valencian economy is booming after decades of relative sluggishness, with much new construction and infrastructure projects (eg: roads) evident, the huge City of the Arts & Sciences urban renewal (leisure/ recreation facility) project near the heart of the city and the touted Americas Cup Race for 2009, with its ambitious attendant reconstruction of Port area districts and facilities. The existing port is one of Spain's largest and busiest.

48 people work full time on urban tree pruning, which (like Barcelona) forms a large part of the budget. Planting and cultivation are contracted out to the private sector. Decisions about urban trees are political, with advice from relevant areas such as the Parks & Gardens Department, Professional groups, and community.

Through Ximo Sanchez I was introduced to several colleagues who run Valencia's tree management system, which appears to be quite sophisticated. By far the emphasis so far has been in documenting, on a GIS database, the tree 'stock' of some 110,000 trees in total around the city, recording location, species, age, condition. Much effort is expended in valuation of trees, presumably to make them 'stack up' in political debates and decisions on development.

Every street tree and notable park trees in the city are mapped on a computer GIS system, with an inventory storing data on their species, age, condition, services nearby (pipes/wiring underground). A system of valuation of trees is undertaken, and information on systems used for this in Australia was keenly sought.

An Urban Commission makes decisions on planning matters including street trees. Technical specialists are involved in advising this commission, but its decisions are political, influenced by many factors. This 'paralyses' the system in these men's view. Valencia has seen huge urban change (development) in the last 20 -30 years, with increasing housing density and suburban sprawl, construction of a metro rail system (2 lines), underground car parking etc.

Despite this there is no overall 'green' plan for the city, although there are particular protests and community actions, which have led to specific project sites for urban renewal/improvements. There is an overall plan for planning, but this does not extend to trees or open spaces. In general there is not a culture of valuing trees for themselves, above a monetary/pragmatic approach.

All maintenance work etc is done by private consultant/contractors, under guidelines from Council staff via contract documents and site supervision/monitoring. Valencia has no school for training arborists, although Spain has an Arboricultural Association which runs periodic industry courses.

Especially favoured tree species are *Citrus* and different types of palm trees. Also commonly seen are elms (interestingly seen here as a symbol of independence and good government), Canary Island date palms, *Washingtonia robusta* fan palms, jacarandas, white cedars/Indian bead trees (*Melia azedarach*) and (usually in single huge specimens in parks or 'islands', Moreton Bay and a few Port Jackson figs!

I noted a range of trees used in Valencia's city streets, some recently planted. I witnessed a passionate defence of the elm tree's importance to the people of Valencia province, in that it is seen as representing/symbolic of good government, ie: democracy and stability here. This perhaps dates to Napoleonic invasion/French and Spanish liberal political ideas, which had periodic success in this fiercely proudly independent region over the last 200 years at least. In this same era street trees enjoyed vogues of being promoted and planted on city streets.

For a list of common street tree species in Valencia see **Appendix T:**

28) observations from interviewing Patrizia Falcone, heritage architect, Barcelona

Ms Falcone is a key person responsible for many of Barcelona Parks & Gardens Department's recent park restorations and has done some new work. I was keen to ask her about her/the department's philosophy, approach, levels of public consultation, political support and how recent 20th century parks fare as 'modern' heritage, ie: whether her ambit includes the series of 1970s Parks Director Joaquim Casamor's design and park upgrade.

The advantage Barcelona has had with its 'stock' of historic parks is that their age (generally 19th & 20th c.) has meant that there are extremely good records available, for instance photographs of creation, early and later life, to inform restorations. Earlier gardens and parks in Spain do not have this advantage.

One major change in the way of work has been increasing public interaction in plans to reinstate or restore parks, particularly where this work clashes with local issues like car parking, recreation etc. This has at times been difficult and confrontational, with expertise and agendas being drawn into question, politicisation of heritage issues etc.

This very much parallels the Australian situation where perhaps 20 or 30 years ago heritage

Right) an indication of how popular some Barcelona parks are! Parc Guell in full tourist mode on a sunny day. Tourism aside, public interest and engagement is growing in Spain's parks and public gardens.

restoration was very much an 'expert' system, not open to question or debate, least of all to the general public. This is not the situation today.

My impression from other conversations in Spain is that due to the lack of democracy and participation of the community (or being asked) until relatively recently, this change is occurring now, rather than perhaps in the 1980s and 1990s like Australia, with a stronger and older tradition of participative democracy, in planning and heritage decisions at least.

See **Appendix U** for Discussion and general lessons learnt from the fellowship

4.0 RECOMMENDATIONS

4.1 [A] The Opportunity

Australia has an opportunity to capitalise on its diverse collection of historic parks, gardens and landscapes, diverse population and climates, popularity of gardening and garden visiting here. Potentially this small sector of the economy could grow and contribute more to future jobs, economic activity and richness of cultural life, for owners, visitors and tourists, be these domestic or international.

Cultural tourism is a growing sector of this broad part of the economy. Promotion of 'value-added' holidays, or experiences, means visitors may stay longer in an area, spend more and gain more from their visit, than, say a 'sun and sand' experience alone. Featuring the heritage resources of an area or region, presenting alternatives to divert and retain visitor interest can do much to stimulate local economies, turn around marginal areas and keep places both alive, well and well-looked after.

Finding sensible linkages between sectors of the economy, and between stakeholders, such as Governments, educational institutions, industry and the community offers opportunities to multiply funding for beneficial projects. Again raising awareness of the needs and possibilities is a necessary starting point to any such linkages or investment.

Showcasing the range and richness of Australian historic parks and gardens could be a vital and growing sector of cultural tourism as a sector of the national and regional economies. This of course depends on improved levels of understanding, promotion and resourcing.

Australia also has an opportunity to learn from similar climatic-zone countries who may have been dealing with similar challenges in different ways, for longer. A relatively high and growing consciousness of both limited resources (land, water, skills), the environment including challenges to achieving sustainable development, and more sustaining environments in which to live, play, work.

4.1 [B] The Problem (skill gaps).

Key skills gaps in this area relate to the broad areas of awareness, education and training, resourcing, and higher standards and practice of management. Improved understanding, resourcing and standards are needed to address these gaps. This is the case in a range of fora, from Government, Industry and the public.

A lack of general and specific awareness of what is Australia's resource of historic parks, gardens and landscapes, what their needs are, and what their contribution to the future sustainable development could be, leads to their unfortunate poor management, neglect and loss in some cases.

A lack of skilled people in charge of managing, advising and undertaking work on such places is one gap. A lack of skilled trained horticultural staff, arborists skilled on working on historic or 'ancient' trees is another. A lack of skilled decision makers, well briefed and informed about the particular heritage values of a historic park or garden in making funding or development decisions is another.

A lack of sensitivity to the particular types of expertise relevant on multi-disciplinary teams making development studies or decisions about historic landscapes is another. Lack of advice, appropriately senior in any such team, from people with training or experience in managing historic parks and gardens, leads to poor decisions, overlooked heritage values or issues, and unfortunate outcomes.

Conclusions: General lessons I learnt from the fellowship:

Awareness Raising

1. The gap between theory and practice in identifying, conserving and managing historic parks, gardens and cultural landscapes – legislation/criteria may define and potentially apply to these as a category, but there appears to be a low general awareness of their existence, variety and vulnerability. They tend to not be listed on heritage lists, or if they are to not have clearly identified heritage values. Thus they are often not being considered in relevant decisions on planning, urban design, structural change, and are not being actively managed to retain these heritage values. It is important to have appropriate planning controls conserving them, and guidelines on assessing and managing these complex, layered, vulnerable places;

2. The importance of Central Government leadership in setting policies, standards, comprehensive inventories of the 'resource', guidelines on identification, assessments, conservation and integrated management. Government commitment to long-term funding, promotion and marketing (eg: cultural tourism) where appropriate. Additional funding and clear, applicable guidance for regional and local governments with devolution – education and training for relevant staff including engineers and parks maintenance staff, Councillors, successful consultation with stakeholders eg: community, the development industry and heritage experts;

3. The need for increased ongoing awareness raising for decision makers about heritage landscapes, and their needs (including Governments, Departments, Councils, funding bodies, architects, engineers), eg: for their active management and adequate recurrent resourcing, competent staff and appropriate training. The need to include heritage landscape specialists in teams planning change or management of these places ie: avoiding undue bias / blind spots. The need for ongoing funding after installation or restoration and for ongoing integrated management to ensure the original design concept or planting is not eroded or lost (eg: through inadvertent actions, using 'standard' practices from elsewhere; or ignorance). The need for replanting losses, proper pruning, maintenance of traditional irrigation systems and awareness of the problems that can occur with introducing new irrigation systems eg: localised chemical build up/concentration, fungus, plant deaths;

4. The economic, cultural and conservation benefits of integrated Government and private tourism marketing and improved conservation management of these places as key parts of an area's identity, attractiveness, cultural richness. Also the usefulness of coordinated promotional and educational tools such as booklets, brochures, videos, seminars, websites, on-site interpretation, site operator and tourist information staff training. The importance of central Government providing or working in partnership to give 'industry' guidance and coordination eg via Tourism, Heritage agencies;

5. The value of (more) widespread consultation before making major decisions or changes to historic parks/gardens such as restoration, reinstatement or adding new features. The need to seek wider input on such matters via public advertising and stakeholder engagement. The importance of consulting outside/other heritage landscape experts, landscape architects and archaeologists came up as a constant need (cf: architects, engineers);

Education & Training learnings

6. The need to include a meaningful heritage landscapes component in all relevant tertiary training, eg: of landscape architects, architects, engineers, urban designers, planners, horticulturists, arborists. The need to include a 'landscape' component in all 'heritage' training courses to ensure a wholistic approach is encouraged. The need to foster standards to raise awareness in 'heritage' professions, competency training and industry accreditation;

7. The need for increased training of landscape 'designers' on ongoing management needs. The need to foster the notion that sustainable design includes appropriate ongoing maintenance. eg: the need to consider ongoing maintenance needs, the level of owner resources and commitment in any designs/ revamps and in management plans, so that 'detail' and 'concept' are not lost with time, lack of funds, expertise or staff. Increased training on defining aspects of landscape significance, (eg: writing specific schedules of maintenance, identifying which plants to keep, pruning methods to retain a desired "look", composition of beds, heights of hedges). The need to prepare outline plans of management for recent and historic parks, with detailed maintenance policies and prioritised maintenance tasks, over the short, medium and long terms;

8. The need to promote the importance of good 'fit' of design, composition and planting to the specific region, place and environment to be sustainable (ie: not require massive resources to retain in the long term) eg: water needs of different plants in dry/ Mediterranean climates, benefits of using locally indigenous plants / plants from similar climatic zones … The value of learning lessons from older local surviving gardens, traditional irrigation systems, long-time horticulturists, managers etc;

9. The need to better-promote good examples of new design/ revamps/ surviving historic parks and gardens with 'lessons' for today/ tomorrow, to industry, designers including urban designers, planners, Councils, heritage decision makers and the public. This can include promoting sustainability, in terms of promoting appropriate design, plant selection, irrigation (or the lack of it), lower ongoing maintenance costs;

Management learnings

10. The very real problems arising from changing formerly private (eg: Royal) gardens/parks into public ones (particularly gardens changing into parks), in terms of increased visitation, pressure and wear; pressure for other uses they were not designed for (eg: active recreation); inadequate resourcing (eg: funding, number or type of gardeners, training); monitoring; maintenance; vandalism, litter, graffiti and security issues;

11. The need to actively manage visitors, monitor condition and quickly repair any site damage: (eg: lawns, trees, paths and steps) by setting limits on numbers entering fragile sites or other tools such as: introducing (and setting an appropriate level of) entry fees; setting time limits on entry/ quotas per hour; limiting hours or visiting 'season'; blocking access to some parts; and most importantly, explaining to the public why measures are proposed/ occur;

12. The need to regulate behaviour by educating visitors, (eg: no picnics, no tripods/ require prior permission for photography, no dogs/ on leash only; collection of droppings; no children; no stepping on grass/ garden beds). The importance of the inobtrusive provision of waste bins, car parking areas, public transport stops, bike storage, cafes, visitor facilities/centres, directional or other signage etc so as not to unduly detract from the qualities of the place. The need for on site security for particularly fragile/ valuable places – security cameras; signage;

13. The need not to be too 'purist' about natives v exotics, but to weigh up what is historically or environmentally appropriate - what works: Australian trees (and to a lesser extent shrubs) are widely and proudly used in 'drier' parts of Spain, in parks, as street trees and motorway-side plantings, for rural shelter belts and shade. For example street trees commonly seen were kurrajongs, Illawarra flame trees, Casuarinas and River Red gums. Generally there seems low concern about 'weed' potential (apart from eucalypts in 'wet' (Northern) Spain). Similarly issues of possible risks of branch drop with river red gums are clearly overlooked. Spain appears far less litigious or fretful in this regard than Australia.

4.1 C] The Solution

Awareness Raising

1. A concerted 'upgrade' program in terms of systematically identifying, conserving and managing historic parks, gardens and cultural landscapes – ensuring heritage lists at National, State and Local Government level investigate the 'resource' in this type of heritage place, clearly define their heritage values, list significant places on relevant statutory lists, define management needs, appropriate protection, including appropriate planning controls to conserve their heritage values, management guidelines for owners, investors and decision makers;

2. Central Government leadership in setting policies, standards, comprehensive inventories of the 'resource', guidelines on identification, assessments, conservation and integrated management. Government commitment to long-term funding, promotion and marketing (eg: cultural tourism) where appropriate. Additional funding and clear, applicable guidance for regional and local governments with devolution – education and training for relevant staff including engineers and parks maintenance staff, Councillors, successful consultation with stakeholders eg: community, the development industry and heritage experts;

3. Increased ongoing awareness raising for decision makers about heritage landscapes, and their needs (including Governments, Departments, Councils, funding bodies, landscape architects, park managers, architects, engineers), eg: for active management and adequate recurrent resourcing, competent staff and appropriate training. Including heritage landscape specialists in teams planning change or management of such places. Providing ongoing funding after installation or restoration and for ongoing integrated management. Replanting losses, proper pruning, maintenance of traditional irrigation systems and awareness of risks with introducing new irrigation systems;

4. Coordinated Government and private tourism marketing and promotion of the economic, cultural and conservation benefits of integrated management of these places as key parts of an area's identity, attractiveness, cultural richness. Coordinated circulation of promotion and education tools eg: booklets, brochures, videos,

seminars, websites, on-site interpretation, site operator and tourist information staff training. Central Government provision of/ partnership in 'industry' guidance and coordination eg Tourism, Heritage agencies;

5. More widespread decision-maker consultation before making major decisions or changes to historic parks/gardens eg: restoration, reinstatement or adding new features. Seeking wider input via public advertising and stakeholder engagement. Consulting outside/other heritage landscape experts, landscape architects and archaeologists as required;

Education & Training learnings

6. Seeking that all relevant tertiary training includes a meaningful heritage landscapes component, eg: of landscape architects, garden designers, architects, engineers, urban designers, planners, horticulturists, arborists, all 'heritage' training courses. Government Agencies and Industry seeking to raise standards and awareness in 'heritage' professions, competency training and industry accreditation;

7. Increased academic and industry / professional training of landscape 'designers' on ongoing management needs. Fostering the notion that sustainable design includes appropriate ongoing maintenance, eg: the need to consider ongoing maintenance needs, the level of owner resources and commitment in any designs/ revamps and in management plans. Increased training on defining aspects of landscape significance, (eg: writing specific schedules of maintenance, identifying which plants to keep, pruning methods to retain a desired "look", composition of beds, heights of hedges). Encouraging preparation of outline plans of management for recent and historic parks, with detailed maintenance policies, prioritised maintenance tasks, over short, medium and long terms;

8. Increased promotion of the importance of good 'fit' of design, composition and planting to the specific region, place and environment to be sustainable (ie: to save resources in the long term) eg: water needs of different plants in dry/ Mediterranean climates, benefits of using locally indigenous plants / plants from similar climatic zones. Promoting lessons from older local surviving gardens, traditional irrigation systems, long-time horticulturists, managers;

9. Better-promoting good examples of new design/ revamps/ surviving historic parks and gardens with 'lessons' for today/ tomorrow, to industry, designers including urban designers, planners, Councils, heritage decision makers and the public. Promoting as part of sustainability in terms of appropriate design, plant selection, irrigation (or lack of), lower maintenance costs;

Management learnings

10. Dedicating increased resources and planning when changing formerly private gardens/parks into public ones (particularly gardens changing into parks), in terms of increased visitation, pressure and wear; pressure for other uses they were not designed for (eg: active recreation); inadequate resourcing (eg: necessary ongoing funding levels, number and type of gardeners, training); monitoring; maintenance; vandalism, litter, graffiti and security issues;

11. More active management of visitors, monitoring of condition and rapid repairs of any site damage: (eg: lawns, trees, paths and steps) by setting limits on visitor numbers, introducing (and setting an appropriate level of) entry fees; time limits on entry/ quotas per hour; limited hours or visiting 'season'; restricting access to fragile areas; and explaining to visitors why;

12. Increased regulation of visitor behaviour by education, (eg: no picnics, tripods/ requiring prior permission for photography, no dogs/ on leash; collection of droppings; no children; no stepping on grass/ garden beds). Sensitive and inobtrusive provision of waste bins, car parking areas, public transport stops, bike storage, cafes, visitor facilities/centres, directional or other signage etc. Providing site security for fragile/ valuable places – security cameras; signage;

13. Promoting a reasoned discussion about appropriate plant material: on a case-by-case merit/ ecosystem based approach, seeking not to be too 'purist' about natives v exotics, but to weigh up what is historically or environmentally appropriate - what works. Educating stakeholders including the community about species-specific 'weed' potential, risks of branch drop with tree species, alternatives that may suit a historic park or garden better, management techniques to allow 'co-existence' of problematic or now-unfashionable species (eg: pruning to remove fruit on 'weed' species spread by seed, reintroduction of pollarding of trees…

4.2 Action Plan

Specific reference is made to **Appendix D**: Conclusions from 2001 book: *Proteccion de los Jardines y Sitios Historicos – normativa, analisis de la situacion, (Protection of Historic Gardens & Sites – standards, analysis, status*), by Soledad Martinez Munoz & Luisa Roquero. This was a national study of gaps and needs of Spain's national 'resource' of historic parks and gardens and cultural landscapes. Its recommendations are grouped into 1, 2, 3-year actions by responsible agency, eg: national government, etc. Australia has done national surveys in the 1980s and 1990s of historic gardens, and of designed cultural landscapes. These did not necessarily lead to statutory listings or protection and improved management assistance.

The following seeks to merge these recommendations with my own solutions generated from my fellowship. Key actions are for the ISSI to work with relevant stakeholders to build community and industry group lobbying of Central and State Governments, as well as professional industry group actions (eg: groups like the Australian Garden History Society (AGHS), Australian Institute of Landscape Architects (AILA), Australian Institute of Horticulture (AIH) and Australia ICOMOS (the Professional Heritage Consultants' body), Australian Institute of Parks & Recreation (AIPR) etc publications of articles in popular and industry magazines, give talks and workshops to seek support for the following actions:

1) Scope: Pre-inventory Actions
ISSI and industry groups to lobby the Federal Australian Heritage Council (AHC)) & State Governments to provide additional funding and staff (additional specific fellowships?) to:
2006 – prepare a pre-inventory (based on a revivified Register of the National Estate, World Heritage List (Melbourne's Royal Exhibition Building & Carlton Gardens are listed on this), an expanded National Heritage List and Commonwealth Heritage List including historic parks & gardens) of all possible landscape heritage to establish the character and scope of the resource;
2007 – revise the listings and descriptions of each one of Australia's already-identified historic landscapes, parks and gardens, in terms of layout, contents, features, and condition. Establish which (if any) have disappeared, and which have been changed or used for functions that detract from their heritage significance;
2008 – revise landscape heritage inventory after the above actions.

2) Training Actions
ISSI and industry groups (eg: AGHS, AICOMOS, AIH, ACNT, AIPR) to lobby AHC, State Governments and Industry Groups themselves to:
2006 – Seek funding for AILA (working with above groups) to develop a compulsory module of heritage landscapes training that can be integrated into all relevant education courses (University, TAFE etc) (eg: landscape architects, garden designers, park managers, architects, engineers, urban designers, planners, horticulturists, arborists, the nursery trade, all 'heritage' training courses). This module needs to place an increased focus on identifying and conserving heritage values, managing conflicting values, post-installation maintenance needs, matching designs with place and owners' requirements, level of maintenance, lessons from historic parks and gardens in the area in terms of design, layout, plant selection, etc.
2006-2010 - provide an ISSI fellowship per state and territory to teach this component of these courses;

2006-2010 - ISSI to lobby industry groups and other media for relevant industry and public promotion (eg: through AILA 'Landscape Australia' design conferences, AGHS conferences, major garden shows, AIH seminars and 'Australian Horticulture' magazine, TV programmes (eg: ABC 'Gardening Australia') content) and Nursery Trade conferences promoting the importance of good 'fit' of design, composition and planting to a specific region, place and environment to be more sustainable. Also promoting study of and circulation of lessons from older local surviving gardens, traditional irrigation systems, long-time horticulturists, managers; Increased promotion of a reasoned discussion about appropriate plant material: on a case-by-case/ ecosystem based approach, seeking not to be too 'purist' about natives v exotics, weighing up what is historically and environmentally appropriate; what works;

- ISSI to lobby AILA, AIH and the nursery industry to study historic parks and gardens in each State and region for lessons in drought hardiness, climatic suitability, low maintenance, etc - and encourage propagation and commercial release of plant material from these places to encourage modern use;
- ISSI to work with industry groups seeking that 'Landscape Australia' annual national design conferences include a dedicated 'heritage landscape' component, focussing either on (international/national) lessons (in sustainability, irrigation, plant selection, design) to be learnt from, or best-practice adaptations of such places - with wider application;

– ISSI to lobby industry groups, Federal & State Government Education Departments seeking funding for scholarships to produce some students of the first grade of heritage landscape architecture, in a public

university in each State (this could include an overseas fellowship component/bringing in overseas lecturers);
- Fund fellowships and scholarships to produce some students of the first grade in TAFE-based horticulture and arboriculture courses, specialising in heritage landscape work, managing change sensitively etc;
- Lobby State Education Departments to incorporate specific local heritage landscape-related study projects in relevant secondary school curriculum - eg: science, environment, conservation, history, geography;

2007+ ISSI and industry groups (including Australian Local Government Association and Australian Institution of Engineers through their conferences) to lobby Federal & State Government Education Departments for targetted industry sector education and training to raise standards and awareness in 'heritage' related professions, competency training and industry accreditation for relevant parties including Heritage Agency staff, State & Local Government engineers and parks maintenance staff, Councillor induction training; encouraging decision makers to include heritage landscape specialists in/ lead teams planning change or management of such places. Increasing the understanding of and focus on the need for ongoing funding after installation or restoration, and the need for ongoing, integrated management;

- ISSI to consider a role for its Research Institute as a central point to commission, compile and circulate 'best-practice' information and examples on park or garden water management (or sustainable agriculture/cropping/alternative farming), tourism management, historic park and garden management, 'dry' or 'low water' plant selection, good case studies of managing change sensitively in such places;

2009-10 – ISSI and industry groups to lobby Federal & State Government Education Departments to:
- review the adequacy of trades training (horticulture, garden design, parks maintenance, landscaping nursery staff in particular) towards the provision of a competency-based accreditation system of appropriate parks maintenance staff (apprenticeships, trainee schemes, work rotations etc) with relevant training to manage historic parks and gardens.

3) Inventory Actions
ISSI and industry groups to lobby AHC & State Governments to:
2006 – design a simple, generic, useable inventory that can serve as a base for all State and Local Governments, encouraging all to codify and describe their landscape heritage on statutory lists and to focus funding programmes to foster the achievement of this;
2007-10 – provide targeted funding to State & Local Governments to address this process of training in the identification, assessment, listings and preparation of management advice;

4) Classification Actions
ISSI and industry groups to lobby AHC to:
2006 – following Portugal's example, adapt the existing AHC criteria and Burra Charter to be useful for listing of this type of heritage - with any necessary adaptations to the different administrations involved in its conservation. Circulate and promote the adoption and use of these criteria to address neglected or non-identified places, re-evaluations or identification of 'new' values of places that are already listed (as buildings, settings);
2007-8 - promote use of classification and criteria to Governments and industry at all levels doing heritage studies, local planning preparation, rezoning proposals, to ensure due consideration of historic landscape issues in any change that may affect these places (eg: 'up-zoning', increased density, traffic, intensity of use);

5) Promotion Actions
ISSI and industry groups to lobby AHC, State Governments, and Industry Groups to:
2007, 2008 + Once the AHC has decided on the scope of heritage to be conserved, develop appropriate forms and funds to ensure its effective national promotion to State & Local Governments and other stakeholders, eg: through inclusion as a regular component of conferences (AILA, AGHS, AIH), courses, Garden Exhibitions/Trade Shows, seminars, websites/ relevant website content, TV programmes, magazine articles/content, brochures etc (eg: "Great Parks & Gardens we love/ we want to keep") in all of Australia, to help stimulate interest in the conservation, good management and promotion of these places;

- ISSI to consider role for Research Institute as a central point to commission, compile and circulate 'best-practice' information and examples on park or garden water management, tourism management, historic park and garden management, 'dry' or 'low water' plant selection, good case studies of managing change sensitively in such places;

2009-12; 2012-20 lobby for Federal and State Government commitments to long-term funding, promotion and marketing (eg: cultural tourism component linked to nature tourism in State/regional promotions) (eg: Heritage Trails of Queensland) where appropriate. Provision of targeted additional funding, clear, applicable guidance and training of relevant staff or groups for State and Local governments with any devolution;
- ISSI and industry groups to lobby Central Government and industry for a combined biennial international

design competition to make a significant historic landscape, park or garden more sustainable, sensitively adapt it for changing conditions, uses etc- promoting 'best practice' sensitive design, retention of heritage values, good climatic or regional 'fit' and ongoing integrated management planning;

6) Legislation Actions
ISSI and industry groups to lobby AHC, States, Australian Local Government & Shires Association to:
2006, 2007 Provide targeted funding to fill gaps in State & Local Government registers listing this type of heritage, and provide advice, consistent guidelines and regulations to assist all Governments in identifying, conserving and managing it (eg: guidelines focussing on clearly defining relevant heritage values, management needs, appropriate protection including planning controls, costed and prioritised maintenance tasks etc);

7) A federal advisory group
ISSI and industry groups (AILA, AIH, AGHS, ACNT) to lobby AHC to:
2006 Recruit the expertise required, representation etc to constitute a central cabinet/group to advise on, promote and protect Australia's landscape heritage (ISSI Research Institute could play a role in this also);
2007 Create a central cabinet/group for the protection of Australia's landscape heritage;
2008 Circulate a draft national policy on significant cultural landscapes, historic parks & gardens (this could be based on the existing ACNT National Policy on Cultural Landscapes, with added sections on gap identification and filling, costed prioritised actions, and roles of respective stakeholders could play in implementation);
2009-10 Use feedback from above to finalise a national policy, circulate final policy.

8) Improved management
ISSI and industry groups lobby the AHC, State & Local Governments to:
2007 + Encourage more widespread decision-maker consultation via public advertising and stakeholder engagement before decisions or changes, particularly groups with knowledge about historic landscapes;
- ISSI to consider a role for its Research Institute as a central point to commission, compile and circulate 'best-practice' information and examples on park or garden water management, tourism management, historic park and garden management, 'dry' or 'low water' plant selection, good case studies of managing change sensitively in such places;
2008-10 -Provide and circulate guidelines for changes of use (private gardens to public parks) or owner (Government to private) with any devolution/disposal. Dedicating increased resources and planning when changing formerly private gardens/parks into public ones (particularly gardens changing into parks), adequate; monitoring; maintenance; security.
- Provide guidelines, funding and increased training (eg: for Local Governments, industry and community groups) on defining aspects of landscape significance, (eg: writing specific schedules of maintenance, identifying which plants to keep, pruning methods to retain a desired "look", composition of beds, heights of hedges).
- Encourage the preparation of outline plans of management for recent and historic parks, with detailed maintenance policies, prioritised and costed maintenance tasks, over the short, medium and long terms.
- Encourage the use of 'heritage-restricted valuations' to lower land tax and rate burden on (or other incentives for) private owners to conserve and manage historic parks and gardens well;
- Encourage the greater use of volunteer groups (Australian Trust for Conservation Volunteers, Green Corps, Hands-on Heritage (VIC) with appropriate advice and supervision to assist owners in doing practical conservation and maintenance works on heritage landscapes, parks and gardens, eg: weeding, replanting and replacing missing, significant elements, pruning to reinstate significant views and connections etc.

4.3 Further skill gaps

Specialists in Garden or landscape archaeology;
Specialists in pollen analysis & soil stratigraphy/ analysis as applied to historic landscapes, parks, gardens;
Specialists in Ethno-botany relating to Aboriginal land use practices, plant use, trade /exchange;
Specialists in writing concise, focussed garden or park-specific conservation management plans;
Specialist arborists focussed on historic or 'ancient' trees, prolonging life spans in public parks or gardens, alternatives to 'standard' arboricultural practice etc;
Specialists in managing 'conflicting values' in historic parks and gardens, balancing old and new uses, needs, recreation and tourism pressures with retention of authenticity and heritage values.
Specialists in all major cities focussing on historic landscape, park and garden identification, assessment, conservation and management advice and works, particularly the latter;
Design educators (Universities, TAFEs) promoting serious study of historic parks and gardens, lessons to be learned from these in current and future design, plant selection, climatic or regional suitability;
Promoters of integrated 'place-based' management and marketing that is infused by local or regional heritage values, historic land uses, arts, cultural development, tourism and small businesses.

See **Appendix V** for Contacts. See **Appendix W** for References.

Appendix A
Barcelona Parks Department: detailed learnings; parks & trees management

Nursery/plant supply
This covers 9 hectares high on Montjuic Hill, consisting of two parts, and old part dating from the 1920s, and a newer part from c.1989 pre Barcelona's Olympic Games. About 1 million plants (some 239 species) are raised here each year for use in the City's parks and gardens, despite the site's non-ideal northern aspect (south/east would be preferable). Many plants are also bought in also, including new street trees. Of these 1 million produced, half are flowering plants (annuals, impatiens, calendulas etc) for display beds, 200,000 are evergreens (ground covers like ivy are mass-produced), 60,000 shrubs, 25,000 aromatic plants, and around 1000 aquatic plants.

'English' and Canary Island ivy (*Hedera helix & H.canariensis*) are much propagated and used for urban ground cover, it being highly pollution tolerant and hardy to trampling, re-growing quickly. Mondo grass (*Ophiopogon spp*.) is not widely available on the market but the nursery is propagating two types, large and small growing, for ground cover use.

Another pollution tolerant species of shrub favoured is the privet *Ligustrum lucidum var. texanum*, which is grown from seed.

A major problem is maintenance, speed of growth of replacements (eg: after a seasonal display, or after vandalism or damage), and accordingly ease of establishment, display and care are priorities in plant selection.

Oleander (*Nerium oleander cv.s*) and hop bush (*Dodonaea spp. eg: D.viscosa*) are much used, as are *Pittosporum* species eg: Japanese *P.tobira* and *P.t.'Variegata*', commonly used as a hedge and as a shrub (and all over Spain).

I asked about sources of Mediterranean or Spanish native plants, and whether these were widespread or easy to get. They aren't! Catalonia has one specialist nursery, Biorica in Girona (south of Barcelona) growing indigenous plants to the Iberian peninsula, but only in small amounts/orders, and these can't be relied upon for large scale orders/jobs. France and Italy have a broad nursery industry (as well as Holland), with some nurseries carrying a range of native plant species or forms, eg: Rei near Montpellier, Fe lepi and Mediterranea, with some 200 cultivars of rosemary!

Forms of olive tree are favoured: *Olea europaea var. sylvestris* is much used in Barcelona being hardy and quick growing (this is like a wild form, with highly silvery leaves and tiny fruit, no good for eating).

A favourite Barcelona street, featuring Australian kurrajong trees, something rare in Australia since c.1930 Canberra.

The Nursery's Director Steven was keen to get sources of Australian tree species seed for importation, making me think that the range available in European nurseries must be small!

Water Use
Part of gaining ISO14000 certification has been the management focus on decreasing water consumption, along with other commendable practices such as large scale compost production and use, and using organic or ecological pest and disease control.

Senora Fransi noted the Department has a rigorous programme of checking irrigation systems to avoid waste water/ leakages and maximise efficiency. The Regional Government is changing the system for public water provision to be much stricter, with dwindling supplies and growing use, both industrial and domestic.

Over the period 1993-2004 the parks system has increased its irrigable area by 14% and yet the amount of irrigation water applied has been reduced by 43%, thanks to automated irrigation systems, increased use of freatic/artesian water, use of subsoil water to water street trees, mulching and control of soil humidity, plant species selection to suit the climate and soil and aspect etc. This is a remarkable achievement by any score.

Street Trees

Barcelona claims to have the perhaps the greatest number of trees in its streets amongst other European cities, of over 155,000. There was an overall growth of 2% in number of street trees between 2001 and 2003. In seeking to meet ISO14001 a program of analysis on street trees has been undertaken, assessing condition, inventory, species selection (and replacement of ailing/poorly performing species), better matching of species and size to varying street scale, planting and pruning practices, health, education and promotion.

At present the city has 144 species, with the dominant ones being only a dozen species including the hybrid plane (*Platanus x acerifolia* (called *P.x hispanica* in Barcelona))(30% of total); nettle tree (*Celtis australis*) half as many again; then smaller numbers of (in declining magnitude): pagoda tree (*Sophora japonica*), Siberian elm (*Ulmus minor*), black locust *(Robinia pseudoacacia)*, *Tipuana tipu*, Australian kurrajong (*Brachychiton populneum*), Lombardy poplar (*Populus nigra 'Italica'*), Indian bead tree/ white cedar (*Melia azedarach*), shining privet (*Ligustrum lucidum)*, date palm (*Phoenix dactylifera*), Seville orange (*Citrus x aurantium*), Judas tree (*Cercis siliquastrum*), red cherry plum (*Prunus cerasifera 'Nigra*') and other species (intriguingly including Australian *Acacia saligna* & silky oaks (*Grevillea robusta*)).

5 species of palm are used, being date palms, Canary Island date palms *(Phoenix canariensis*), cotton and Mexican fan palms, *(Washingtonia filifera and W.robusta*) and Chinese fan /windmill palm (*Trachycarpus fortunei*). The native Mediterranean fan palm, *Chamaerops humilis* is also popular for tubs and in recent landscaping (tends to clump as a shrub when young, although it does develop a trunk with age).

New street trees are bought in at 25cm diameter pots/ c.1 metre height, and are planted with stakes painted different colours on top to distinguish relevant watering regimes. Street trees are watered for the first 1-2 years maximum. Planting periods are between november-february (spring); for warm-climate trees (*Brachychiton, Tipuana*), and autumn for cold-climate trees (*Ulmus, Celtis)*.

A system of footpath/pavement plaques identifying all street trees (usually one plaque per block) is used throughout the city, presumably to encourage interest in and knowledge of street trees. I was delighted to see in one of the first streets in the city I traversed, an avenue of young Australian kurrajong trees, intriguingly labelled the bottle tree (which in Australia is *B.rupestris*)(see photo on previous page), but labelled with botanic and common names, and in Catalan and Castillian Spanish.

Street trees included some species I have never seen used as such, or rarely. Ombu or bella ombra, *Phytolacca dioica*, a South American species with massive swollen basal trunk and roots, is popular for water front use along beach promenades, and I saw this along the Costa Brava. Tamarisks (*Tamarix spp*.) or flowering cypresses are also used in such locations, as are Australian she-oaks (*Casuarina spp*., probably C.glauca, although *C.equisetifolia*, horsetail she-oak, was the species I saw most used in Spain, and with labels.

Left) typical street paving label identifying the tree used in that street, a simple, tough, educative tool. This street has Australian she-oaks!

Canary Island and true date palms (*Phoenix canariensis and P.dactylifera*) are popular in seafront streets, as are cotton or Florida palms, (*Washingtonia robusta)* with their tall clean trunks. Harbour front streets in Barcelonetta included Jerusalem thorns (*Parkinsonia aculeata*), (a declared noxious weed in Australia's north and in dry regions of western

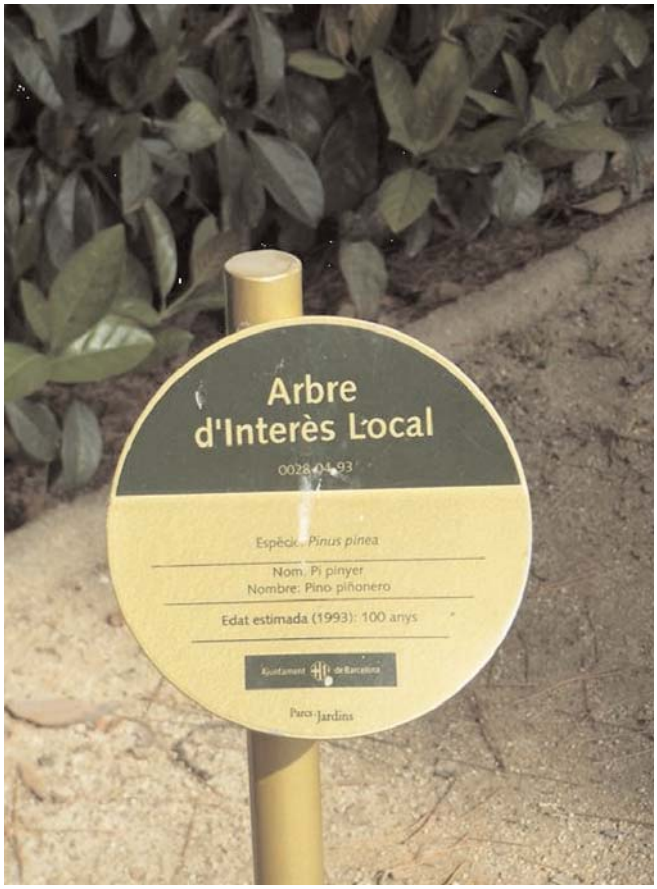
NSW), Bolivian tipu (*Tipuana tipu*) and ombus.

A visit to Sitges, a coastal resort south of Barcelona, showed seaside street tree plantings of Australian Port Jackson figs (*Ficus rubiginosa*) and Moreton Bay figs (*F.macrophylla*) also.

Smaller city streets and lanes were planted with purple cherry plums (*Prunus cerasifera 'Nigra' or 'Rubra*') or privet (*Ligustrum vulgare*), which is a native species in southern Europe, although shining privet (*L.lucidum*) is seen naturalising on hillsides (eg: Montjuic), much as it does in South-Eastern Australia.

Extensive programs of pruning of street and other trees exist in direct proportion to complaints and disputes about tree growth from residents, or pressure on politicians.

Notable Trees (in parks)
There is a system of noting and celebrating (146 in total) 'trees of local/regional interest' by plaques and interpretation. Trees are assessed for historic, aesthetic and ecological values, and plaques note species, common name, origin, age, in addition to normal street tree identification. A guidebook to the "*Trees of Barcelona*" is sold through the Department and Tourism offices.



These include rare or unusual species (eg: jujube, *Zizyphus jujube*), old or beautiful specimens. An example fulfilling all three of these criteria is a River Red Gum (Eucalyptus camaldulensis) in the Palau de Pedralbes gardens, claimed to be over 100 years old.

Staff Training
The department has 899 staff, of which 83% are gardeners, and 7% technical staff (ie: with advanced expertise in some area), the remainder are administrative staff. A series of compulsory staff training courses are run throughout the year, covering a range of topics from broad (environmental issues and awareness), to specific and technical (management plan preparation, implementation, street tree pruning, machinery maintenance/mechanics), and a range of inside and outside expertise is used to run courses.

Communication
A range of methods of communication and promotion is used (website, books (guide to parks, single park guides eg: Parc Guell), pamphlets, events (Spring Festival in various parks; Rose competition in Parc Cervantes etc), talks, walks, music events etc is used to help citizens and visitors to enjoy and appreciate the parks system. By far the majority of complaints from citizens concern street tree pruning, and second in importance are issues of green space (provision, level of care, conservation).

The Department's education programme includes working with primary and secondary school students, in planting up school grounds and compost making basics.
One interesting aspect is that the Department classifies parks and public gardens into four types, with differing levels and types of management. These are:
1) Historic or thematic parks;
2) Suburban and urban parks, roadside plantings, urban plazas;
3) Forest parks and sloping sites (eg: Parc Putget);
4) Small parks, small plazas, streets with trees.

A fifth (which could be seen as a subset of 'urban parks') are community gardens, small local areas where allotments for growing food etc are provided on a quota and queue system).
In addition is a system of providing community gardens/allotments, recycling of organic matter/ materials by the broader public. There are 6 such allotment gardens locally now, where local residents can use an allotment for up to 5 years, to grow fruit, vegetables, make compost for their own use (not for sale). Management takes an emphasis on ecological methods (educating people away from chemical use), particularly immigrants or retired people from the rural parts of Spain. Permacultural methods are gaining in use and interest.

Accompanying the specifications for managing each ‘type’ of park, is a regular series of training modules, short and day courses for gardening and maintenance staff, and others that are open to the community also. These include:
- historic garden and park maintenance;
- Arabic gardening traditions, and Antoni Gaudi’s landscaping (Parc Guell is Barcelona’s most famous park, created by this unique artist);
- European standards for park management, horticulture, plant health/sanitation;
- pests & diseases in palms;
- creating and maintaining aquatic gardens;
- street tree establishment;
- arboriculture.

More information on these can be found at www.bcn.es/parcsijardins or by email: formacio.laberint@mail.bcn.es. Other relevant industry training is noted under ‘**References**’.

Above) Something I observed in many historic parks in Barcelona were signs intimating that more information on the park’s history, services etc is available by mobile phone by calling a certain central number. This seemed very modern! My lack of a mobile that was working made this service unavailable, but given the prevalence of mobile telephones, seems a practical accommodation, and cheaper to run than replacing or amending the contents of signage on a regular basis.

Social aspects
Senoras Fransi and Monras noted that in the 1980s new and revamped parks in Barcelona were predominantly designed by architects and urban designers, (by competitions), leading to many being 'hard', full of paving, structures and sculpture rather than much planting and particularly any planting other than trees. An over-emphasis on design and function has led to some public reaction against these characteristics, and lobbying for more 'soft' landscaping, shrub planting, and variety.

They also noted there have been problems with (post design/construction) maintenance, both in budget/resources and in level of care/training as to what the desired effect was. These issues, allied with social problems like drug use, thieves and vandalism, particularly in areas of low income, high immigration or short-stay residents, have led to the need to re-work parks, and manage them differently.

Cultural differences, with transplanted traditions from the countryside to the city, have caused management challenges and education programmes in response. Examples are immigrants from rural cultures such as Andalucia or Galicia in Spain, South America and Morocco (there were 2 million of these in the 1990s in Barcelona), where people are used to gathering outside in the countryside in large groups for picnics, parties and socialising, eating etc. Often in these places, plastic packaging is either non-existent or far less widespread, and wastes left on the ground are less of an issue, being normally organic and eventually rotting.

Such differences and steady migration to the cities have meant heavier park use, and in some cases damage. Efforts have been made to modify behaviour, and to 'harden' park areas to accomodate pressure. Other efforts such as the limited provision of allotment garden spaces to grow food in the cities, have been highly successful, especially in dense, low-income areas with little open space.

There has been an increased focus on public education, for instance as to appropriate forms of behaviour in public open spaces, eg: using rubbish bins and dog dropping disposal, to increase local 'ownership' and pride in parks, and modify behaviours. Park rangers in the form of cleaning staff are fairly visible, sweeping, emptying bins etc. I did not notice 'rangers' as such, although historic parks such as Parc Joan Maragall or Laberint d'Horta have a guard on the gate.

Senora Fransi was keen that I send her Australian information on ecological park or public space manage-

ment and on "Friends" groups, and I done so, focussing on the Friends of the Royal Botanic Gardens, Sydney, and Land and Bush Care initiatives across Australia, for instance to clean up and care for urban biodiversity, remnant patches of bush, creeks and riverine areas, wetlands etc.

Tourism impacts

I asked about the impacts of tourism on parks, and how these are managed. Placa Cataluna is the most heavily used park/ urban open space, along with Las Ramblas. These are predominantly paved spaces, the latter with rows of plane trees, the former having areas with tree planting (evergreen oaks) and some lawn areas, both supposedly off limits to pedestrians, although many 'sunbakers' lie on the grass.

Below) sign noting visitation limit per day, Jardin del Babertint d'Horta, Barcelona

Senora Fransi noted that it is northern Europeans who lie on the grass, but was sanguine about impacts, noting that it doesn't kill the grass! She also noted that impacts from tourists are predominantly on central city sites, and Park Guell.

Plans for the future include an expansion in area of green space across the city, making up for lost time (the Franco years meant a general running down of infrastructure including parks and gardens, loss of trained staff, resources and massive urban growth, immigration and resource pressure).

These include targeted programs to provide open space in tight, older suburbs and working class areas where industry is contracting or has moved out (using former industrial sites). They also include an increased move towards ecological management, lower water use and higher recycling/reuse, more native plants etc. 2003-7 goals include restoring and integrated management for 12 existing parks, and increasing access to 11 parks that are currently not highly used.

They also include a progressive program of buying back the centres of city blocks in the Eixample district (c.1870-1930s inner 'grid' Barcelona) where what were originally intended to be open space block 'cores' for gardens and recreation have been lost to speculation and private ownership. Of course getting these spaces back, and turning them into useful pocket parks and green spaces is costly and long term work. I managed to find and visit several of these, and while they are modest generally in scale and 'fitout', these spaces are understandably very popular with residents, giving city apartment dwellers somewhere away from cars where they can sit, children can play safely etc. Some are hard-paved areas only, or have playground equipment etc. Others are more garden/park like with tree, climbers, shrubs, lawn areas, albeit small. One is even a swimming pool and 'beach'.

Plants used:

More information on these can be found at www.bcn.es/parcsijardins or by email: formacio.laberint@mail.bcn.es

Appendix B:
Barcelona Botanic Gardens – detailed learnings

There is an important collection of species of *Narcissus spp.* bulbs (daffodils, jonquils). Council funding has been sought to attract a research student to work on these, unfortunately refused last year. They will try again. I was lucky enough to see this in flower, and given its richness (species I have never seen) I am amazed a post-graduate student is not volunteering to work on it for free!

The Council runs training courses for staff, although they are more to do with administration than with gardening. The opportunity exists to cooperate with external training, eg: with the University, Private Companies/ nurseries, Horticulture Schools.

While there is potential for staff rotation/interchange with other institutions, at present the Gardens are too small to offer much to other bodies. In 2004 a partnership with Munich Botanic Gardens brought a gardener from that its Mediterranean section to work in Barcelona.

Public consultation is relatively little done, the management being basically 'expert'.

Visitor numbers have increased from 1999's initial 10,000 to 35,000 in 2004. There is no limit on numbers set, the gardens being large and having capacity to absorb growth. The last sunday of each month and special festival days are entry-free, an incentive to boost visitation. One such day recorded 1900 visitors, a record to date. Visitors are from Spain mostly, and on sundays (the busiest day) predominantly family groups from Barcelona. During the week school groups and some tourists predominate. The gardens are negotiating to become one of the agreed stops for the Tourist Bus that operates out of Placa Catalunya, which would be a major boost. Unfortunately competition for this is intense, and the gardens still little known.

Visitor feedback is mostly positive, particularly about the garden's design and architecture, and practical suggestions (more shade, seats, fountains, information on how to get to the site) are on the whole related to its young age and low budget.

Pressures on the gardens include noise from neighbouring land uses, such as model airplane operators and loud music from the Baseball Stadium nearby. In terms of risk management, the site is designed for relatively easy access, with ramped paths all over, although more handrails especially in places where retaining walls have drops of some 2 meters are planned. Open gutters beside paths are a slight trip hazard, and a security study undertaken has recommended these be filled (eg: with gravel) or painted a different colour for visibility (concrete), something the designers are resisting. Filling with gravel may be the better solution.

The Gardens have a public outreach program, with regular talks and events, and some trips eg: to the Pyrenees and mountain reserves. With time it is hoped to expand these programs, using the Friends group and the Gardens' growing profile with the public.

An Association of over 100 Friends has developed since 1993, to assist planning for the new garden even before it became a reality. Some form a regular group working in the gardens and its nursery area, with horticultural staff. Experiments are being carried out involving the application of new technologies to park maintenance, and research aimed at identifying plants most suited to sustainable Mediterranean gardening.

Future changes are a little difficult to speculate upon, given the garden’s relative youth and early stage of development. Two parts are yet to be developed and it is proposed to have temporary exhibitions on these, featuring themes, such as a Grasses conservation garden, featuring a natural grassland complex found on gypsum soils in Spain’s western coastal zone. This will focus on education, the collection and propagation of seed stock (for in situ conservation/rehabilitation).

Two other sections are proposed to have more rockery areas, pending extra funding. These will feature flora from Southern Spain and Northern African endemic species.

Appendix C:
Detailed learnings from Jardi Botanic Mar I Murtra, Blanes

Scientific research has focussed on indigenous and endangered flora, molecular biology and diseases of cacti, eg: columnar cacti die back (*Hypogeococcus festerianus* fungus), and the cochineal insect, which attacks cattle in Spain, causing economic problems for agriculture (host prickly pear cacti are common).

The majority of water used (70%, since 1999) is reticulated town water, prior to this rainwater only was used, but this has proven insufficient. Rainfall is 5-600mm per year (equal to Canberra's), mainly in spring and autumn. Salinity is an increasing problem in water supply as the site's aquifers are so close to the sea, this having caused some plant deaths. 60% of watering is by sprinklers and diffusion, the remainder by hoses. The expectation is that the current system will last for about five years only. Current needs are to install a system of general filtration and a pump. Future plans are to collect rainwater and increase automated systems of irrigation.

Nearby towns to Blanes only got reticulated water in the 1960s and Council control over it only dates to the 1970s. From the 1700s all water was the Spanish Crown's, and a King's agreement dispensed rights to dig an acequia (canal) and wells to irrigate private fields. The Water Agency of Catalonia was only established in 1997-8, and is up against local water associations, Councils etc who have all been powerless pre the 1970s. The Spanish class structure has also been such that many such things are not discussed, not widely known or understood.

Valencia's cathedral still has a 'water court' where disputes between farmers/orchardists are heard in front of an arbitrator, a tradition dating back apparently to the Middle Ages. Rural Andalucian valleys such as the Alpujarras near Granada still have collective acequia management, strict adherence to quotas, times of 'tapping the canal' to divert water to your allotment/orchard, dispute resolution etc.

The lack of administrative control of private wells being dug to tap local water supplies until relatively recently is an issue. The Catalan Regional Government issued a 1990s edict to local Councils to register all private wells, but this was soon abandoned at the difficulty and size of the task! A consequent lack of consciousness about water use, conservation, particularly amongst migrants or expatriates from northern Europe moving into regions of Spain, or even between regions, adds to the complexity of the issues involved.

A challenge to increasing access to the gardens is lack of parking, limited due to topography and land ownership, with only some 6 car parking spaces directly outside, and tight local road access only. A shuttle bus operates between Blanes and the site, every half hour. This situation could be improved, for example by buying one or more adjacent properties (admittedly expensive given their cliff top position and views), or subsidising more regular bus trips.

An area of ecologically managed vegetable gardens displays all varieties (species, cultivars) of vegetables traditionally grown in the regions farms and orchards, particularly old forms.

Due to its steep site and some 'plunging' paths (spectacularly leading to cliff top lookouts/miradors over the sea), the gardens present challenges to around-site access and risk management. Walls where these exist (eg: on cliff tops) are low.

Major paths are ramped or gently sloping allowing wheelchair or disabled access. Other areas are steps only and do not allow wider access for mobility-impaired visitors. It is hard to see how this situation could be improved without widespread damage to the plant collection and aesthetics. Where improvements in access can be made they are being, with easier grades of ramps and tracks.

Other weeds are also an issue, Cape pea bush (*Polygala myrtifolia*), for instance, being under control within the garden, but a weed outside it, so constantly re-invading.

I asked if the layout was of heritage value in itself, or had it changed. The structure and original design has not changed, but what has is the organisation of the plantings and collections

Rubbish from tourists and requests for more rest areas and drinks machines are emerging issues, as are conflicts over vegetation with more neighbours moving into the area, with subdivision. Other challenges/ goals are getting a general increase in visitors, especially local Spanish people and increasing the educative potential of the garden, and its core messages about conservation, local flora and environment, appropriate flora (for gardens), weeds and garden escapes.

I suggested that target market audience identification, and messages that the gardens wants to market to each, would be sensible. Thematic management, curation that was more didactic (eg; Royal Botanic Gardens, Sydney has a definite Thematic Curation policy and messages to deliver), increased market research, marketing and promotion, wider distribution of 'clients' or 'public', involving or partnering with the local nursery industry to propagate and sell indigenous plants, ditto with parks departments, landscape designers and professionals.

I advised that making the collections relevant and exciting, promoting the research findings to ordinary Spaniards and key stakeholder groups would seem wise ways of increasing support, visitation and outreach.

An example would be further collaboration with the Botanic Garden of Barcelona, cooperative research projects (frost resistance, drought resistance, fire resistance), plant and staff exchanges, guided visits, talks etc. (both bodies being small and having similar issues).

I mentioned "Friends" group activities in Sydney such as "Growing Friends" who weed areas of the gardens under staff supervision, propagate and sell rare plants from the Botanic Gardens collections, run guided walks and talks, raising awareness and funds for needed works. I suggested cultivation and propagation workshops and sales to the public, or to nurseries to propagate and promote.

The garden has a website, and I suggested increasing its inter-activity and links to similar institutions. Opportunities might exist for partnering projects with Blanes Council, parks and road management agencies, for more broad-reaching 'ex-situ' plant conservation, rehabilitation, planting schemes.

I suggested that in the short term the greatest needs seemed to be finding a new director who is strong in strategic planning, visioning, and able to re-focus the garden's core activities, particularly desirable education, research, design and composition changes. Also someone is needed with definite public relations and communications skills, to build outreach links.

Appendix D:
Conclusions from 2001 book: *Proteccion de los Jardines y Sitios Historicos – normativa, analisis de la situacion, (Protection of Historic Gardens & Sites – standards, analysis, status*) by Soledad Martinez Munoz & Luisa Roquero

1) Scope: Actions (for the Ministry for Environment, Culture & Development (MECD)
2002 – prepare a pre-inventory of all possible landscape heritage to establish the character of this Spanish legacy;
2002 – revise the listings and descriptions of each one of Spain's already-identified 52 historic/artistic gardens, and 54 historic sites in terms of their contents and features, and condition. Establish which (if any) have disappeared, and which are being used for functions that detract from their heritage significance;
2003 – revise landscape heritage inventory after the above actions.

2) Training Actions
2002 – Get the Spanish Landscape Architects Association to develop a module of heritage landscapes training that can be integrated into education courses;
2003 – create some students of the first grade of landscape architecture, in a public university

3) Inventory Actions
2002 – design an inventory that can serve as a base for all of Spain's autonomous communities (Regional Governments), encouraging all to codify and describe their landscape heritage;

4) Classification Actions
2002 – following Portugal's example, design criteria for the listing of this type of heritage which are well adapted to the different administrations involved in its conservation.

5) Promotion Actions
2003, 2004 Once the Ministry (MECD) has decided on the scope of heritage to be conserved, develop appropriate forms and funds for its promotion, eg: through conferences, courses, seminars, in all of Spain, to help stimulate interest in conserving this heritage.

6) Legislation Actions
2002, 2003 Help fill the gaps in autonomous regions (Governments) who don't have legislation/registers listing this type of heritage, develop consistent guidelines and regulations to assist all Governments in identifying, conserving and managing it.

7) Institutional Processes Actions
2002 The Ministry (MECD) should create the formula (expertise required, representation) to constitute a central cabinet/group to advise on and protect Spain's landscape heritage;
2003 Create a central cabinet/group for the protection of Spain's landscape heritage.

Appendix E:
Parque de Buen Retiro, Madrid

Plant list (chiefly Trees recorded)

horse chestnut, Aesculus hippocastanum
southern nettle tree, Celtis australis
manna/flowering ash, Fraxinus ornus
stone pine, Pinus pinea
Mediterranean cypress, Cupressus sempervirens
mock orange, Philadelphus coronarius
holly, Ilex aquifolium
yew, Taxus baccata
bearded iris, I.germanica cv.s
black poplar, Populus nigra
honey locust, Gleditsia triacanthos
privet, Ligustrum vulgare (hedges)
Monterey cypress, Cupressus macrocarpa
bamboo, Phyllostachys sp.
ivy, Hedera helix
olive, Olea europaea
bay, Laurus nobilis
Swedish birch, Betula pendula var. dalecarlica
golden bells, Forsythia x intermedia
Arizona cypress, Cupressus glabra/ C.arizonica
Japanese laurel, Euonymus japonicus
cherry laurel, Prunus laurocerasus
evergreen/holly/holm oak, Quercus ilex
laurustinus, Viburnum tinus
coastal redwood, Sequoia sempervirens
Chinese fan/Chusan palm, Trachycarpus fortunei
Chinese wisteria, W.sinensis
purple cherry plum, Prunus cerasifera 'Nigra'
Adam's needle/Spanish bayonet, Yucca gloriosa
shining privet, Ligustrum lucidum
blue Atlas cedar, Cedrus atlantica 'Glauca'
tupelo/sour gum, Nyssa sylvatica
swamp cypress, Taxodium distichum (growing in pond, a common treatment in Spain)
weeping willow, Salix babylonica
lilacs, Syringa vulgaris cv.s
Tasmanian blue gum, Eucalyptus globulus
hybrid plane tree, Platanus x acerifolia
desert ash, F.angustifolia
Himalayan cedar, Cedrus deodara
Japanese pagoda tree, Sophora japonica
white poplar, Populus alba
tulips, Tulipa cv.s
'English' oak, Quercus robur
evergreen magnolia, M. grandiflora
box, Buxus sempervirens (hedges)
Siberian elm, Ulmus pumila
oleander, Nerium oleander cv.s
tree of heaven, Ailanthus altissima
bears breeches, Acanthus mollis
box elder, Acer negundo
sycamore, Acer pseudoplatanus
Judas/tree of love, Cercis siliquastrum
false acacia, Robinia pseudoacacia
Japanese pittosporum, P.tobira
Portuguese laurel, P.lusitanica
Spanish fir, Abies pinsapo
elder(berry), Sambucus nigra
may bush, Spiraea cantonensis
aspen, Populus canadensis
Photinia glabra
Chinese elm, Ulmus parvifolia
Juniperus x pfitzeriana cv.s
Lombardy poplar, Populus nigra 'Italica'
Juniperus x pfitzeriana cv.s
firethorn, Pyracantha sp.
Aleppo pines, Pinus haleppensis

Appendix F:
Parque del Fuente de Berro, Salamanca district, Madrid

Plant list (mainly the trees)

Himalayan cedar, Cedrus deodara
stone pine, Pinus pinea
horse chestnut, Aesculus hippocastanum
pink honeysuckle, Lonicera tartarica
tree tulip, Magnolia soulangeana
Japanese pittosporum, P.tobira
cherry laurel, Prunus laurocerasus
white poplars, Populus alba
lilacs, Syringa vulgaris cv.s
Deutzia scabra
ivy, Hedera helix (ground cover)
oleander, Nerium oleander cv.s
golden ash, Fraxinus excelsior 'Aurea'
flowering cherry, Prunus serrulata cv.s
box, Buxus sempervirens (hedges)
blue Atlas cedar, C.atlantica 'Glauca'
yew, Taxus baccata
Mediterranean fan palm, Chamaerops humilis
European privet, Ligustrum vulgare (hedges and trees)
coastal redwood, Sequoia sempervirens
bay/laurel, Laurus nobilis
hazelnuts, Corylus avellana
maidenhair tree, Ginkgo biloba
snowberry, Symphoricarpus orbiculatus
bears' breeches, Acanthus mollis (ground cover)
bamboo, Arundinaria / Phyllostachys sp.
greater celandine, ?Celandinus majus
red cherry plum, Prunus cerasifera 'Rubra'
southern nettle tree, Celtis australis
false acacia, Robinia pseudoacacia

spruces, Picea spp.
'English' oak, Quercus robur
Adam's needle/Spanish bayonet, Yucca gloriosa
tamarisk, Tamarix sp.
elderberry, Sambucus nigra
may bush, Spiraea cantonensis
grape holly, Mahonia aquifolium
Photinia glabra
Canary Island date palm, Phoenix canariensis
golden rain tree, Koelreuteria paniculata
firethorn, Pyracantha sp.
Japanese laurel, Euonymus japonicus
pampas grass, Cortaderia sp.
golden privet, Ligustrum lucidum 'Aureo-Variegata'

Appendix G:
Parque Juan Carlos 1, Barajas, outer Madrid

Plant List

linden/limes, Tilia sp.
privet, Ligustrum vulgare
Juniperus x pfitzeriana
St. John's wort, Hypericum calycinum (ground cover)
lavender, Lavandula spp.
rosemary, Rosmarinus officinalis cv.s
roses, Rosa cv.s
hybrid plane trees
evergreen magnolia, M.grandiflora
Mediterranean cypress
Japanese pagoda tree, Sophora japonica
Abelia japonica
field maple, Acer campestre
laurustinus, Viburnum tinus
Spanish broom, Spartium junceum
honeysuckle, Lonicera pericyclamum
stone pine
Judas/tree of love, Cercis siliquastrum
red mulberry, Morus rubra
Japanese barberry, Berberis thunbergii
Siberian elm
Indiana bean tree, Catalpa bignonioides
upright white poplar, Populus alba 'Fastigiata'
Himalayan cedars
sweet gum, Liquidambar styraciflua
Chinese wisteria
bay/laurel,
box elder, Acer negundo
Viburnum rhytidophyllum
strawberry tree, Arbutus unedo
golden bells, Forsythia spectabilis
Japanese pittosporum
Japanese laurel
Cotoneaster spp. (C.?glaucophyllus, C.horizontalis)
NZ cabbage tree, Cordyline australis
Canary Island date palm
Adam's needle/Spanish bayonet
pomegranate, Punica granatum
myrtle, Myrtus communis (hedging)
Florida fan palm
oleander
century plant, Agave americana
tamarisk
firethorn
white cedar/Persian lilac, Melia azederach
cherry laurel
poplar, Populus ?serotina
bamboo
pampas grass
olive (plantation)
apple blossom, Escallonia rubra
Chinese/Chusan fan palm
ivy (ground cover)
box honeysuckle, Lonicera nitida
crab apples, Malus spp.
flag iris
big tree, Sequoiadendron giganteum
birches, Betula spp.
Aleppo pines
Leyland cypress, x Cupressocyparis leylandii cv.s
Arizona cypress
red alder, Alnus cordata
Deutzia scabra
horse chestnuts
flowering cherries
ashes, Fraxinus spp.
honey locusts
snowberry
oleaster, Eleagnus angustifolia (has silver leaves like a weeping silver pear)
Himalayan jasmine, Jasminium mesnyi
red NZ flax, Phormium cookianum cv.s
Norway maple, Acer platanoides cv.
whitebeam, Sorbus aria 'Lutescens'
tulip tree, Liriodendron tulipifera
white broom, Retama monosperma

Appendix H:
More learnings from the Real Jardin Botanico, (Royal Botanic Garden), Madrid

I asked about competing values management, and Mr Armada noted that some pressure to reduce water use and increased use of autochthonous flora (locally indigenous) is being placed on the gardens, from the Ministry, although he is resisting it, considering the garden should be an exception, given its history and collections. An original focus on Spanish, medicinal and American flora has widened over time to be plants from all over the world, old and new, with tropical and sub-tropical species grown in the glass houses.

Retention of the historic plant collection is his main pressure, this being time and cost-intensive. Government enquiries about management costs are frequent.

Among other activities the gardens ran, in May 2005, the second conference on Monumental & Singular Trees, along with the Spanish Arboriculture Association and the University of Alcala de Henares, with the Regional Government of Madrid and Botanic Gardens of Valencia.

Plant list (selective: only 'unusual/unexpected in Madrid species)
NB: the garden has its own microclimate allowing 'tender' species to survive despite Madrid's harsh climate and cold, long winters. Such species include:
orchid trees (Bauhinia spp.) Australian pincushion bush (Hakea spp.)
strawberry tree/madrono (Arbutus unedo)(the traditional tree symbol of the city of Madrid)
Judas/tree of love (Cercis siliquastrum) palmetto palm (Sabal palmetto)
Brazilian Araucaria angustifolia (similar to Australia's Bunya pine, A.bidwillii)
Podocarpus neriifolia Podocarpus macrophyllus
kurrajong Umbellularia californica
Myrica serifera (SE USA) Distylium racemosum (Hamelidaceae, Japan)
Sycopsis sinensis (Hamelidaceae, Japan) vanilla bush, Azara macrophylla
Beaucarnia recurvata (Mexico) Arbutus andrachne (E Mediterranean)
Bosea yervamora (Amaranthaceae, Canary Islands)
Tamarix africana (SW Europe) T.gallica (SW Europe)
Eucommia ulmoides China Ruprechtia salicifolia (Polygonaceae, Brazil)
myrtle (hedge and shrub) carob
Caragana arborescens (yellow pea flower, 6x3m), Siberia/Mongolia
Quillaja saponaria (quillai)(Rosaceae, Chile) citrus relative (& rootstock), Poncirus trifoliata

I was interested in the range of junipers and other native conifers, and their origins/ranges. These are not often seen/ used in Australia (J.communis being excepted) and which perhaps could be:
sabina blanca, (Juniperus thurifera) Mediterranean region
sabina roma, (J.phoenicia) Med. rgn. J.oxycedrus x thurifera
enebro, (J.oxycedrus) Med. rgn. sand juniper, (J.communis) Med. rgn.
Canary Island juniper, (J.cedrus) Canary Islands
Tetraclinis articulata (Cupressaceae) SE Spain and NW Africa

Australian species of shrubs and trees were grown, some looking the worse for the winter cold and showing frost damage, others hardy and fine:
eg: various bottlebrush species, Callistemon citrinus, C. liniariifolius, C.comboynensis, C.salignus, C.pinifolius
Various bracelet honey myrtles, Melaleuca decussata, M.ericifolia, M.thymifolia (some frost damaged)
Acacia verticillata (orange flowers)
cabbage palm, Livistona australis grass tree, Xanthorroea quadrangularis
river red gum (15 m tall)(several) spider flower, Grevillea juniperina
Pittosporum phyllireoides (I last saw this wild on Rottnest Island, WA!)
New Zealand species, (some which are quite frost tender, were also notable here:
southern rata, Metrosideros umbellata puka/broadleaf, Griselinia littoralis
five finger, Neoopanax laetum (frost damaged) Maori onion, Bulbinella angustifolia
ngaio, Myoporum laetum (very frost damaged) cabbage tree (Cordyline australis)
flax (Phormium tenax & P.colensoi cv.s) korokias (Corokia cotoneaster, C.virgata)
kohuhu (Pittosporum tenuifolium) lacebark (Hoheria sexstylosa)

Drimys winteri Quercus calliprinos E Med. rgn.
she oak barberries, (Berberis spp.)
grape hollies, (Mahonia spp.) pagoda tree, Cercidiphyllum japonicum
Daphniphyllum macropodum (Daphnaceae, Japan)(like a large leaved rhododendron)
Rhamnus ludovici-salvatoris (endangered buckthorn from the Balearic Islands)
lentisc, Pistacia lentiscus
Choisya ternata 'Aztec Pearl' feijoa, Acca sellowiana
Schinus polygamus (rare in Australia: the Tasmanian Botanic Gardens has one)
Rhamnus davurica (E.Asia, umbrella form with weeping branches, 6x8m)
palo blanco, Picconia excelsa (olive relative from Canary Islands, rare in Australia)
fringe bush, Loropetalum chinense Laurus azorica (Azores & Canary Island
bay/laurel) bay/laurel, L.nobilis Indiana bean tree, Catalpa bungei
oleander Schinus lentiscifolius (Brazil)(Australia does not have this)

white cedar/Persian lilac
Gomphostigma virgatum (Loganiaceae, Sth.Africa/Zimbabwe)
Ligustrum sempervirens (E China, 2m, shrubby species, very shiny leaf like L.texensis)
Senegal date palm, Phoenix reclinata
P.canariensis
P.dactylifera

Appendix I:
Alcazar de los Reyes Christianos gardens, Cordoba

Plant List:
Japanese laurel (hedges),
box (Buxus sp.)
saltbush, Rhagodia sp.

Trees
(usually trained as standards with clean trunks and elevated canopies and underplanted with shrubs, or flowers), inside hedged 'beds'

Seville oranges	planes
Japanese pittosporum	laurustinus
bay/laurel	she oak, Casuarina equisetifolia
river red gum, Eucalyptus camaldulensis	Mediterranean cypresses
red cherry plums	tamarisks
pomegranates	almonds
evergreen /holly/holm oaks	desert ash
Judas/tree of love	myrtle (as hedge and shrub)
Chinese fan/Chusan palm	Florida fan palms
strawberry tree	carob, Ceratonia siliqua
Siberian elm, Ulmus pumila	fig, Ficus carica
Himalayan cedar, Cedrus deodara	Indiana bean, Catalpa bignonioides
crepe myrtle, Lagerstroemia indica cv.s	date palms
shining privet, Ligustrum lucidum	

Shrubs
Himalayan jasmine, Jasminium mesnyi

may bush, Spiraea cantonensis	plumbago, P.capensis
oleander	Syrian hibiscus/rose of Sharon, H.syriacus
Photinia glabra	cycad/sago palm, Cycas revoluta
Japanese quince, Chaenomeles japonica	
snowball tree, Viburnum opulus 'Sterile'	lilac, Syringa vulgaris

Espaliered on walls (shrubs/trees):

Seville oranges	plumbago
Bougainvillea cvs.	Chinese wisteria
Mediterranean cypress	

Bedding plants
Roses, sweet William, stocks, Virginia stocks, borage, zinnias, snapdragons, calendulas, Coreopsis, larkspurs, Nile lilies (Agapanthus orientalis), geraniums (also in pots), Violas, pansies, lavender, Petunias, Godetias, statice, Verbena, opium poppies, corn poppies (a weed)

Appendix J:
Learnings from Reales Alcazares, Seville

Interview with Jose Maria Cabeza, Director, Patronato Reales Alcazares
I asked about the irrigation system/s used. Mr Cabeza noted that the gardens are broken into three zones, being: outer palace courtyards (12th c. mostly); Jardines de la Dama (16th c. pleasure gardens behind the palace); and 19th-20th c. outer garden, partly in English 'landscape park or meadow' (pradero) style ie: grassed with trees, partly created for Seville's 1929 exhibition (a more formalised former orchard area of oranges, water channels and sculpture).

Each has differing irrigation systems. The traditional huerta/orchard gardens outside the castle walls, watered

with wells (pozos), acequias (water channels) and a 12th c. aqueduct from the River Guadalquivir (also feeding the former mosque/cathedral courtyard), were broadly still operating in the 12th and 16th c. gardens. The 20th c. gardens are irrigated by drip irrigation systems, some of which I could see being installed, eg: recent rose plantings.

I asked about the reception to the recent 'excavation/reinstatement' of Patio de las Doncellas. Mr Cabeza noted that the Organisation had consulted ICOMOS (International Council of Monuments & Sites, the independent expert body advising UNESCO's World Heritage Committee about cultural heritage sites on the World Heritage List. He noted that reactions had been very positive, and that the work was reversible. (I noted at the Islamic gardens conference in Granada I attended that reactions to this work had varied widely and some archaeologists/others were very upset about it).

I asked whether there was any possibility to uncover the in-filled Patio de Crucero/Maria de Padilla. He replied that this was quite possible in terms of funding, but not so in terms of having a consensus (of experts), ie: would be contentious. Support would have to be sought and built, as well as any necessary stablisation to hold up surrounding buildings.

I asked about modification and adaptation of the gardens in terms of planting and other details. Mr Cabeza outlined that the complex's primary heritage value is symbolic, as a centre of royal power and display over a considerable period, with numerous periodic changes. Some of the garden/planting detail has been eroded by 'accomodation' decisions in the 19th and 20th centuries, (eg: introduced palm species, paving materials) which to some extent detract from the place's value as a medieval/renaissance/baroque complex of productive/pleasure gardens.

The conservation policy now is to slowly replace trees/plants as they die with more authentic species known to have been used in that garden/era, on a case-by-case, gradual basis. Advice from the Swiss/Spanish landscape architect Consuelo Connacher on the gardens forms the basis of this approach.

The Fuente de la Dama, a fountain with water organ on the grotesque wall is unique in Spain, and a specialist report on its conservation has been prepared by expert consultants, Italian Leonardo Lamberd and British Rodney Briscoe. This reflects a pattern of 'buying in' expert advice on specific projects.

The complex is still a royal site, (its upper storey) used by the royal family when it visits Seville, but it was gifted to the city in 1988, and is run now by the Patronato (heritage) agency, under the umbrella of the Parks & Gardens Department.

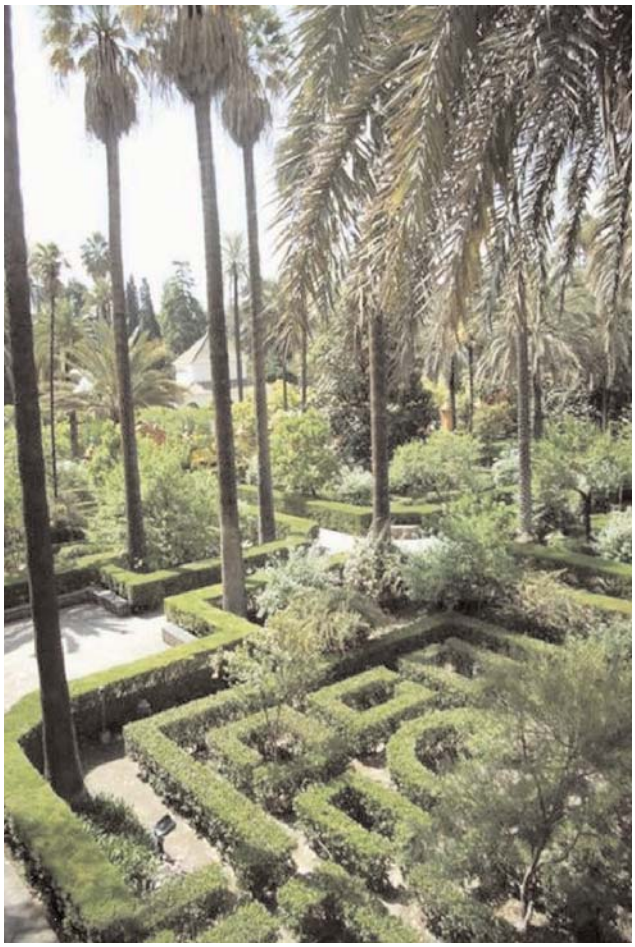
Their budget is 370m Euros/year, with 30% spent on staff, 20% on activities (concerts, exhibitions, conferences) and the rest on works, research etc. There are 42 staff for gardening, maintenance and security. The royal family/national government provide funding to maintain furniture etc, but the rest of the budget for conservation works is Seville's. An entry fee of 6 euros (c.$A12) is charged, with extra fees for the use of audio guides in various languages.

Gardening staff are provided by the Parks & Gardens Department, and specialised tasks are contracted out, such as work on palms, water works/fountains and fauna.

In terms of staff training, the Andalucian regional government, through a centre in Palma del Rio in Cordoba, run a range of modules/courses for staff, eg: maintenance of machinery, garden design, history and conservation issues. There is currently no staff interchange or rotation amongst Seville's parks and gardens (which seems unfortunate, given their range).

I asked about education and outreach programmes to

Below) outer huerta garden, Alcazar, Seville, full of palms and beds with myrtle hedging



the public. These focus on the collections (art, furniture, garden features), through conferences, workshops and talks on specific topics. Sporadic projects arise such as one where students from the University's architecture school made an inventory of all garden/courtyard fountains, with measured drawings and historic research to date each accurately. A poster featuring this is now sold, and it was clearly useful for students to appreciate some 900 years of design! Other projects have been run with botany, engineering, history, and landscape or natural science students.

I asked whether there was a site conservation management plan. The answer seemed to be no, at least in overall terms. Again this is unfortunate given the complexity of the place, range of its needs and various users. There is a programme of conservation works, and budget for specific projects and interventions, such as garden development, restoration, replanting and archaeological investigations (examples of the latter have occurred in the Jardin del Principe, one of the complex's oldest).

How are competing values managed? An example is the policy of slow gradual replacement of non-authentic (recent) plant material from the older parts of the gardens, where one period is favoured over retaining each era's changes to the place. Another is the dramatic reinstatement of one historic period at the cost of another, eg: the sunken Patio de las Doncellas reinstatement.

Such matters are particularly layered and complex in this place, with its multiple changes over time, significances etc. The fact of its being the largest Mudejar garden in Spain is perhaps rightly seen as more important than later (19-20th c.) garden changes. Clearly the oldest Islamic era fabric or layout is also valued highly or more highly in parts (Doncellas) than the later Mudejar era. This could be due to the relative scarcity of Islamic era gardens in Spain.

Rich archives in the Patrimonio Nacional in Madrid are drawn upon for research where needed. Maria Medina Muro has been involved with these in earlier times (presumably pre 1988 when Patrimonio Nacional was in charge of the complex). Loss of corporate memory might be an issue with devolution and increased outsourcing advice, and I note Ms Medina's strongly stated view (see (13)) that this place (and the Alhambra) should be managed by Patrimonio Nacional and not by Regional/City Governments.

The complex gets 1.1m visitors per year, 2/3 being Spanish and the rest foreigners, mostly from France, Germany, England, Italy, Portugal and the USA. Types of tourism vary with the season, with summer/autumn and spring after the April 'Feria' fair celebrations stretching Seville's resources to the maximum. Different kinds of tourists come at peak times to other times, with busiest seasons come larger numbers with less general interest in cultural matters, and more "do" Seville' mass-tourism. I was lucky to visit just after Feria was over, and found the place crowded even in 'quiet/lull' mode!

Problems arise in creating the right balance in terms of ongoing royal access and use (ie: privacy), functions for government and the municipality, and running a major tourist facility and attraction in the middle of a bustling city. A rolling program of musical and other cultural events is run here for instance, attracting crowds. Political pressures are also brought to bear to host private functions, dinners etc, and fitting these in along with public access is another balancing act, made sharper by Civic funding/control.

It is a challenge to seek to ensure a pleasant visitor experience by controlling numbers entering, (some spaces are quite small and 'block' easily), security, servicing (I observed a run-out of audio guides, which are sold in various languages, on one of my visits, necessitating people to do without or face a wait until more were returned.

Two on-site shops sell a range of merchandise including books, cards, Islamic music and gifts. Some of these were very high quality and scholarly works and priced accordingly. A third outlet was a small cafe/bar facility in the outer gardens area.

The complex enjoys no pressure for subdivision or urbanisation, although it is at the heart of a city of 600,000 which is densely packed, with 4-8 storey housing being common.

The organisation has insurance and claims to have no problems with accidents or risk management. Mr Cabeza noted that Seville's climate is becoming more erratic and extreme, citing a maximum temperature last summer of 53 degrees C! Apparently 38-40 degrees is not uncommon in summer, but this last season (and the winter included) has been extreme. Such conditions would doubtless be adding pressure to garden plants, and water demand.

Plant List

Entry courtyards:

date palms
Norfolk Island pine, Araucaria heterophylla (!)
Citrus esp. Seville oranges, mandarins
box (hedges)
myrtle (hedges)
roses
bearded iris, I.germanica
laurustinus
loquat, Eriobotrya japonica
Himalayan jasmine
she oak
almonds
kangaroo? vine, Cissus sp.
bull bay/evergreen magnolia, M.grandiflora
Mediterranean cypress
Chrysanthemums
pomegranates
Japanese laurel (hedges)
mock orange, Philadelphus coronarius
yellow Banksia rose, R.banksiae 'Lutea'
Nile lilies
Viburnum suspensum
jasmine, Jasminium officinale
floss silk tree, Chorisia speciosa
river red gum
Yucca elephantipes

Outer garden/English 'park'/former orchard/huerta pleasure gardens

Chinese fan/Chusan palm
stone pine, Pinus pinea
Himalayan cedars
yellow oleander, Thevetia peruviana
taro, Colocasia sp (in ponds)
Japanese sacred bamboo, Nandina domestica
papyrus/nut grass, Cyperus alternifolius (in ponds)
Ruscus hypoglossum
carnations in pots
Muehlenbeckia platyclada (Carmichaelia-like)
guava, Psidium cattleyanum
Jacobinia purpurea
Malabar nut/vasika, Adhatoda vasica
lasiandra, Tibouchina glandulosa
queen of the night, Cestrum nocturnum
maidenhair tree
may bush i
privets (12 metres tall!)
Virginia creeper, Parthenocissus quinquefolia
cat's claw creeper, Doxantha unguis-cati
Japanese pittosporum
bear's breeches, Acanthus mollis
Norfolk Island hibiscus, Lagunaria patersonae
Adam's needle/Spanish bayonet, Yucca gloriosa
quince, Cydonia oblonga
winter honeysuckle, Lonicera fragrantissima
Cocculus laurifolius
Canary Island pine, Pinus canariensis
bamboo, Phyllostachys sp.
tipu, Tipuana tipu
sweet/Spanish chestnut, Castanea sativa
bird of paradise flower, Strelitzia reginae
Florida fan palm
sago palm/cycad
crepe myrtle
NZ cabbage tree, Cordyline australis
Hibiscus mutabilis
Blechnum sp. (fern in grotto)
datura/angel's trumpets, Brugmansia sp.
Judas/tree of love
Cordyline terminalis (frost damaged)
poinsettia, Euphorbia pulcherrima
Lantana camara
Senecio petasites
oak, Quercus sp.
olive
ivy, Hedera helix
Jacaranda mimosifolia
oleanders
golden privet
fruit salad plat, Monstera deliciosa
Acacia sp. (large leaf)
kurrajong
kaffir lilies, Clivia miniata
Indiana bean tree
winter sweet, Chimonanthos praecox
Dombeya sp.
false acacia, Robinia pseudoacacia
carob tree
Hill's fig, Ficus x hillii

glorieta (topiary arches) with Mediterranean cypresses and myrtle hedges
'English' lavender, Lavandula spica (hedge to new rose bed)
osage orange, Maclura pomifera
spindle tree, Euonymus europaea
red cherry plum
Centaurea argentea (large pinnate silver leaf, large 'drumstick buds/yellow corn-flowers) grown in pots)
elephant's ear, Bergenia cordifolia
figs
mulberries
date palms
southern nettle trees, Celtis australis
white cedar/Persian lilac, Melia azederach
sage, Salvia officinalis
Indian shot, Canna indica cv.s
peaches
Rhamnus davurica (weeping habit)
Canary Island date palms
NZ ngaio, Myoporum laetum (hedge)
(true) lilac
Deutzia scabra

variegated Japanese laurel
chaste bush, Vitex agnes-castus
Mediterranean fan palm, Chamaerops humilis
Bougainvillea cv.s
Chinese wisteria
NZ cabbage tree
Syrian hibiscus
Jasminium polyanthum
plumbago (espaliered)
spider plant, Chlorophytum comosum
Sapindus sorowii (walnut relative)
ombu/bella ombra, Phytolacca dioica

Appendix K:
Parque Maria Luisa, Seville

Plant list:

Sapindus sororowi (walnut relative)
Jacaranda
Lord Howe Island form of Moreton Bay fig, Ficus macrophylla var. columnaris, from Australia)(incorrectly labelled as Coussapoa dealbata (Moraceae, Nn.S.America))
Mediterranean cypress
she oak
lotus plum, Diospyros virginiana
hoop pine, Araucaria cunninghamii
Cook's pine, A.columnaris
Chinese cabbage palm, Livistona chinensis
Podocarpus neriifolia
Chinese fan/Chusan palm
planes (very tall)
horse chestnut, Aesculus hippocastanum
oak/roble, Quercus pedunculate
Senegal date palm
ombu/bella ombra
Yucca elephantipes
white cedar/Persian lilac
honey locust, Gleditsia triacanthos
Judas/tree of love
Cocos Island/queen palm, Syragus romanzoffianum
golden rain tree, Koelreuteria paniculata
pomegranate (hedges and shrubs)
Hill's fig
sago palms/cycads
Arizona cypress, Cupressus arizonica
Chamaecyparis sp. (hedge)
oleander
may bush
Himalayan jasmine (on arbor)
mock orange
evergreen/holm/holly oak
buckthorn, Rhamnus alaternus
box (B.sempervirens (hedge))
myrtle (hedges)
Ruscus aculeatus (ground cover)
mulberries, Morus alba
ground nut/papyrus
silky oak, Grevillea robusta
olive
NZ flax, Phormium cookianum cv.s
purple Cestrum, C. x cultum
montbretia, Crocosmia crocosmifolia
arum lilies, Zantedeschia aethiopica (in ponds, in pots)(ground cover too)
kurrajong
Japanese sacred bamboo
oleaster, Eleagnus angustifolia
river red gum (very tall)
southern nettle tree
Tetraclinis articulata
Bunya pine, A.bidwillii
Canary Island date palm
Florida fan palm
swamp cypress, Taxodium mucronatum
date palm
evergreen magnolia/bull bay
lime/linden, Tilia virgata
carob
Canary Island pine, Pinus canariensis
Siberian elm
Spanish bayonet/Adam's needle, Y.gloriosa
privet, Ligustrum japonicum
pagoda tree, Sophora japonica
Japanese laurel (hedge)
laurustinus
roses
flowering rush, Russellia juncea
black locust/false acacias
Cape honeysuckle/tecoma, Tecomaria capensis
ivy
Malabar nut/vasika
plumbago
yellow jasmine, J. fruticans
yellow Banksia rose (on arbor)
Japanese pittosporum
Cocculus laurifolia
Buxus balearica
Abelia japonica
tree of heaven, Ailanthus altissima
yew, Taxus baccata
bamboo, Arundinaria japonica
kaffir lilies
fig
honey flower, Melianthus major
queen of the night (Cestrum nocturnum)
winter sweet
bear's breeches
Photinia glabra
Viburnum odoratissimum

Common Street Trees in Seville

orchid tree, Bauhinia speciosa
parasol tree, Firmiana simplex

golden rain tree, Koelreuteria paniculata
white cedar/Persian lilac, Melia azederach
Seville oranges, Citrus x aurantiacum 'Seville'
kurrajongs, Brachychiton populneum
plane trees, Platanus x acerifolia
tree of heaven, Ailanthus altissima
pepper tree, Schinus molle

Appendix L:
Casa de Pilatos, Seville

Plant List by patio:
Patio 1/entry/Apeadero
Walls covered with:
Bougainvillea cv. (purple - 'Spectabilis'?),
plumbago
Jasminium polyanthum, J.mesnyi
4 Seville orange trees espaliered
Ground cover:
kaffir lilies
geraniums

Patio 2/marble paving and sculptures only, central fountain.

Patio 3/Jardin Grande (Large garden - older)
Trees
evergreen magnolia
olive
date palm
clipped bay/laurel
Seville oranges (this patio had earlier been a huerta/orchard)
Florida fan palms (several)
crepe myrtle
lemon
red cherry plum
Chinese fan /Chusan palms (several)
cock's comb coral, Erythrina christa-galli
strawberry tree

Shrubs (all within box-hedged compartments)
mandarin
Syrian hibiscus/rose of Sharon
Jacobinia sp. (purple)
azaleas
chilli (amazing 3m tall as a standard!)
swan plant, Asclepias sp. (amazing 4m tall!)
roses
Banana
mock orange
angel's trumpets, Datura sp.
pomegranate
bamboo (Arundinaria ?'Gracillima') (clipped)
Abelia sp.
Gardenia florida (clipped)
Polygala myrtifolia

Ground covers
kaffir lilies
bear's breeches
violets
nut grass/papyrus
Indian shot, Canna indica cv.s
Crinum sp. (C.?powellii)
Rhapis sp. (clumping fan palm)
cuckoo pint, Arum italicum
Nile lilies

Walls covered with:
Bougainvillea cv.
wax flower, Hoya carnosa
Virginia creeper
Stephanotis sp.
pomegranate
Chinese wisteria

Palms supporting climbers of:
rambling roses, Rosa wichuriana cv.s
large red rose, 'Peace' rose
Pots of:
ivy geraniums, Pelargonium peltatum cv.s
Camellia japonica cv.s
Centaurea argentea (large pinnate silver leaves)
Central (steel) glorieta covered with yellow Banks' rose, Rosa banksiae 'Lutea'

A 1990 book (Connacher) listed the following species but I could not find these now:
Catalonian jasmine, Jasminium officinalis 'Grandiflorum'
yellow jasmine, J.fruticans
Lord Howe Island palm, Howea forsteriana
Japanese laurel (hedges)

Patio 4/Jardin Chico (little garden - 1913)

Trees

figs (2), Ficus carica (over the water tank/alberca)

Seville oranges
crepe myrtle (standard pruned)
evergreen magnolia
Florida fan palm
white cedar/Persian lilac
date palms (2)
jelly palm, Butia capitata
Chinese fan/Chusan palm
sago palm/cycad
pepper tree

NB: a large jacaranda noted in a 1990 book had fallen over in a storm since and been removed.

Shrubs

mock orange
angel's trumpets (standards)
roses
bird of paradise flower
large leaved asparagus fern (clipped into balls)
citrus

Ground covers

arum lilies
cinerarias, Senecio cineraria cv.s
spider plants
violets
bear's breeches

Walls covered with:

Virginia creeper
trumpet creeper, Campsis grandiflora
plumbago
small leaved fruit salad plant, Monstera sp.
star jasmine, Trachelospermum jasminoides
pomegranate
yellow Banks' rose
Bougainvillea cv. (purple - 'Spectabilis'?)
asparagus fern
Himalayan jasmine

Palm supporting:

rambling rose, Rosa wichuriana cv.

Hedges:

lower level: box (citrus beds)
upper level: myrtle (rose beds)

Pots with:

miniature roses
Buxus balearica
cast iron plant, Aspidistra elatior
azaleas
kalanchoes
ivy geraniums (also prominent on terraces/window balconies)

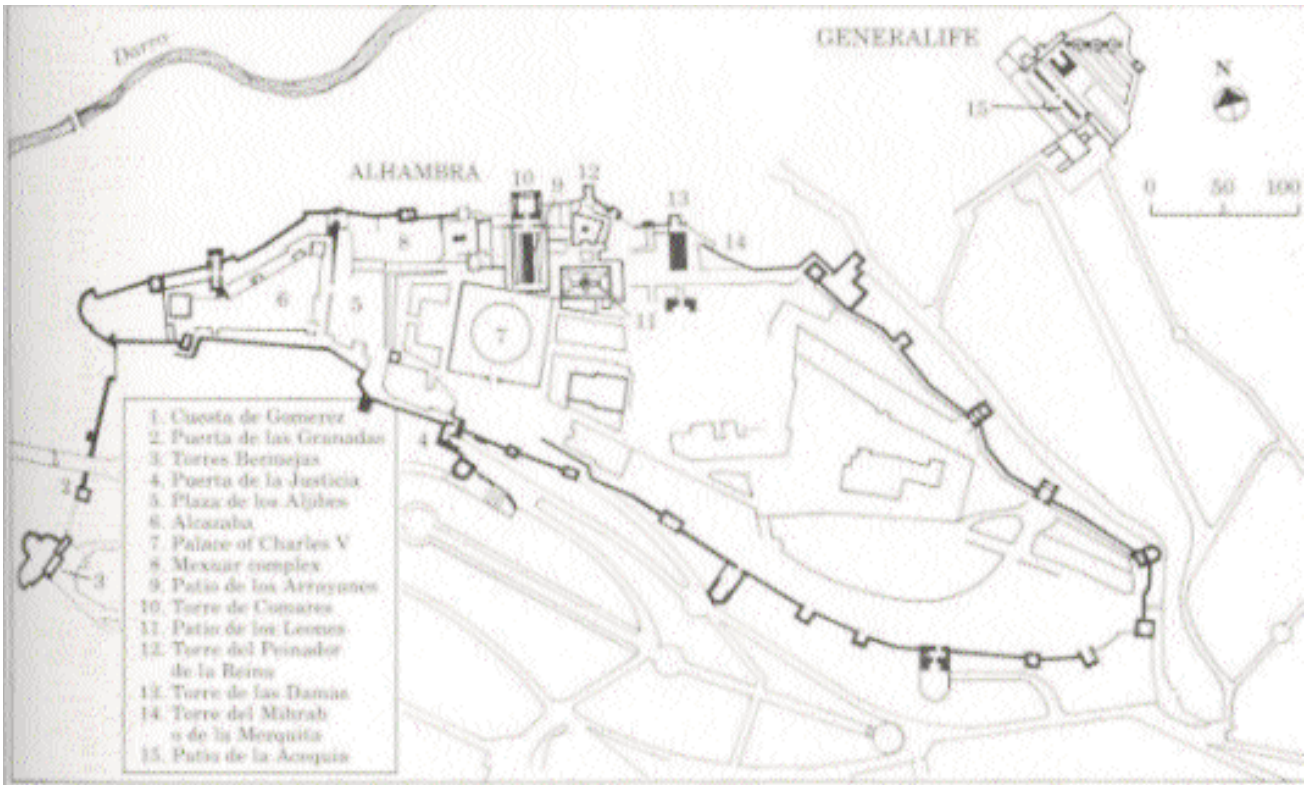
Arbor (lattice) supporting:

asparagus fern
Cissus sp. (?C.antarctica, kangaroo vine?)

Appendix M:
Observations from visiting the Alhambra

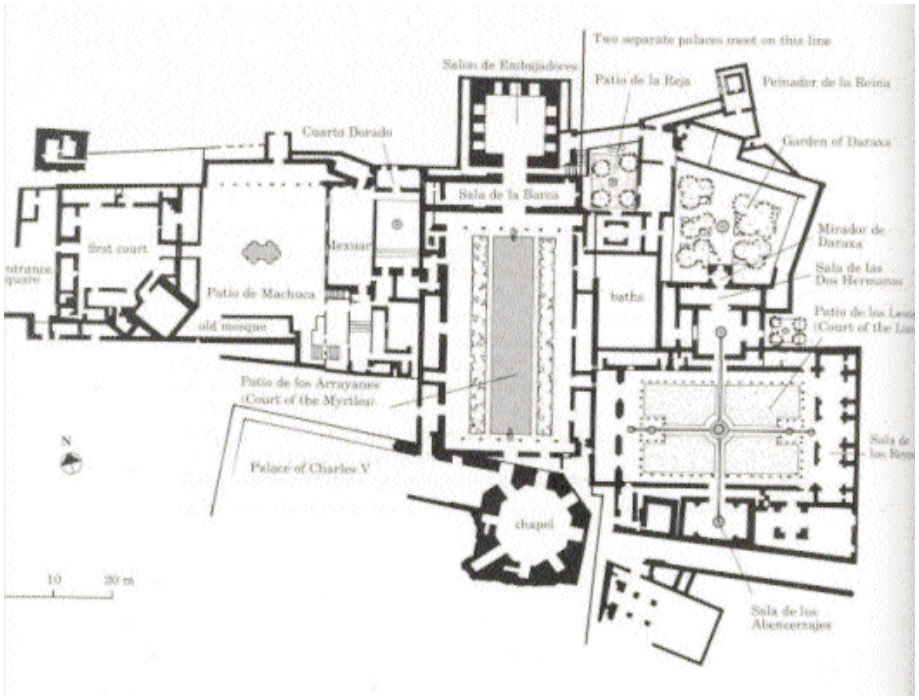
The Alhambra is a 12th-14th c.. Alcazar-Medina/ Castle-fortified city complex, modified in the 16th. c.-20th c.s). The Generaliffe adjacent to it is a c.1250(variously modified into the 19th & 20th centuries) Royal huerta/pleasure and orchard garden retreat), above the City of Granada.

Below) Plan of Alhambra Medina complex, with palaces, housing, shops, fortress (Source: Brooks, 1987)



The complex was mostly built by the Nasrid dynasty in the 14th c, extending an earlier fort. It was built as a combination of fortress/alcazar, palace and city/medina with attendant housing, shops, mosques, and productive gardens or huertas. Some of its greater extent has been lost to modern Granada and in terms of internal 'content', much is an archaeological site today.

The Alhambra generates 188m euro/year for Granada's economy (source: 2004 study reported in local news-



Left): Plan of Nasrid Palaces showing patio gardens and surrounding building complex. (Source: Brooks,1987)

External access is from left to right, with the public/visitors only allowed into the main Patio de los Arrayanes (Myrtle Courtyard).

The Patio de los Leones (Lion Courtyard) was a private internal space for the Royal court, off limits to outsiders.

paper). NB: The Regional Government's total budget is 198m euro/year – clearly 'heritage' is making the major contribution to the regional economy in terms of direct and indirect employment, and spin-offs!

The Alhambra is the best and most famous example of a late-medieval castle garden in Europe, standing on a fortified plateau, across a valley from the Generaliffe and bordering the Sierra Nevada mountains. Before reaching Spain, the Moors had seen and occupied Roman villas in North Africa and learnt from them.

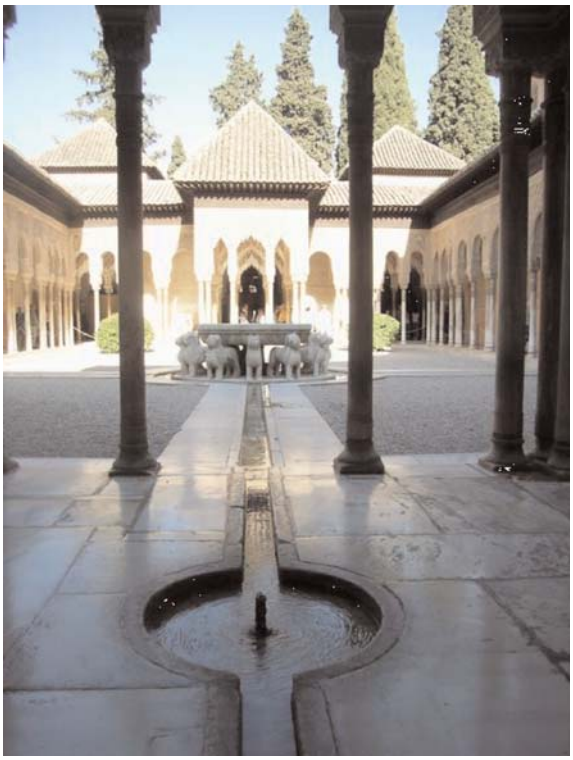
Muhammad I (1230-72) made the Alhambra his palace and much of the work was done in the reigns of Yusuf I (1333-54) and Muhammad V (1354-91). The overall plan of the plateau resembles that of Hadrian's Villa, Tivoli. In Arabic, Alhambra means Red Castle.

Right) Patio de las Arrayanes, Alhambra - main 'public' reception court for the Nasrid Sultans - a simple landscape of power - water channel, myrtle hedges, simple building materials used with exquisite artistry.

Muhammad ibn-Yusuf ibn-Nasr (starter of the Nasrid dynasty) commissioned the gardens. In terms of 'ornamental' gardens these are within (and later additions are beside) what is a group of internally focussed palace buildings, with a series of increasingly private rooms and patios/ courtyards, some 'public' for receptions and dispensing of justice by the Sultan, others private for his court and family only.

Along with the buildings these have been much changed over the years, by successive Muslim rulers, Christian Kings and courts, squatters, foreign visitors and 'experts' in successive restorations to emerge as the modern tourism icon of today - arguably so since the Renaissance.

The palace's external windows frame dramatic views of the surrounding landscape, as though they were oriental miniatures. The importance of the Alhambra in garden history cannot be over-stated: it is a distillation of the East Mediterranean tradition of garden-making in the West; it is the prime example of garden design from the period; it is a great work of art which may have inspired the enclosed knot and parterre gardens of northern Europe. (the last three paragraphs were taken from www.gardenvisit.com/ge/alham.htm).



Key garden elements are:

The Patio de los Arrayanes (court of the myrtles) built in the time of Yusuf 1 (1333-1353) is a sober rectangular patio with a large alberca/pool/water tank flanked by low myrtle hedges. This is primarily thought to have been a reflective space, on a scale to impress court visitors such as ambassadors with the Sultan's power, as they approached for audience.

Left) The Patio de los Leones (court of the lions) built in the time of Mohammed V (1353-1391) is a courtyard in crucero (cross) form with a fountain supported by lions in the centre, and a columned perimeter gallery. At times this has been paved, at times it has been gardens of low flowers. This is thought to have been a private court for members of the Royal household only, although another theory is that it could have been a madressah / muslim college.

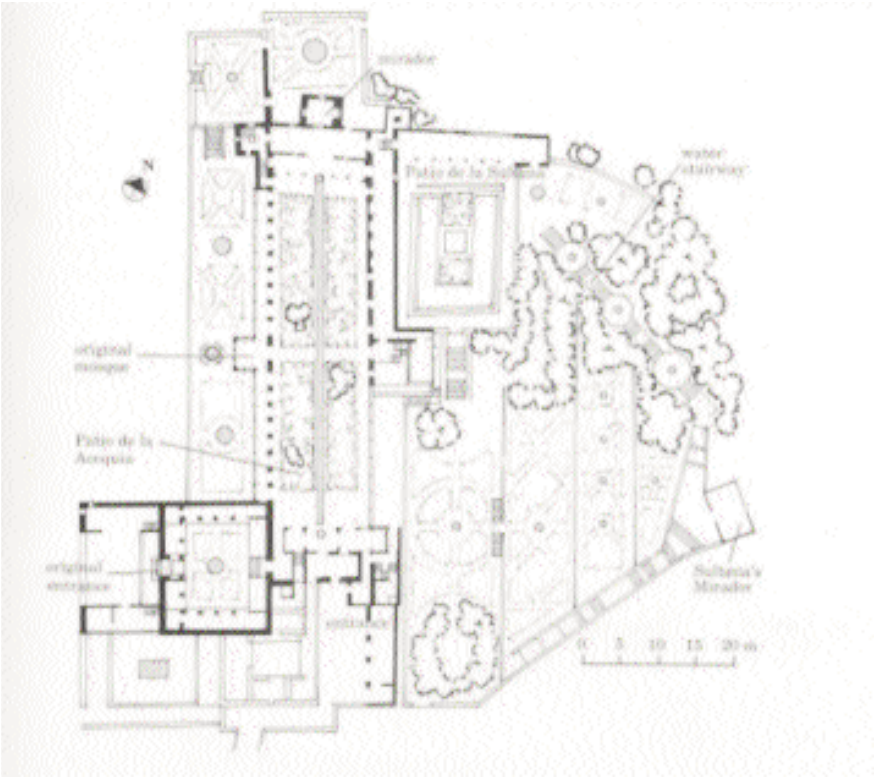
The Patio de Lindaraja, formed by Christian King Carlos V after 1492, is an enclosed space with a central fountain, parterres with hedges of box, laurels and tall cypresses. The fountain is in 2 stories, the top being a recycled earlier Islamic 'lotus' bowl fountain, raised up on a later Renaissance marble

basin below. This was primarily a private, domestic, reflective space for the women of the Royal household.

The Jardines del Partal were established in the 20th century by architect/conservator Leopoldo Torres Balbas in the zone of the Tower of the Damas, where there were a series of old albercas/ tanks and acequias/ water channels. They have a terraced arrangement with large squared ponds reflecting the pavilions, steps, hedging and views out to the Albaicin/ old Muslim city quarter, and to the Generaliffe.

The Generaliffe is a part of the Alhambra medina, separated by the Cuesta del Rey Chico (a gully). It includes perhaps the oldest garden in the 'West' (ie: Europe), if ‘garden' means a predominantly ornamental and private space (cf: Cordoba mosque's Patio de la Naranjas, which is more of a public square.

It was partially built in 1319 as a villa and orchards for recreation, rest and retreat for the Sultans and their court, with patios, water tanks, fountains and gardens, in terrace layout on a hill overlooking the Alhambra. The gardens were conceived as a representation of Islamic paradise: a leafy orchard full of fruits, water channels and pavilions. The irrigation system of acequias/water channels is very interesting, its aesthetic based on practical irrigation & gravity.



Left) Plan of the Generaliffe (Source: Brooks, 1987)

Key features are outlined below.

A lower series of terraces which retain orchard and vegetable plantings (at left);
The Patio de la Acequia (courtyard of the water channel)(main ‘cross’ formed space between buildings);
A series of further terraces up the hill (to the right);
A mirador (lookout pavilion) at the top (Sultana’s pavilion) (at lower right)

Below the plan (ie: west of this) is the ‘new’ gardens of the Generaliffe, being a 20th century creation, in sympathetic style, controlling views as you approach

Key features are outlined below.

A lower series of terraces which retain orchard and vegetable plantings;
The Patio de la Acequia (water channel) is a large, long space, open to the landscape at one side through an arcade, with vistas over the Alhambra. Originally it was a garden in crucero (cross) form with a raised longitudinal water tank, a shorter cross axis path, sunken meadow gardens (as in Seville’s Patio de las Doncellas) and (originally) a central pavilion. The courtyard has seen many changes since its inception, to the buildings around it, (extended in height), many changes to plantings, soil level, fountains and garden structures.

An example of planting changes is that there was a range of elaborate cypress topiary shapes here from perhaps before 1500 and cypress 'structures' from at least the 19th century, gone today)(See (21) Patios de la Acequia exhibition & Jose Tito Rojo paper and interview, (22B)).

Today the central pavilion is gone and the water channel reduced in impact by rows of 'squirter' fountains added later in the romantic age. Arching fountains have been features of the tank since 1865 (and possibly earlier) but more likely this was a tranquil pond in Medieval Muslim times.

Today’s ground level is 0.5 metre above the c1250 level, (temporarily uncovered in 1959 works).

The Patio del Cipres de la Sultana uphill has an original estanque/water tank in the form of a ‘U’. A series of vigorous fountains disrupt and enliven what probably originally was much more serene space with murmuring

water features at most. Regrettably the famous Sultana's cypress is dead, although its huge trunk has been retained. This post-dates the Reconquest (1492 in Granada), and its cypress in particular was noted by a visiting Venetian ambassador in 1526.

The Escalera de Agua/water staircase is in the highest terrace of the grounds. It is divided into three flights of steps with circular landings with small fountains. The wall railings/balustrades are water channels formed by simple roofing tiles. This 13th c.structure predates similar staircases made in Renaissance Italy in the 16th c.

Expert Guided Tour of the Alhambra - learnings
The Mexzuar (first 'entry' area to the Nasrid Palaces) garden area includes an alberca/water tank in the form of a Roman nymphaeum at Volubilis, broadly rectangular but with 'scallops' cut into its sides, overlooked by arcades.

Right) A box-hedged square shape off-axis to its surrounding gardens outside the Mexzuar towards the Alcazar/ fortress marks and interprets the location and orientation of a former mosque here, facing its mihrab/prayer niche directly towards Mecca.

This is a subtle and an interesting garden 'interpretation' of a lost building.

Decorative plaster repairs where required are now very expensive to fix, as Spain lacks qualified/experienced craftsmen/labour, and these must be imported from Morocco.

There is a strict hierarchy of spaces from outside to inside, and from public to private, with visitors only being admitted to certain places, depending on their position, or petition/business of visit. Living spaces (eg; Court of the Lions) were quite separate from public reception and business places (Court of the Myrtles, Mexzuar).

Indirect entrances (corridors, doors/portals) between spaces are the rule for all spaces in the Nasrid Palaces, an adaptation for defensive purposes, meaning visitors are meant to be confused, to never see ahead where they are going, until a corner is turned. Similarly often twin doors are presented, one being either false (leading nowhere) and the other into the next space, Elsewhere in Seville's Alcazar, one hid a rapid possible escape exit for the Sultan/courtiers.

Traditional irrigation was evident and still in use in places, particularly outer areas still within the fortress walls. Element evident to the watchful included the Acequia Real/royal water channel which feeds water off the adjacent mountains into the complex (although now diverted within the walls), a small aqueduct which conveys this towards the (former, ruined) city part of the complex, smaller acequias/water channels conveying water to pools, flower beds, orchard areas, baths, rills beside steps and paths, steel/ wooden/ earthen plugs in mounded earth to stop/admit water into sunken flower/garden beds, 'ploughed' stripes of mounded earth to direct water within 'flooded' beds, curved mounds of earth in sloping beds to trap and hold water going down-slope.

Appendix N:
Summary of paper given (opening the conference) by Jose Tito Rojo, expert in Islamic Gardens, Granada University/Botanic Gardens

Mr Tito Rojo was a specific lure to Granada, recommended by Eduardo Mencos as an expert on Islamic gardens, and particularly on restorations. He has spent some time specialising in the study of Islamic gardens in Spain, analysing the breadth of documentation and analysis over time, photography and visual representation, actual remaining gardens, and using modern more 'scientific' analyses such as those of pollen and soil levels.

A key concept in Islamic gardens is provision of water, which is a requirement for Moslems to wash face, hands and feet before visiting a mosque or praying (at home). Mosque courtyards from earliest times had water in the form of fountains, a tap, basin. Pleasure gardens followed suit, perhaps in an evolution from a mixed pleasure/productive garden, the huerta, where water was functional (for irrigation and for air-cooling), as well as beautiful, (for contemplation or for providing sound or atmosphere).

Key topics (in his research of earlier writings/observations on Islamic gardens in Spain):
1) religious feelings about gardens, symbolism of layout, features, plant species;
2) the union of the beautiful and the practical - the huerta/orchard-garden;
3) the closed character of spaces (walled/hedged from outside view);
4) the use of still water, and lack of elevated fountains/jets
5) research on the influence of territory, city and rural and cultivated spaces in each;
6) the age of surviving gardens, and role of gardening/horticultural traditions;
7) permanence of styles, and lack of a trajectory/progression (deriva) in gardens;
8) confusion by some of the terms "Arab" with "Spanish", and range of Islamic garden expressions around the Mediterranean basin (corresponding and blending with various local cultures, traditions);
9) variation and interconnection of different documented types of fountains (over time);
10) writers and visitors who didn't speak Arabic describing gardens as 'Arab' (on impressions);
11) archaeological/documentation of places, factual analysis cf opinion (pollen, soil level analysis).

He broke into time periods and types various attitudes and approaches to understanding of these gardens:

1st phase/pre 19th c. (late 18th)/ Romanticism
Dominated by English and French writers, and romantics - eg: "*Los Jardines Andaluces*", promoting notions of 'Oriental luxury', exuberance of these gardens - fountains, colour, their differences from Christian/European gardens. eg: American Washington Irving, who moved into the Alhambra when it was a squatter's ruin, living there and writing and illustrating (with some liberties) his celebrated '*Tales of the Alhambra*' in 1832. Another is James Cavanagh Murphy, who wrote the 1813 'The Arabian Antiquities of Spain', noting there was 'nothing more perfect' than the Generaliffe gardens, in their gallantry, luxury, and planting following of the Chinese style (a la English Chinoiserie of that era)!

Right) Patio de la Acequia, Generaliffe - looking rather bare after a recent replanting and remodelling, partially based on advice in a report by Jose Tito Rojo.

This ‘look’ is in marked contrast to the lush over-planted space better known in post cards since the 1950s, with plants such as Bougainvillea (of the Christian/ post-America period) dominating, perhaps inappropriately

Left) Patio de la Acequia in a typical Granada post card - the 'look' since perhaps the 1950s. Note the purple Bougainvillea, crepe myrtle (pink) and other plants not available pre 1492 Columbus' arrival in the New World.

Source: Post Card

2nd phase/2nd half 19th c./ Romantic Arabism/Orientalism

eg: Rafael Contreras, 1878 noting the beauty and symmetry, architectural cypress branch patterns of the Cordoba mosque/cathedral. J.Romero Murube in 1938, and Fouquier & Duchene in 1914 were other examples cited, the latter noting that Spain was the only country where you could find 13th c. gardens 'exactly as created'.

In 1855 Melita Atienza y Sirvent wrote of 'Arabs, voluptuous in peace, heroic since the sublimation in war', misquoting an 1850 writer Pi y Margall who said they were 'voluptuous in peace, ferocious in war'.

3rd phase/1st half of 20th c./ Between scientific nihilism and romanticism

1905 Valladar said of the Generaliffe that its garden had 'nothing worth mentioning except the great cypress' (of the Sultana).
1924 Valladar wrote on Seville's gardens and palace
1922 Burin wrote that Arabic gardens were all lost, except for the Alhambra, and he established the concept of the 'National Garden' eg: 1922 Florence Symposium's 'Italian', 'French', 'English' (landscape) and 'Spanish' (Medieval Andalucian Arab/ Hispano-Muslim) gardens.
1909-20 Pedro Giraud wrote that the form of garden adopted is called 'apaisada'
1934 Leyva wrote of an indefinite style 'Jardin Arabe modernista'
1915 Frenchman JCN Forestier (influential in Spanish park/garden design, eg: Barcelona, and much-influenced by Islamic gardens in Andalucia) wrote that the Alhambra was 'disgracefully efimeras' noting its admirable marble fountains, and lamenting its neglect. He noted its characteristics of parterres, disorder of cultivation (plantings), mix of edible and ornamental etc.

1939 architect/conservator Taras Bulba claimed it was easy to distinguish in the Generaliffe what was Muslim and what were later constructions. He was responsible for some major changes.

1978 Gomez and 1975 Moreno pushed for more scientific approaches, which led to the 4th:

4th phase/2nd half, 20th c./Scientific Methods

This period saw studies of particular aspects, eg; fountains, soil stratigraphy in Patio de la Acequia, layout and depth of soil in Muslim v Christian eras. Tools like pollen analysis were used to ascertain dates of types of planting present. There has been a growing appreciation that the story was more complex than earlier thought. Archaeological excavations have led to some major reinstatements/ reconstructions/ uncovering original gardens. (e.g.: recent work on Patio de la Acequia replanting, Seville's Reales Alcazares courtyard...).

1941 Marcais, notion of 'paradise' garden, and Persian 'paradaiza', transplanted into Andalucia
1953 Moreno's Manifesto of the Alhambra - notion of the Arab garden as an attempt to represent paradise on earth, as manifest theology, based on the Koran's descriptions of heaven as garden. Analysis of Orientalist images of gardens, and what was being represented, conveyed, obscured.

Conclusions
Each age has its own concept of what is a 'Muslim/ Islamic/ Arab/Hispano-Muslim' garden. Each age has also made changes to these gardens, for good or bad, and these reflect broader traditions of local horticulture, agriculture, etc, not necessarily Islamic in origin.

What Mr Tito Rojo said we need is proper historic and documentary investigation, thorough analysis and understanding of the remaining actual places (layout, fabric, composition, plant palette etc), and the honesty to admit we can never achieve 'authenticity' in a reconstruction, based on (at best) partial information. Historic records are patchy, inconclusive, and at times contradictory. All of them in some way reflect the recorder, their culture, biases and blind spots, agendas. Cross-checking and corroboration are important in getting a more balanced view.

Medieval, possibly 'first hand' records such as the illuminated manuscripts of the 'Cantigas de Santa Maria' with simple images of gardens, plants, meadows of flowers, orange trees, cloisters, a 'garden of eden', pools, central fountains/bowls, myrtles and water were invaluable guides.

Mr Tito illustrated the example of the celebrated fountain of the Court of the Lions in the Alhambra. This has had 5 versions known/recorded over time. It was 'two storeyed' in 1665, 1835 and 1945, and 'one-storeyed' in 1954 and 1965 (and now). Which is authentic? The justification for removing the 2nd storey was 'authenticity' but based on what? Early photographs show this fountain with 31 small fountain jets spurting water vigorously in all directions (1930s), not so now. In 1890 there was one, single, very high jet and now it is some 30cm in height (Victorian era images exaggerated the height and thus drama of the Alhambra fountains, and architecture, for effect).

His point is that 'restoration' is often of adapting reality to our (prevailing) theory - and that instead we need respect for 'pervivencias', which (I think) means the things that survive. He made passionate arguments for reinstating removed elements from the Generaliffe gardens, such as cypress 'architecture' in the form of circular 'glorieta' pergolas with arching curves of green, taller citrus trees, flower meadows with grass as well as flowers, topiary figures and shapes which have been recorded in this space over time etc.

Questions included ‘Was the paradise garden a literary (v actual) invention, and by European rather than Islamic writers?’ Mr Tito Rojo answered saying there were differences between Royal or rich gardens (which depended on politics and context) and others - these were 'status' gardens designed to impress and be observed. He noted the origins of the 'Hispano-Arab' garden such as Persia, but stressed that in Spain there were also strong legacies from the Roman occupation, as well as more local (Berber etc) influences from North Africa, quite apart from the Omayyad dynasty which came from Syria/Middle East to Spain, with Berber troops and help.

Later I got to interview Mr Tito Rojo and asked him how he considered this heritage was managed, in relation to Islamic gardens and change. He directed me to a recently published article of his in the Cuadernos de la Alhambra # 39 (an academic journal of studies/research/works report).

Right) view from the Generaliffe to the Alhambra complex below.

Note the productive huerta garden on the terrace (one of many) below the Generaliffe, with fruit trees, nut trees, crops of vegetables.

This reports on a four year research project he undertook with Manuel Casares under a signed agreement with Patronato-Alhambra-Generaliffe (the heritage body managing the complex), advising on authenticity of elements of the Patio de la Acequia courtyard garden, based on art history, textual and graphic analysis, pollen and soil level analysis, fabric analysis, botanical, arboricultural and archaeological investigation, and making recommendations for future management. This project was meant to inform current and future management, but he appeared sceptical about its actual implementation, noting that the director of the Patronato, an architect (continuing a long tradition of architects making such decisions!) was adapting it to his own ideas, with no consultation with the authors.

Along with the manager of the gardens who is an agronomist, these two appear to be applying their differing biases and priorities to the complex's presentation today (plus ca change!). Mr Tito Rojo is clearly not happy with the results, describing them as 'feo/ugly'. He lamented the lack of a central cenador pavilion, the lack of strong vertical elements (planting), lack of a flower meadow with grasses in the two main beds (a 1590 text notes grasses, as do Moslem era writings and images), describing the current plantings dismissively as a 'jardin anglais' (English).

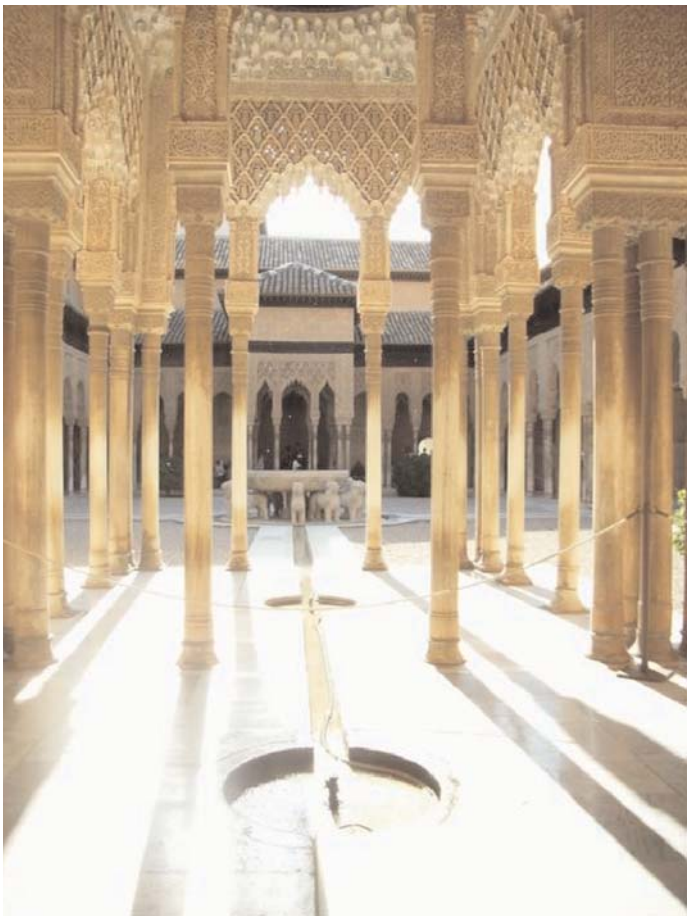
He added that citrus are there but pruned too short (not to block the architecture/ view/ photos!), noting that historic records clearly show this is how they were intended/grown to be taller, not treated as secondary props for the architecture of the portico, a la Italian/Baroque/English preferences.
Plants such as crepe myrtle and *Bougainvillea*, though pretty/spectacular (witness postcards of this space since the 1950s) were not grown here in Moslem times. Bougainvillea was introduced from Sth. America c.1600 into a Christian Spain. He noted there was a tradition in the Moslem era of using introduced plants in gardens, implying that this might justify their retention. Lost topiary columns, arches and shapes were noted, and have also not been reinstated as he recommended.

His main criticism was that the Patronato (and perhaps by extension, their visiting public?) prefer restorations that are to particular dates or periods (eg: Romantic era, here) rather than more complex layering.

I asked about the Court of the Lions, noting theories/assertions that this had been a sunken flower meadow garden, and asking how long the current 'at level' gravel and four citrus had been there. He noted that citrus have been recorded in that space since the 1900s, as have myrtles 'enramada' an Italian sub-species(?). He added that an earlier text refers to this as a bower/shady grove under the shelter of branches, noting a 'roseto' (large rosette), setos (hedges), and mirto de hoja grande (form of myrtle with large leaves/arrayan morisco, now very rare in comparison to the small leaved form arrayan/mirto) which is commonly seen/used in hedging and as a shrub.

He lamented at the loss of a 100 year old or so specimen of this large leaved form of myrtle in the Alhambra which was drastically pruned and partly uprooted in March 2005 – eventually killed, despite his advice not to. The senior gardener is well-trained, but not so his juniors it seems - there is now only one example of this myrtle left, in the Generaliffe garden. (NB: I noted a large old specimen of this same form outside Seville's Reales Alcazares).

He noted how there is no professional association of gardeners in Spain, and only a tiny association of landscape architects, agreeing that even these do not receive training in heritage or garden history, the nearest such course being the United Kingdom's University of York's!

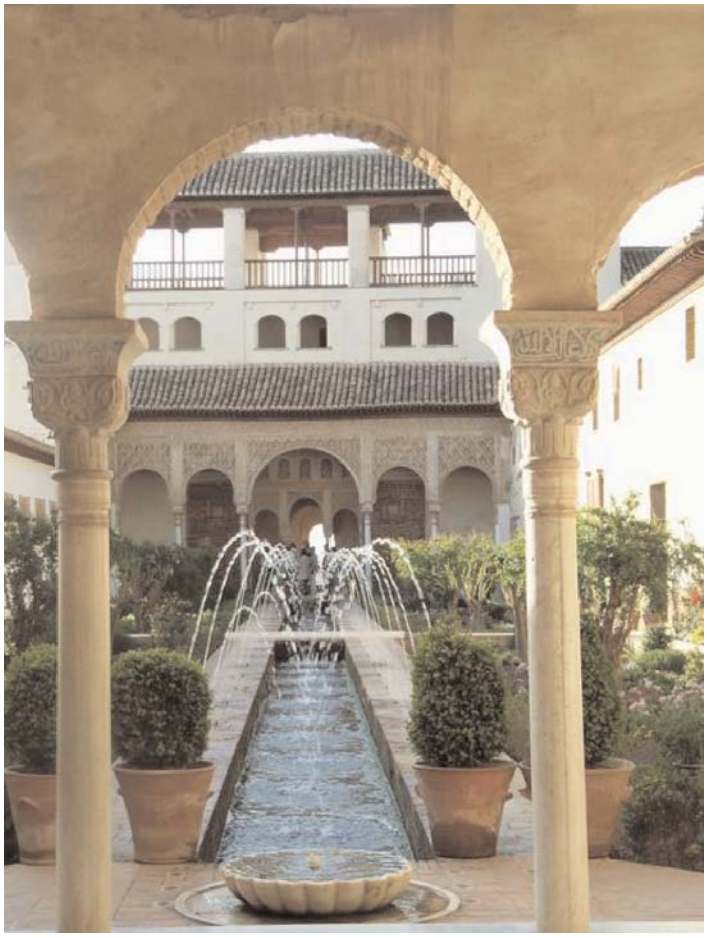


Right) Patio de los Leones: there is still debate about whether this courtyard was originally paved, a garden, sunken or not etc. So many romanticised images have been produced and circulated for so long, it is difficult to sift fact from supposition or imagination. Research from primary sources, visitors etc who left records, is needed to tease out such information.

I showed Mr Tito Rojo a copy of my article in "*Australian Garden History*" journal on Max Shelley, designer of the garden at Boomerang, Elizabeth Bay, Sydney, and he was much taken with that building/garden's resemblence to aspects of the Alhambra, and sought a copy. I noted how in the 1920s when that was built, Australian popular garden/home magazines were full of Spanish mission architecture and writers looking to the Mediterranean and California as better examples of in/outdoor living, and cultures of the sun, than legacies from northern Europe or England's misty gloom!

I also attended a Granada University exhibition opening *'21 Patios de la Acequia*' organised by Jose Tito Rojo, which assembles and shows for the first time a range of photographs, lithographs/ engravings and sketches of this same courtyard since 1766 (photos since 1862), older images of a Medieval Andalusian courtly garden and a 1600s/1700s Persian Royal Court garden, this being one source of the imagery and approach. In addition excerpts from literary sources were included dating back to the 1526 visit of the Venetian ambassador Navagiero. These clearly document 9 different layouts and planting schemes - defying any claim that it is as it was (when?), questioning the meaning of 'authenticity' in this iconic garden space.

These 9 different versions vary in layout, planting, height, density and effect. These strongly reflect the romantic re-modellings undertaken in the 19th century, and also the c1960 re-modelling based on site archaeology (of Bermudez Pareja)(including some test pits to establish Medieval (c.1250) soil levels (c.1 metre below present), pollen analysis to establish plants grown in the patio by relative era etc.



Right) another view of the Patio de la Acequia - another ‘contested space’ in terms of real Islamic form, content, composition, with much layering and change over its long Christian-era post 1492 occupation

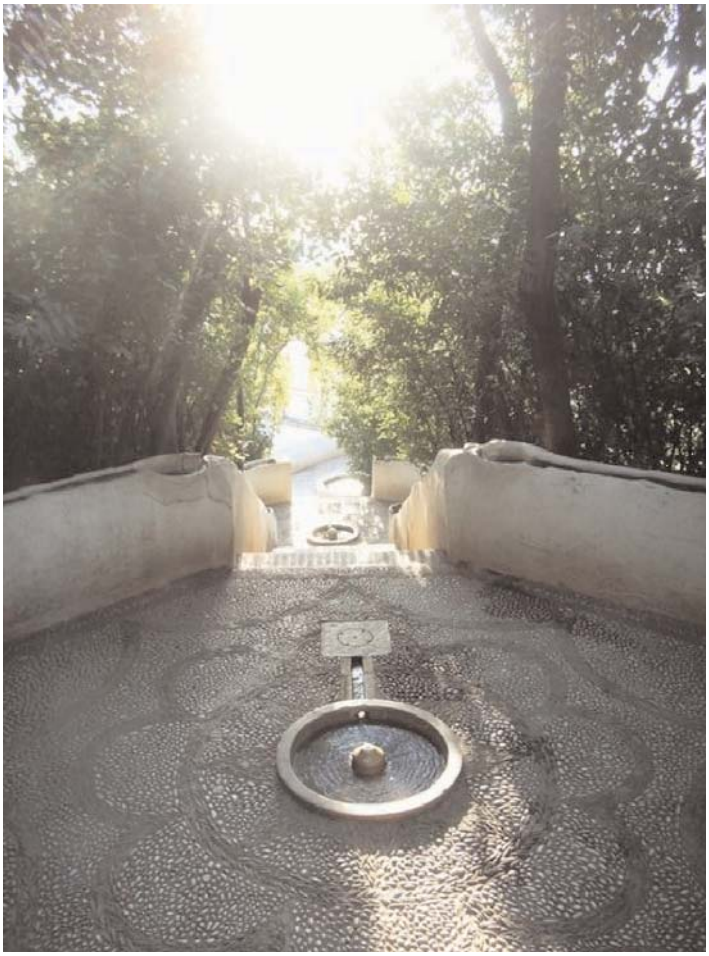
Navagiero in 1526 wrote of (today lost) elements including a (sunken from today's soil level) meadow/prado; water games/tricks to dowse visitors and fountains. (NB: Granada was recaptured by the Christians in 1492 under "Catholic" King Ferdinand and Queen Isabella, and for a time they lived in the Alhambra complex). He noted myrtle hedges, a meadow and beautiful trees (only replanted hedges, shrubs and flowers remain today).

Bertrant a visitor in 1659 noted the courtyard had a multitude of fruiting trees. With the exception of some very short clipped citrus there are none today. He noted a large number of fountains on all sides, small parterres, laurels, the water staircase (which predates Italian Renaissance versions), although he commented that this one was not wide as they were in France at the time.

Amongst other losses is a range of topiary cypresses, also trained over arched cane supports into 'pergola' structures called 'ballerinas', eg: a central one over the water channel (seen in images from c.1808, 1840, 1862 & 1889. Other images show no central pergola/ballerina, and either cypress arches crossing the water channel (1806, 1812, 1832, c1862, 1865, 1869), or parallel to it in long flat 2 dimensional arcades (c1865, c1889, c1931). At times also (1837, 1850, 1945) cylindrical shaped ‘figures’ in topiary have been noted (now gone). At other times, (1892, 1955, 2000) there has been no topiary.

What Jose Tito Rojo's research into documentary sources and palynology (pollen analysis of sections of soil going down in level and time in this space) is that in myrtles, cypresses, citrus, laurels and to a lesser extent roses were present in Medieval soil layers (ie: pre 1492). In addition grass, plantain, ivy, jasmine, pistachio, loquat, grape, hazelnut, medlar, quince, walnut, pine, willow, elm and nettle tree pollen were found in these early soil layers. American plants such as *Bougainvillea*, prickly pears (*Opuntia spp.*), false acacia (*Robinia*), sky flowers (*Ipomea*) and trumpet creepers (*Bignoniaceae*) and South African (*Pelargonium spp*.) do not appear until after 1492, Spain’s ‘discovery’ of America.

Right) Escalera de Agua/ water staircase at the rear of the Generaliffe - generally considered to be little changed from its earlyform, and some 200 years older than similar (perhaps better known) structures in Italian Renaissance gardens - which were probably influenced by this.



He makes much of the Granadine tradition of horticulture, particular tastes for topiary and productive gardens as still exist in the "Carmens" of Granada, (terraced garden spaces within walls in old Granada, particularly in the Albaicin, the quarter that matches the ages of the Alhambra and Generaliffe). Even these carmen gardens have been romanticised and made more ornamental than productive by restoration and new occupants in the 19th and 20th centuries, although it would appear that romanticism in western visitors eyes has led to many changes (eg: Alhambra and Generaliffe garden 'restorations') well before the 19th century.

As well as planting changes, layout and detail changes aspects such as whether or not side walls facing 'the view' had always been open arcades etc - many elements appear inconclusive and open to debate when more and more evidence is gathered and scrutinised carefully and coldly.

His conclusion was that this space has changed much over time with differing occupants, styles and particularly differing age's 'ideas' of what constituted an Arabic/ Islamic/ Hispano-muslim/Andalusian garden, ie: what was appropriate to put back in 'restorations'.

Of course this enables you to question whether (particularly this might apply to visiting foreign Westerners) any profound statement of 'this is an intact/original Arabic/ Persian/ Muslim/ Andalusian garden (example/style)' are true, or are based on assumptions, interpretations at points in time, when the 'original' has been changed so much. This doesn't necessarily devalue what remains, but suggests caution in making definitive statements might be highly advisable when evidence is lacking to back up claims - something that perhaps could well be applied across the board in heritage work worldwide, and of 'experts'. A similar question might be to put to western, non-Muslim authors claiming all Islamic gardens are ‘a representation of paradise’ – are they? The quadripartite or ‘cross’ form predated Islam in several Middle Eastern cultures…

So each age or era needs to be carefully considered in making conservation or 'restoration' decisions, their relative heritage values assessed, before any action is taken to remove or reinstate elements, at the cost of others. This is a similar conclusion to the Australia ICOMOS Burra Charter principle of 'doing as much as necessary, but as little as possible' and of valuing each layer/era of a place's development as playing a part in its history and heritage value. It contrasts sharply with older 'conservation' thinking of stripping back later additions/changes to a chosen period or date deemed the most significant.

A case in point was the Patio de las Doncellas reinstatement/reconstruction in the Reales Alcazares in Seville, which caused much debate amongst industry experts (eg: archaeologists v historians) in the Conference on Islamic Gardens in Granada.

A 1600s marble paved courtyard with small central fountain, at the same floor level as the surrounding palace reception rooms, has been excavated to reveal an intact c1200s Islamic sunken garden, its brick arched walls/raised path bases intact, and a raised single central, longitudinal water channel. Two sunken 'meadow' plantings with citrus trees and flowers have been reinstated.

To my outsider's eye this makes this space much more complicated and interesting, being one of the few remaining sunken Islamic patio spaces left in Spain, and strongly making the point about the age and layering of this complex, which is predominantly (above ground) evocative of later Christian/ Mudejar changes. However this reinstatement undoubtedly involved removal of a legitimate 'authentic' stage of development, which is what has caused 'heat'.
Much the same thinking has informed conservation decisions and actions in Australian heritage places since perhaps the 1960s. "Experts" often with little or no consultation, and at times little or no evidence beyond their opinion, have made sweeping changes to heritage places in the name of 'restoration to its former glory', removing later layers to 'reveal significance'. At the time these were often thought ground breaking, yet today they would be more likely to be not allowed, with different thinking, valuing all layers, and trying to tell more complex and less 'pure' stories.

Pollen analysis has not been extensively used in Australian garden history/restorations beyond a few high-profile locations to my knowledge, and appears widely used in Spain, at least on Islamic era garden research.

Literary records appear to be widely used in both countries, with Spain's including good records of the Christian (less so of the Islamic) era (many were burned by zealous 'Reconquest' bishops or Kings erroneously claiming all were Korans!), Renaissance and later eras, and in some cases Roman and Greek era records.

Australian equivalents date from botanical and zoological explorers pre 1788 (eg: Dampier off WA in late 1600s, and the Dutch), to records from the First Fleet in 1788 and afterwards, such as plant lists on boats, plants received lists in Botanic or Government Gardens, nursery lists, diaries and correspondence of notable gardeners, botanists, etc. These are a great help in deciding what plants were growing at the time, were available (if not proven to be in a
particular garden, although in some cases good records exist of particular gardens or parks, eg: original design plans, planting schedules etc).

The "*Trees and Shrubs of Andalusia*" book is a milestone reference combining artistic, literary records, botanical and ethno-botanical (medicinal, culinary uses), linguistic changes of plant names, types of use etc of a huge range of plants across "La Andalus" or Muslim Spain, and of its smaller remnant, modern Andalusia, ie: southern Spain. The plants included are both indigenous and exotic, including a long history of importation (eg: Greek and Roman imports of vine grapes and olives and wheat, and Muslim imports of economic importance like silk, citrus - key in wealth generation in for example Valencia, since the middle ages, and in modern exports to Europe).

No such equivalent book has been produced for colonial Australia, although partial equivalent books and research focussing on Aboriginal ethno-botany, botany and garden design styles over the time since 1788 have been published. Research has been done on pre-1870 nursery catalogues (mostly in NSW & Victoria) and plant records, and this has been loaded onto a searchable website
(www.hht.net.au under 'Caroline Simpson Research Library' and 'colonial plants database').

Appendix O:
Notes from visit to Cuarto Real de Santo Domingo (Royal Court of Holy Sunday), Granada

I was lucky to visit a rarely and specially-opened building and archaeological site as part of the conference. This was a former (12-14th c. Nasrid royal possession, a huerta/orchard estate outside the inner walls of the Alhambra, part of the Huerta Grande de la Almanxara, close to the Genil River. The Catholic Kings gave it to the Order of Santo Domingo as a convent. Nationalised in the 19th c. it went into private hands, and is in part now still privately owned (with recently built flats), part is now a new inner-city park, which with the rest was acquired by the regional Granada Government in 1990.

The huerta had a diverse range of buildings as well as fields of fruit and vegetables, including a qubba/salon of protocol, of similar age to the Nasrid palaces, now perched on the wall of the Arrabal de los Alfareros, and hard up against a large, 19th c. house. This wonderful and intact early building was specially opened up for our visit, and experts explained its intricate decoration and features, some being restored, and site archaeology and future goals (reinstatement of the pleasure garden in front of it) were outlined.

An octagonal pool had been in front of the qubba, and a 19th c. version of this was placed in the same

location. Archaeological testing has confirmed the location and form of the original tank/pool and fountain, and the presence of a portico between pool and qubba. The old garden remains under 40cm of soil and the 19th c. garden is on top of it, in some instances reusing elements (a circular flat 'pool' with spout mounted on the edge of a rectangular pond is identical to examples in the Alhambra).

This is the oldest surviving example of Nasrid residential architecture, despite several 'restorations', some not very sympathetic. Its typology is very important, showing the close relationship of house and garden. The salon was probably a place for the simple enjoyment of its surrounds with orange groves, water, flowers, and fields stretching between the Genil and the outer Alhambra walls up the hill. 2 alhanias laterales (large open niches for rest/repose sunken into the internal walls) and four small closable rooms face into its central cubic void, with a two storeyed vault above, and screened windows out to the north/Genil. The richness of interior ornament was quite amazing.

Appendix P:
Learnings from Book launch: *Trees & Shrubs of al-Andalus*, Granada

The conference also included a launch of a major reference work documenting native and cultivated (exotic and improved) species documented over time in Islamic Spain, including botanical, cultural and 'use' information. The citation is: *Trees and Shrubs of Andalucia* /CSIC/Centre for Arabic Studies/Monogram/Julia M Carabaza Bravo, Expiracion Garcia Sanchez, J Esteban Hernandez Bermejo, Alfonso Jimenez Ramirez.

I was lucky enough to attend this event, hosted by Granada University, at which two of its principal authors, Ms Carabaza and Mr Bermejo spoke, as follows:

This book documents 456 identified species (300 herbaceous, the rest woody) of trees and shrubs, native and exotic/imported, cultivated in al-Andalus or Moslem Spain pre 1492. A work of some 20 years in preparation, it includes close textual analyses, botanical and herbarium records, gardens, translation of works in several languages, cross-checking of mis-identifications or species confused between different sources/cultures and correcting past errors of identification, naming, etymology.

Each entry has information on plant morphology, forms, techniques of cultivation, uses and economics (crop species etc), with a critical commentary also.

123 species were cited in historic texts, 159 more were cited in part, 174 more included specific citations. (456 total). 20 more species were known from other sources such as still being commonly cultivated today, including: sweet chestnut (*Castanea*), nettle tree (*Celtis*), carob (*Ceratonia*), hawthorn (*Crataegus*), quince (*Cydonia*), fig (*Ficus*)(both sycamore fig (Egypt) and edible fig (*F.carica*), dates (*Phoenix*), and sumac (*Rhus coriaria*, a spice).

Arab introductions into Spain included Judas tree, *Citrus* (orange, lemon, lime) from Asia, eastern sweet gum (*Liquidambar orientalis*), oleaster, (*Eleagnus angustifolia)*, white cedar/Persian lilac, mulberry, banana, jujube *(Ziziphus jujube*).

(NB: although outside the scope of this book, post-1492 Christian era introductions included a wealth of 'new world' plants from the Americas, eg: *Caesalpinia sappan* (Brazil), *Bougainvillea* (Brazil), *Jacaranda* (Braz/Argentina), passionfruit (Brazil) etc.)

Species cultivated rarely or temporarily (eg; Botanic gardens) included sebes, (*Cordia myxa)*, cotton (*Gossypium*), Syrian cherry, (*Hyhaene* tebaica) (in a mosaic in Cordoba), *Lawsonia, Tetraclinis* (a conifer), argan (*Argania*), snowbell (*Styrax*), *Caesalpinia spp*., and branching palm.

Another group were species valuable in commerce as products and aromatics (herbs, plants used for perfume manufacture, wood, timber, charcoal etc) eg: *Aloe*, *Aquilaria*, frankincense (*Boswellia*), cinnamon, *Cassia* and camphor (*Cinnamomum*), myrrh (*Commiphora*), pepper (*Piper*), ben (*Moringo oleifera*), sa/teak (*Tectona grandis*), silkworms/mulberry (*Morus*) and *Citrus*.

Another group were indigenous or autochthonous plants that were cultivated, eg: strawberry tree, *Cistus*, hawthorn (*Crataegus monogyna*), ash (*Fraxinus angustifolia*), manna/flowering ash (*F.ornus*), jasmine (*J.fruticans*), myrtle,
oleander, broom (*Retama sphaerocephala*), tamujo (*Seuringa tinctoria*), chaste bush (*Vitex agnes-castis*), evergreen/holm/holly oak (*Quercus ilex*), cork oak (*Q.suber*), hazelnuts (*Corylus avellana*), serbales, majoletos.

Species not cited in literature but whose geographic distribution/range includes Spain were included, such as lime/linden (*Tilia spp*.), tree heath (*Erica arborea*), spindleberry (*Euonymus europaea*), holly *(Ilex aquifolium*), privet (Ligustrum vulgare), fir (Abies spp.)(A.pinsapo or the Spanish fir is but one example).

Species with confused terminology between cultures/records include: brooms (*Genista*), buckthorns (*Rhamnus*), dogwoods/cornels (*Cornus*), sweet alyssum (*Globularia maritima), Coriaria myrtifolia*.

Species known from the end of the Muslim period/Renaissance were included, such as lilac (*Syringa*) and Spanish broom (*Spartium junceum*).

Conclusions
Moslems in Spain perfected (Roman era) irrigation, disease control, propagation of plants, introduced many plant species, developed new cultivars and varieties. They also developed a singular cuisine or gastronomy, and greatly enriched Spanish culture. This was before America came to Spain, with its similarly rich ethno-botanic heritage.

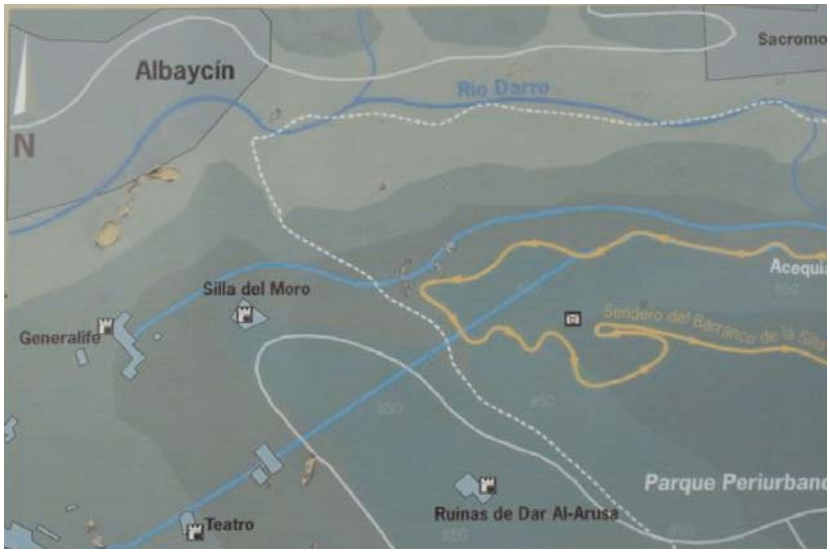
Appendix Q:
Observations from visiting sites 'uphill' of the Generaliffe including 'the Sigh of the Moor/ Silla de Moro', Sacromonte flora

I ventured 'uphill' to try to better understand the water supply channels/ acequias supplying the water system of the Alhambra & Generaliffe and former Medina/city. These proved to be fascinating, being two Acequias Reales (Royal water channels), one feeding the Generaliffe, the other the Alhambra complex. A system of water tanks uphill from the Generaliffe store water, and the channels feed uphill to the Sierra Nevada Mountains. While I read and heard talk of underground water wheels /norias, lifting water out of the Darro River, I could not find confirmation of these, nor mention of them on interpretation signs. These signs mark out the routes of the water channels, which today can be explored and followed by recreational users, by walking, bikes etc. A peri-urban park has been created above the Generaliffe, open to residents and visitors to Granada. This also serves nature conservation and broader recreation uses, along with some continuing agriculture, orcharding and forestry.

I made a point of noting what grew outside areas that were irrigated, in both 'town' ie: the Albaicin or Islamic quarter, and 'gown' or the Alhambra complex on the opposite hill. Above both are hills with grazing lands, some forests, and scattered houses, a convent etc. Much of the land above the Alhambra/Generaliffe is now a peri-urban park, managed as open space by Granada's Government with passive recreation as the main use, walking tracks etc.

The Sacromonte/ Holy Mountain adjoining the Albaicin is a hill opposite the Alhambra/ Generaliffe's) hill, and reflects its flora too, with some more obvious 'garden escapes' from the town's gardens, garden rubbish, etc.

Right) detail from a map in the peri-urban park above the Generaliffe & Alhambra, showing (in pale blue) two major 'Royal' water channels supplying both, from way uphill in the Darro River valley. A walking trail is shown in yellow, the river in dark blue.



To stress how important irrigation is to this landscape, the following were plants I observed growing (NB: some of the more 'water-loving' species were growing on river flats/closer to moisture sources). Others are 'garden escapes' but have to fend for themselves.

Plants observed were:
boxthorn, (Lycium sp.)
tree of heaven
century plant (Agave americana)
feathered grape hyacinth (Muscari plumosum)
privet
prickly pear (Opuntia sp.)

olives (a few)
river red gum
ivy
Aleppo pine (Pinus haleppensis)
black poplar (Populus nigra)
almond
snapdragon (Antirrhinum sp.)
horehound (Marrubium vulgare)
Siberian elms
single white rose
Bupleurum sp.
mignonette
wild onion (Allium sp.)
Glycine sp.
Judas tree
bearded iris (I.germanica)
hedge mustard (Sisynchrium sp.)
periwinkle (Vinca major)
Mediterranean cypress (a few)
catchfly/campion (Silene sp.)
Clematis sp.
southern nettle tree
ash
false acacia/black locust
buckthorn
lentisc
figs
Spanish broom
white poplar (Populus alba)
chinchincheries (Ornithogalum sp.)
spurges (Euphorbia sp.)
willow (Salix sp.)
Angelica sp.
elderberry (Sambucus nigra)
Cornelian cherry (Cornus mas)
broom (Genista sp.) & blackberry (Rubus sp.)

Appendix R:
Learnings from visiting the (Summer) house museum and Parque Federico Garcia Lorca, Granada

This was once a rural orchard estate (Huerta San Vincente) outside the city, but now lies within a modern Granada city park, named after the writer FGL and surrounded by 8 storey blocks of flats and freeway ring road.

What is interesting about this park is that it manages to retain and provide some (albeit small in area) relatively 'rural' setting for the house museum and its immediate garden and 'fields', within a modern landscaped city park. Extensive use of 'rural' creek-side and timber trees typical of the Vega (plain) surrounding Granada, such as black poplars (*Populus nigra*) is also gratifying, given that the poet and playwright specifically noted the beauty and evocativeness (sound of leaves in the wind etc) of these trees, writing from this place.

Small 'fields' close to the garden contain furrows and typical crop species, including vegetables, also a helpful interpretative device for the house museum. Guided tours are given of the interior of the house, and regular cultural programmes and exhibitions. No other signage within the park explains who Garcia Lorca was, although perhaps this is unnecessary for local visitors.

Appendix S:
Detailed learnings from Parc Marxalenes & Parc de la Rambleta, Valencia

Parc Marxalenes includes an artificial swamp/ lagoon, with a study centre focussing on the ecosystem of such places on Valencia's plain, courses for schools etc.

The simple opportunity for city-dwellers (in predominantly 4-12 storey flats) to visit a local park with 'natural' wetland and woodland areas, wild plants, orcharding plants (olives, *Citrus*, fruiting and medicinal plants), a lagoon and more 'rural' atmosphere, is incalculable, and there are wide educational opportunities off-shooting from this.

As well as the above-noted study centre, the local library and child care centre are in adapted historic farm buildings (14-16th c.) on site, and a dog exercise area also on site means that a number of differing social groups use the park on a daily basis. Planned future phases of expansion include more active recreation and sporting facilities, yet to be built. The area is rapidly urbanising.

Interpretative and educational opportunities are well tackled, with free colour brochures on aspects of the park (wetland flora/ecosystems; a nature walk guide) available, a series of themed sculpture and seating 'nooks', each featuring one (usually flowering) native plant or plant typical of the region, identified with a sign.

Parc de la Rambleta is more recent in creation and perhaps more radical again, using natural drainage in a

constructed stream bed, lagoon and infiltration areas, and featuring in differing zones of the park different Valencia plant associations/ ecosystems, eg: aquatic/riverine; meadow/orchard; hillside woodlands; alpine.

Right) Parc Marxalenes, showing native vegetation, sculpture and interpretive natives (one feature plant per ‘clearing) amongst dense housing.

The area was a traditional private huerta/orchard estate, converted into an inner-city park, only some 3 years ago. It is in a densely settled area of 8-12 storey flats and is heavily used, not least because it is relief from the area, and because it offers large and diverse-characted areas of open space, purpose designed dog-exercise areas and of childrens" play equipment. The park is also opposite a major urban public cemetery, which is highly visited.

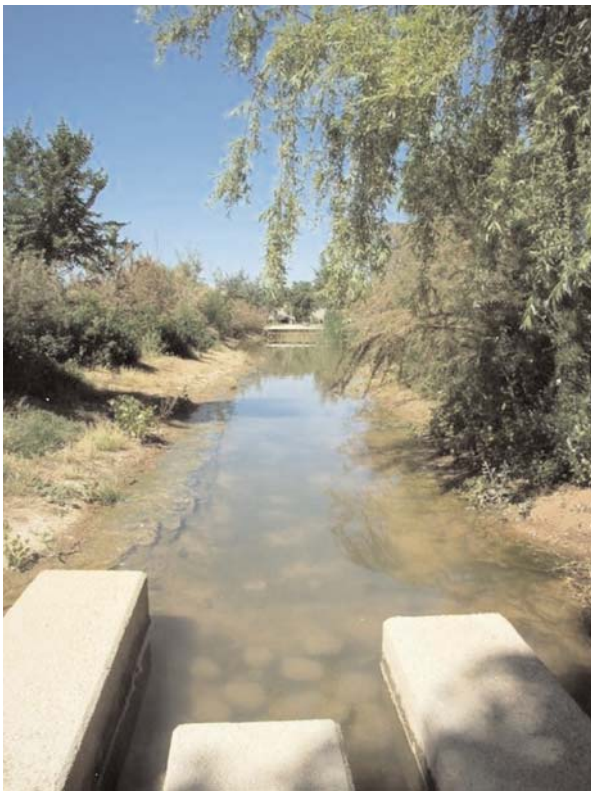
The irrigation system and planting programme are both radical for Valencia, and perhaps Spain. Natural drainage is used, seeking both to tap and trap Valencia's natural 400mm of rainfall, and to recreate a natural stream/wetland system, with a large lake/pond area at the park's core. The aim is to achieve maximum plant species diversity (and by extension, that of birds, insects etc), and to interpret to city-dwellers the natural and traditional cultivated land systems on which Valencia has developed.
Three major zones of planting are provided/are developing, which mimic and represent the traditional major flora zones/ ecosystems of Valencia province, these being:

1) Ribera (riverine) with poplars and tamarisks - two species of each;
2) Olmeda (elm woodland) which occurs on higher ground;
3) Carescal (montane forest of pine, oak etc).

The park is in a process of active evolution, after its initial earth moving and planting, with 'pioneer' species (eg apple mint which is introduced by visiting birds, and thrives in streamside or low-lying locations with moist soils), now beginning to give way to more permanent species which will take over as shade levels and soil depth grow, and storm/surface drainage water is increasingly filtered by roots/plant growth.

Ximo showed me a species of emerald green scarab beetle feeding on the apple mint, which is an indicator of increasing species diversity in just three years. This beetle was apparently introduced to Spain by the Moors.

Algae were evident in the streams and ponds of the park, something Ximo pointed out as a natural process of evolution as more sophisticated aquatic/riverine filtering plants (eg: reeds, rushes) establish and begin to have an effect on water quality (runoff from fertilised paddocks is an algal stimulant). Staff were clearing excessive algae out of the ponds/stream. This is considered a first phase in the park's development. As more birds, insects, frogs etc are attracted to make it home or part of their movements, the ecosystem will become more natural.



Right) detail of a ‘natural’ water channel in Parc de la Rambleta, lined with species native to riverine situations: willows, tamarisks etc. Within a few years an artificial system is naturalising and stabilising, becoming colonised with native species of flora and fauna, brought in by birds and insects.

Locally collected seed is used where available to propagate plants. As plantings mature they are actively regenerating (seedlings, suckers) leading to natural evolution in composition, levels of shade, density and subsequent effects. A deliberate strategy of 'let it be' seems to be applied in some areas (eg: streamside banks, woodlands) to encourage density of planting, actually restricting easy public access, and favouring nature over humans.

Only 1/3 of the park is yet built, and two more phases are in planning. These will feature sub-tropical and tropical species with a dense planting of trees and perennial species including cypresses planned for the park's edge abutting the metropolitan cemetery on one side.

Dominant species included oleanders (*Nerium oleander*), tamarisks (*Tamarix spp*.), hawthorn (*Crataegus monogyna*), southern nettle tree (*Celtis australis)*, Poplars (*Populus spp*.), cherry plum (*Prunus cerasifera*), elm (*Ulmus minor*), soapwort (*Saponaria sp.*), bear's breeches (*Acanthus mollis)*, ivy (*Hedera helix*), blackberry (*Rubus idaeus*) and periwinkle (*Vinca major).*

Caresco or montane woodland flora species included evergreen oak, rock rose (*Cistus spp*.), Mediterranean fan palm (*Chamaerops humilis*), rosemary (*Rosmarinus officinalis)*, carobs (*Ceratonia siliqua*), buckthorn (*Rhamnus alaternus*), strawberry tree (*Arbutus unedo*), Aleppo pine (*Pinus haleppensis)*, olives (*Olea europaea var. sylvestris*)(silver leaves, small fruit) and flowering/manna ash (*Fraxinus ornus*).

I asked what the public and especially the immediate district's reaction to the park had been. Ximo noted that extensive public consultation and involvement in developing the park had occurred, and as a result people both understood and supported the park's aims. Some design modifications and features came from this process, including an extensive playground/lookout area from the highest section of the park over the lake. Different park areas cater to different social age groups, eg: small children's play areas with seating and equipment, fenced off dog exercise area, more extensive areas with paths and seats (not many as yet) etc. In future the adaptation and use of remnant orchard buildings is planned.

Appendix T:
Common street tree species in Valencia

planes
box elder (Acer negundo)
southern nettle tree
Seville orange
white cedar/Persian lilac
privet
mulberries
white fastigiate poplar (Populus alba 'Fastigiata')
pepper tree
black poplar (P.nigra)
Arizona cypress (Cupressus glabra/arizonica)
evergreen magnolia
jacarandas
oleaster (Eleagnus angustifolia)
empress tree (Paulownia tomentosa)
elms
floss silk tree
Florida fan palm
river red gums
she oaks
Japanese pagoda tree (Sophora japonica)
honey locust (Gleditsia triacanthos)
Canary Island date palm
kurrajong
Norfolk Island hibiscus (Lagunaria patersonae)
Indiana bean (Catalpa bignonioides)
Photinia glabra
Populus serotina
evergreen/holly/holm oak
incense cedar (Calocedrus decurrens)

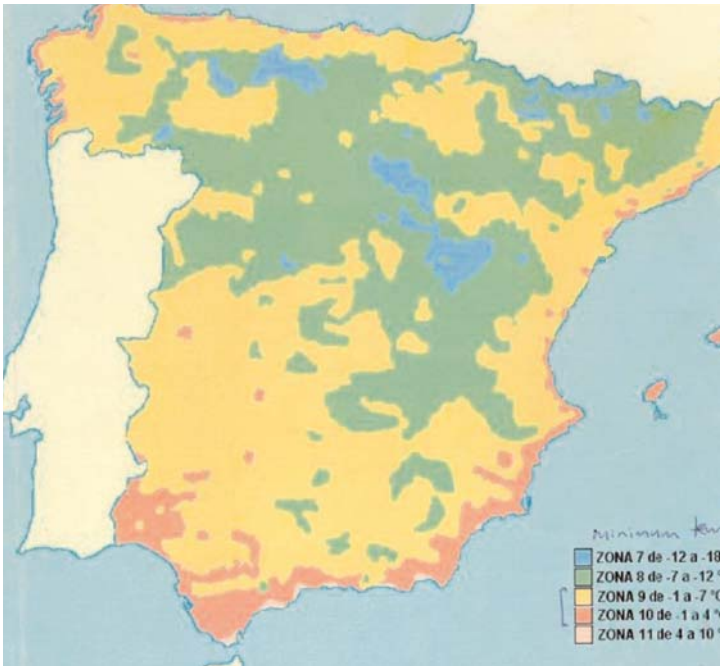
Appendix U:
Discussion and general lessons learnt from the fellowship:

Spain has a rich and long history agriculture, horticulture and gardening. Traces or records exist of stone age, iron age, indigenous Iberian, Phoenician, Greek, Roman, Visigothic (Germanic Christian overlords for Rome), Jewish, Islamic/Moorish (North African/Omayyads from Syria), Christian 'Reconquest' era, Renaissance, Baroque, Romantic, Industrial Revolution, Modern, Postmodern and contemporary era activity. Some of this has included garden making, in the specific and broader sense of manipulating the environment for water, food and fibre needs.

Spain claims to have Europe's oldest continuously gardened space, the Patio de las Naranjas or orange tree courtyard in Cordoba, perhaps dating from the mosque's construction in 748 (and oldest continuously gardened private pleasure garden (the Generaliffe's Patio de la Acequia, 1319, in Granada). It has a range of

Islamic era gardens (intact or reconstructions) from c750-1492, Reconquest (and earlier Medieval) Christian era gardens, eg: monastery cloisters, palace gardens, orchard or huerta gardens etc. It retains examples from each subsequent era, eg: early botanic gardens (Madrid, Valencia) and public parks.

The similarity in latitude of parts of Spain to parts of Southern Australia, their 'Mediterranean' climate, ie: hot, dry summers, cool winters, periodic droughts, poor, eroded soils means that perhaps Australia could learn lessons from Spain - in terms of learning to belong to our 'place', adapting our gardens to its climate, soils, levels of rainfall, variability. I was particularly interested in 'dry Spain', ie: eastern and southern - Central Spain is dry also, although high as well, with severe winters which I did not consider as transferrable to (settled) Australia.



Right) map of climatic zones highlighting minimum winter temperature ranges. Note that even the 'subtropical south' (in pink) where bananas and sugar cane grow, gets minimums of 4 degrees C, as does much of the Mediterranean coast, high inland plateau and mountains covering much of Spain.
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Source: 'Ornamental Trees' website: www.arbolesornamentales.com/jardineriamediterranea.htm

Thus I did not visit 'wet Spain', its north and north-west: Galicia, Cantabria, Asturias or the Basque country; with other plants and traditions.

What interested me was whether with its long tradition of garden making, and of change (repeated conquests/ takeovers/ immigration), Spain again might have things to teach Australia in terms of managing change, something heritage managers are faced with daily. I wanted to try to meet managers of historic parks and gardens, designers and others - to find out who makes decisions, and how, in Spain.

What I found (although this may be only part of the truth) is that modern (20th century) history has played a large part in the current situation. Some 50 years of Franco dictatorship and repression of democracy, on top of some 200 years of push and pull between centralist control forces (royalty, aristocracy, captains of industry) and more liberal (French revolutionary, modern open democratic) ideas, have meant that not until after Franco's death and even since the early 1980s have things begun to open up politically, to allow public participation in decision making.

Spain appears from my perspective to have both a small gardening culture and 'elite' and system whereby most decisions are made by experts, with little or no public consultation or involvement. This could be comparable to Australia c.1980 (the oldest heritage legislation in Australia (barring the National Trust legislation) was 1975, establishing an 'expert' body, the Australian Heritage Commission). NSW followed in 1977 with its Heritage Act, Council and permanent conservation orders (now listings on the State Heritage Register), and Tasmanian state legislation was last, in the early 2000s. Widespread public consultation about listings perhaps dates from the late 1980s, as more Local Councils did heritage studies and began to list items on their local planning instruments.

Spanish heritage legislation was achieved much earlier, establishing an expert central body/bodies and system, which with later devolution and duplication by regional governments, is only now starting to open up to public consultation. (See Patrizia Falcone interview at (28))

My claim about a small elite gardening culture is pertinent. At least since the Reconquest, most gardens in Spain appear to have belonged to the Church (monasteries and hospitals), aristocracy or Royal family. Even the national heritage body, Patrimonio Nacional, is really a reconstructed Patrimonio Real or Royal Heritage body, responsible with managing the properties still belonging to the Royal family, some still used by it. Other Royal properties have been either sold off or devolved to Regional Governments (eg; Seville's Reales Alcazares, Granada's Alhambra), to varying degrees of approbation by some experts I met.

The members of the aristocracy I was lucky to meet (Mencos/Valdez and Medina Muro/Medinaceli families) appear to still own a number of properties across Spain, all including either farms, gardens or both. Perhaps

this remains the norm. The Marquesa de Casa Valdez, Eduardo Mencos' grandmother, wrote a benchmark 1980s book on Spain's historic gardens, no doubt due to her own passion, friendship with and thus, access to similar families who owned such properties around the country.

Apart from these, and public parks (which have usually been devolved/gifted by Royalty or aristocracy to Regional or Local Governments, it might be fair to say that most Spaniards do not own gardens, the majority (post 19th and early 20th c.) living in cities, eg: in apartments or town houses. Garden suburbs and larger garden lots on city outskirts tend to belong to the wealthy.

The aristocracy's long opposition to trades/industry delayed the arrival of the industrial revolution in Spain, as did the lingering of its empire and wealth (eg: from sugar in Cuba). Accordingly the rise of the middle class as a social group, and its magnitude, has been later, eg: post Franco in any great numbers (with exceptions like early 1900s industrial 'barons' such as Count Guell in Barcelona, again these often got their original fortunes from imperial industry off shore). Gardening for pleasure might be considered a middle class aspiration and activity, as opposed to gardening for the stomach.

Some Spaniards I spoke to on gardening culture referred to urban migration and perhaps negative association in some minds between gardens and poverty or rural struggle, these being spaces for vegetables or fruit trees and vines, not pleasure, display or leisure.

Several also noted that Spain was not England, and lacked that culture's widely held and deep association with gardens and gardening - visiting, horticultural societies etc. A lot of aristocratic and Royal gardens in Spain show French and Italian influence, reflecting both the bloodlines/origins of some families (Bourbon, Hapsburg), their travels, and their staff's backgrounds. Some styles lingered longer in Spain than in northern Europe, reflecting its late Baroque demise as fortunes were wasted on European wars or wars of colonial independence, rather than on industrial investment and modernisation, with their attendant increase in the movement of ideas, fashions, information.

Current debates in the Spanish media (or what I could deduce of these) over wind power, water supplies/ costs/ drought, urban planning, immigration and infrastructure, suggest that Spain is very much starting to tackle similar issues as is Australia, in terms of environment, lifestyle, economy, and politics.

Spain's entry into the European Union (dissolving its borders to some extent), the euro, and the much older tradition of seasonal migration south (of sun-starved northern Europeans), has greatly accelerated under Franco's promotion of coastal tourism development. Many older northerners are staying to live in Spain, either seasonally or permanently, avoiding problems of rheumatism and arthritis.

This of course, accompanied by migrants from (in order of magnitude) Eastern Europe, Latin America, Northern Africa and others, means that local economies and ideas are changing eg: about gardens/ing, parks, green space, water availability (including changes from imported cultural 'baggage'), and this is providing challenges for managers of open spaces, recreational facilities, heritage parks and gardens. New users need education to see the cultural values that older residents might know, and to come to appreciate differences in climate and rainfall.

Competing needs and pressures (sports grounds, passive recreation, dog walking areas, children's playgrounds) are meaning changes are being made to historic parks open to the public. Museums and tourist attractions, particularly where private gardens have changed to public parks, have forced a number of changes, eg: visitor centres, toilets, shops, car and coach parking, accomodation, signage, interpretation.

An example locally were City Councils or regional governments in Barcelona, Madrid and Valencia all installing recycled water irrigation schemes in public parks (new/old), and signage to explain that the water is not drinkable (agua no potable), except in designated drinking fountains. Other signs are prevalent encouraging use of litter or recycling bins, and removal of dog faeces, and show a need to educate users, and of differing levels of understanding!

These issues are common to Australia and Spain, although in terms of magnitude of use, population and visitors, Spain is way above Australia. Spain gets some 90 million tourists a year, and top tourism icons like the Alhambra, and Barcelona's Park Guell (which apparently has topped the former in visitor numbers now) get 4-6 million visitors. The Sydney Opera House has some 4 million visitors per year, and no garden.

Strategies to manage visitor loads, flow, resultant pressures and damage become essential, in ensuring these places can cope and survive, intact, into the future. Restricted entry numbers, days or hours, entry fees, and other strategies are employed. Education is a large part of this process, encouraging people to better under-

stand other values and needs of these spaces, than perhaps their own personal views or needs.

The Alhambra has now a ticket system with 6 or 8000 (depending on the source of the figures) visitors per day, divided into morning, afternoon and evening time slots. Outer elements of the complex such as grounds are free, but to enter the Nasrid palaces (inner palaces/courtyards, fortress and Generaliffe) a ticket is required costing c.10 euros (c.$20).

Entry to the broader complex (with a morning ticket) can be at any time between 8.30-2, although a precise entry time slot eg: 930-10am is given on the ticket to enter the Nasrid Palaces, ensuring that visitor flow through these smaller, intimate spaces is controlled. Once in you may stay as long as you like, so exit is perhaps regulated by depth of interest. To visit these spaces now you are acutely aware of mass tourism, with long queues for the 'casual on the day' tickets and inevitable disappointments and stress (600 per time slot are sold each day on the day, others can be bought over the internet or through banks across Spain, before arriving in Granada).

One expert in Spain told me emphatically she will not visit the Alhambra and Generaliffe again as they've been spoiled by tourism, and I can understand this. Visiting at night is a magic experience as the crowds are noticeably smaller, but visiting on special permission or closed days, such as I managed to do in Seville's Reales Alcazares, is of course, far better!

However as World Heritage items, these places get publicity and thus visitation. Spreading the load, and regulating flow and numbers, becomes essential.

Central Government has produced a number of tourism campaigns, and more recently, publications in print and on the internet, promoting Spain's gardens. Monica Luengo and her mother Carmen Anon, through ICOMOS Spain and the Central Government Ministry of Tourism, have produced a booklet on Spain's historic gardens, and a large format book. Eduardo Mencos' book "*Hidden Gardens of Spain*", his grandmother the Marquesa de Valdes' 1980s "*Spanish Historic Gardens*" book, and others, have stimulated appreciation and knowledge of the range and richness of gardens, although many are not open to the public (eg: Mencos' book).

What else I found was genuine curiosity about exotic plants, and about finding plants that would suit local conditions, particularly depleted soils, low maintenance and low water use. My learning was that it is wise not to be too ‘purist’ about natives v exotics, but to see what is appropriate (eg: in a historic garden, or in a climate), what works - and honest about what clearly is a long history of both human and plant immigration/introduction in Spain.

Australian tree (and to a lesser extent shrub) species are widely and proudly used in ‘drier’ parts of Spain, in urban parks, as street trees and motorway-side plantings, in rural settings as shelter belts and shade trees. I was unable to gauge the ‘weed’ potential or extent of these species (apart from noting that eucalypts are an environmental weed in ‘wet’ Spain eg: Galicia). When asking about this, (in addition to mentioning risks of branch drop problems with river red gums), I mostly received laughter in response. Given the latter’s popularity in densely used urban parks, Spaniards would appear less litigious than Australians!

By far the most common species seen were: *Eucalyptus camaldulensis*, river red gum; *E. globulus*, Tasmanian blue gum; *Casuarina equisetifolia*, she oak; *Brachychiton populneum*, kurrajong (street trees in particular). Also apparently gaining popularity are: *Callistemon viminalis cv.s*, red bottlebrush (and other cultivars); *Brachychiton acerifolium*, Illawarra flame tree. These species on the whole appear to be thriving in conditions of long, hard winters (Madrid and the central plains) droughts and sweltering hot summers (Seville and Andalusia), with occasional dieback and leaf miner problems only. Rapid growth and height appear to be key factors in their popularity, as well as appearance and perhaps lack of local predators and diseases.

Perhaps this has to do with a keen desire for shelter and shade in what is a hot climate, and Spain’s general deforestation, and overall ‘cleared’ appearance (albeit less than much of Europe). Environmentalist David Bellamy in his 1980s book on Mediterranean natural history *The First Eden,* notes that the eucalypt was then the dominant tree species in the whole Mediterranean basin, being able to cope with lack of (blown away) topsoil, drought etc.

In terms of appearance, Spain’s long tradition of pruning, hedging and formality in gardens, pollarding and pruning street trees is most interesting to see in contrast to modern Australia’s preference for natural forms. Again Australians have little experience of, or apparent willingness to experiment with using native species formally, treating them simply as plant material, like any other, used to gain the effect wanted. We gladly buy and plant box (*Buxus*) sweet box (*Murraya*) or cypress (*Cupressus spp.*)(all exotic) hedges, but would be far

less likely to think of or use a native species to do the same job, with perhaps far greater soil and climatic hardiness or adaptation. Why?

It is refreshing to see one's native plants being embraced by another culture, and used (rather fearlessly) in a range of situations which I doubt occur in Australia. A willingness to experiment with 'exotics' perhaps is global, and also a greater valuing of exotics. At the same time, there seems to be a growing interest in using Spanish and Mediterranean native plants, eg: in recent parks and Botanic Gardens in Barcelona, Valencia and Madrid. Would that we could use this same spirit with our own native species, as widely, here! This need not mean loss of the character of places, as species could be substituted for colour, leaf size, texture and effect, while (again, with care in species selection) requiring a fraction of the water, soil fertility etc to do well. Food for thought!

It is wrong to say natives have no place in 'heritage' or historic gardens in Australia. Many early Australian settlers eagerly embraced native plants and either retained them in gardens or planted them, seeing them as exotic, new and beautiful. Changes in fashion have seen them come and go and come back again eg; early 1800s, c.1900 Federation era, 1920s-30s, and again since the 1970s 'bush garden' movement. The misguided notion that natives need no maintenance has led to rejections for their 'messiness', when in reality they need tending like any plant.

Australia's very active horticultural export and domestic nursery trade from the 1820s, 1870s etc seems quite forgotten. In some cases native plants survive in historic gardens, having been deliberately retained when making the garden, or planted, not through bird-dropped seed, bush regeneration or neglect! In others written or pictorial records show they were there, even if lost over time. Reinstating them may be a valid conservation policy in some cases, to regain the desired effect, landscape or garden or park character etc.

A simple example is the aging stock of mature southern conifers/ Araucaria species (Bunya pine, (*A.bidwillii)*, hoop pine, (*A.cunninghamii),* Norfolk Island pine, (*A.heterophylla)* and Cook's pine, (*A.columnaris)* and Queensland kauri pine, (*Agathis robusta*) in many historic parks, coastal promenades, Botanic Gardens and private gardens.

Removing them for misguided 'safety' excuses (Bunya cones are huge and dangerous when ripe and falling) rather than fencing off offending specimens (with explanation in public situations) and seeking to replace aging or dead specimens with the same species, is a short sighted measure which will not serve future generations well. We need to conserve these obvious heritage landmarks, and continue to value their dramatic 'dinosaur flora' qualities.

How ironic if Australians would have to travel to national parks, or worse, overseas (eg: Schonbrunn Palace conservatory, Vienna) to see our native horticultural wonders, and appreciate the widespread landscape uses of them soon after their 'discovery' by Western explorers/ botanists. Why can't we do so here also? Wouldn't overseas tourists coming to Australia expect to see our native species growing here, and ancient specimens of them at that?

Appendix V:
Mediterranean climate plant lists

[A] My own lists: (from a range of sources eg: water conservation & Californian gardens, Royal Botanic Gardens, Melbourne, books)

[B] Other lists (referenced)

[A] My own lists

Trees

Acacia spp., wattles
Adansonia spp., baobabs, boabs
Aesculus californica, California buckeye
Aloe spp. (A.bainesii, A.dichotoma (quiver tree), A.marlothii, A.pillansii (desert tree aloe)
Araucaria spp. (A.araucana (monkey puzzle); A.bidwillii (Bunya pine); A.columnaris (Cook's pine); A.cunninghamii (hoop pine); A.heterophylla (Norfolk Island pine))
Arbutus spp. (A.andrachne; A.menziesii (madrona); A.unedo (strawberry tree)
Banksia spp. (B.integrifolia (coastal honeysuckle), B.intermedia (grey banksia))
Brachychiton spp. (B.acerifolium (Illawarra flame tree); B.discolor (lacebark); B.populneum (kurrajong); B.rupestre (bottle tree))

Brahea armata, blue palm
Callistemon spp. (bottlebrush)
Calodendron capense (Cape chestnut)
Castanea sativa (sweet chestnut) (NB: prefers good rainfall, will stand dry when mature)
Cedrus spp. (C.atlantica (Atlas cedar), C.brevifolia (Cyprus cedar), C.deodara (Himalayan cedar), C.libani (Lebanon cedar))
Celtis australis, southern nettle tree/hackberry
Ceratonia siliqua, carob bean, locust tree
Cercis siliquastrum, Judas tree/tree of love
Cereus spp. (C.peruvianus; C.uruguayensis) (torch cactus, candelabra forms)
Chamaerops humilis (Mediterranean fan palm)
Chorisia speciosa, floss silk/ kapok tree
Citrus spp. & cv.s & hybrids (many: orange, mandarin, lemon, citron, cumquat etc)
Cleistocactus hylacanthus, old man cactus
Cordyline australis, NZ cabbage tree/ palm lily
Cupressus spp. (C.macrocarpa (Monterey cypress), C.sempervirens (Mediterranean ")
Dracaena draco, dragon tree/ dragon's blood tree
Eleagnus angustifolia, oleaster/ Russian olive
Encephalartus spp., cycad
Eriobotrya japonica, loquat
Erythrina spp. (E.caffra, E.christa-galli, E.corallodendron, E.indica, E.x sykesii)(coral trees)
Eucalyptus spp. (gums, bloodwoods, ashes, boxes, peppermints, mallees, stringybarks)(eg: E.caesia, E.crebra (narrow leaved ironbark), E.sideroxylon (yellow Mugga ironbark)
Euphorbia spp. (E.ingens) (spurge trees – some species are candelabra/tree forms)
Ficus spp. (F.carica (fig); F.macrophylla (Moreton Bay fig); F.rubiginosa (Port Jackson fig); F. microcarpa 'Hillii' (Hill's weeping fig)
Genista aetnensis, Mt.. Etna broom
G. monspessulanum, Montpellier broom
Hippophae rhamnoides, sea buckthorn
Jacaranda mimosifolia, jacaranda
Juniperus spp. (J.foetidissima; J. phoenicea; J.oxycedrus)(junipers)
Jubaea chilensis (Chilean wine palm)
Kunzea ericoides (kanuka)
Laurus spp. (L.communis (laurel); L.azoricum (Azores laurel) ; L.nobilis (sweet bay/ bay)
Magnolia grandiflora, evergreen magnolia/ bull bay
Metrosideros spp. (M.excelsa (NZ Christmas tree/pohutukawa; M.kermadecensis (Kermadec Island pohutukawa)
Moringa oleifera, Ben oil tree/ horseradish tree/ moringo
M. peregrina (wild drumstick tree)
Morus spp. (mulberries – M.alba (white), M.nigra (black), M.rubra (red))
Nageia falcata
Nolina spp. (N.gracilis, N.parryi - pony tail palms)
Olea europaea (fruting olive)
O. europaea var. Africana (African olive)
O. europaea var. Sylvestris (wild olive)
Opuntia spp. (prickly pear)(O.ficus-carica, O.tomentosa (velvet), O.vulgaris (drooping) NB: noxious weeds in much of Australia)
Phoenix spp. (P.canariensis (Canary Island date palm), P.dactylifera (date), P.reclinata (Senegal date), P.roebellinii (pygmy date), P.theophrasti (Sicilian date palm)
Phyllirea spp.
Phytolacca dioica, ombu/ bella ombra
Pinus spp. (pines)(P.canariensis (Canary Island), P.haleppensis (Aleppo), P. brutia (Turkish), P.nigra (Corsican), P.pinaster (maritime), P.pinea (stone pine), P.radiata (Monterey), P.sylvestris (Scots)
Pistacia lentiscus, mastic/ lentisc
Pittosporum spp. (P.tobira (Japanese pittosporum), P.crassifolium (karo)
Platanus spp. & hybrids (planes)(P.x hispanica, (Spanish), P. x acerifolia/hybrida (London), P.orientalis (Chenar/Oriental), P.occidentalis (western)
Podocarpus spp. (P.elatus (brown pine), P.neriifolius
Prunus spp. & hybrids, (P.armenaica (apricot), P.cerasifera (cherry plum), P.dulcis /amygdalus (almond), P.persica (peach))
Punica granatum, pomegranate
Pyrus spp. (pears) (P.syriaca, P.salicifolia 'Pendula' (silver weeping)
Quercus spp. (oaks)(Q.agrifolia (California live), Q.canariensis (Canary Island), Q.coccifera (Kermes), Q.ilex

(evergreen/holly/holm), Q.suber (cork)
Strelitzia nicolae, white bird of paradise flower (tree)
Tecoma stans/ alata
Trachycarpus fortunei (Chinese fan/ windmill /Chusan palm)
Washingtonia spp. (W.filifera (cotton/petticoat palm), W.robusta (Florida fan palm)
Yucca spp. (Adam's needle/Spanish bayonet) (Y.brevifolia (Joshua tree), Y.aloifolia Y.elephantipes, Y.vallida

Shrubs
Acacia spp., wattles
Adenandra uniflora, China flower
Aeonium spp. (succulent)
Alyogyne huegelii, blue hibiscus
Aloe spp. (succulent)
Arctostaphylos spp. (A.bungens (Mexican manzanita), A.uva-ursi (bear berry)
Artemisia spp. (wormwood, southern wood)
Banksia spp.
Bracteantha bracteata (paper daisy bush)
Buxus spp. (B.balearica, B.sempervirens (box))
Callistemon spp. (bottlebrush)
Chaenomeles japonica cv.s (Japanese quince/japonica apple/flowering quince)
Chamaerops humilis (Mediterranean fan palm)
Cistus spp. (rock roses) (C.creticus, C. x hybrida, C.monspessulanus, C.purpurea)
Citrus spp. & hybrids (C.microcarpa (calamondin), C.japonica / Fortunella japonica (cumquat))
Coleonema pulchrum (diosma, breath of heaven)
Corokia spp. (korokia) (C.buddleiodes, C.cotoneaster)
Correa spp. (native fuschia)
Cotyledon orbiculatus cv.s (succulent)
Crassula spp. (succulents) (C.arborea)
Cycas spp. (cycads) (C.revoluta (sago palm)
Cytisus scoparius (flowering broom) NB: environmental weed in parts of Australia)
Darwinia spp.
Echinocactus grusonii (golden barrel cactus)
Echium spp. (bee balms) (E.candicans (Pride of Madeira), E.wildprettii, E.pininiana)
Eleagnus pungens
Erica arborea (tree heath)
Eriocephalus africanus
Eriostemon spp. (wax flower)
Escallonia spp. (apple blossom)
Eucalyptus spp. (Mallee forms, eg: E.viridis)
Euonymus spp. (E.alatus, E.europaeus (spindleberry), E.japonicus (Japanese laurel))
Euphorbia spp. (spurges) (E.balsamifera, E.canariensis, E.resinifera, E.rigida)
Feijoa sellowiana (Acca sellowiana), pineapple guava/ feijoa
Fouqueria splendens, (ocotillo)
Fragula californica (California coffeeberry)
Garrya elliptica, (catkin bush)
Halimium spp. (sun roses)
Helichrysum spp. (paper daisies) (H.petiolare, & H.p. 'Limelight', H.splendidum)
Hibiscus syriacus, Rose of Sharon
Juniperus spp. (juniper) (J.chinensis, J.communis (sand) J.procumbens (prostrate))
Kalanchoe beharensis (tree form)
Lantana spp. & cv.s (L.camara, L.montevidensis)
Lavandula spp. & cv.s (lavenders) (L.angustifolia, L.canariensis, L.dentata (French), L. x intermedia, L.lanata (woolly), L.latifolia, L.multiflora, L.pinnata, L.spica (English), L.stoechas (Roman/Spanish), L.vera)
Leptospermum spp. (tea tree, manuka)
Leucophyta brownii (Calocephalus brownii) (ghost bush)
Macrozamia spp. (cycads)
Mahonia spp. (grape hollies) (M.aquifolium, M.japonica, M.lomariifolia)
Malva spp. ('tree' mallows)
Myoporum parviflorum, creeping boobialla
Myrtus communis & cv.s (myrtle)
Nerium oleander cv.s (oleander)
Opuntia spp. (prickly pear) (O.fragilis, O.phaeacantha (purple fruited)(NB: noxious weed in Australia)
Osmanthus fragrans (sweet olive)

Pachystegia insignis (Marlborough rock daisy)
Philadelphus coronarius (mock orange)
Phlomis fruticosa (Jerusalem sage)
Plumbago spp. (P.auriculatum, P.capensis)
Punica granatum 'Nanum' (dwarf pomegranate) (various forms/colours)
Quercus spp. (oaks)(Q.coccifera (Kermes), Q.ilex (evergreen/holly/holm)(where grazed/burnt)
Rhamnus alaternus (Italian buckthorn)
Rhus integrifolia (lemonadeberry)
Ribes spp. (flowering currants) (R.aureum (golden), R.sanguineum))
Rosa spp. & cv.s (roses) (R.mutabilis, R.fedtschenkoana, R.foetida, R.f.'Bicolor', R.spinosissima (burnet), R.xanthina etc – NB: some species are very tough/dry-tolerant)
Rosmarinus officinalis (rosemary)
Salvia spp. (sages) (S.gregii, S.guaranatica, S.karwinskii, S.mexicana, S.officinalis (sage), S.rutilans))
Santolina chamaecyparissus (cotton lavender) (several forms)
Sarcopterum spinosum
Sparmannia africana (nodding/drooping hibiscus)
Spartium junceum (Spanish broom)
Syringa vulgaris (lilac)
Tecomaria capensis (Cape honeysuckle, tecoma)
Ternstroemia gymnanthera (thorny burnet)
Teucrium spp. (germander) (T.fruticans (silver), T.betonicum (Madeira))
Xanthorrhoea spp. (black boys, grass trees) (X.preissii, X.thorntonii)
Zamia spp. (cycads)

Climbers
Bougainvillea spp. & cv.s (bougainvillea)
Gelsemium sempervirens (yellow jasmine, jessamine)
Hardenbergia spp. (false sarsparilla, coral pea)
Kennedia spp. (scarlet pea) (K.prostrata (running postman), K.nigricans (black pea)
Mandevilla suaveolens (Chilean jasmine)
Rosa banksiae cvs. (Mrs Banks' rose)
Rosa wichuriana cv.s (rambler rose)
Sollya spp. (bluebell creeper) (S.fusiformis, S. heterophylla)
Trachelospermum jasminoides (Chinese star jasmine)
Wisteria spp. & cv.s (wisteria)

Perennials/ Herbaceous plants
Acanthus spp. (bear's breeches) (A.mollis, A.spinosa)
Achillea spp. (yarrows, milfoils)Aloe spp. (succulent)
Agapanthus spp. & cv.s (Nile / African lilies)
Agastache foeniculum (anise hyssop)
Agave spp. (A.americana (century plant), A.attenuata, A.geminiiflora, A.frankosinii, A.multifilifera, A.parryi))
Agrimonia eupatoria (agrimony)
Ajuga reptans (bugle)
Allium spp. (onion family)
Aloe spp. (succulents) (A.barbadensis, A.striata, A.vera)
Anemone spp. (windflowers)
Anigozanthos spp. (kangaroo paws)
Antirrhinum spp. (snapdragons)
Alyssum saxatile (yellow alyssum)
Arctotis spp. (Cape daisies, black eyed Susans)
Armeria maritima (sea pink/ thrift), A.pungens (giant thrift)
Artemis tinctoria (daisies)
Artemisia spp. (wormwood, southern wood)
Arthropodium cirrhatum (NZ renga renga lily)
Arum spp. (A.italicum (cuckoo pint/ Lords & Ladies, calla lily)
Atriplex spp. (saltbush)
Ballotta pseudodictamnus (dittany of Crete)
Beaucarnia yuccoides (giant spikey succulent)
Bergenia cordifolia (elephant's ear)
Beschorneria yuccoides (giant succulent)
Borago officinalis (borage)
Brachyscome spp. (B.multifida) (Swan river daisy)

Calamagrostis x acutifolia (ornamental grass)
Calendula officinalis (pot marigold/ calendula)
Callibanus hookeri
Camassia quamash (quamash)
Carthamus tinctorius (safflower)
Centaurea spp. (C.argentea, C.cyaneus (sweet sultan), perennial cornflowers)
Cerastium tomentosum (snow in summer)
Clivea spp. & cv.s (kaffir lilies)
Convolvulus spp. (moonflowers) (C.cneorum, C.mauretanicus)
Cotyledon spp. (succulents)
Crassula spp. (succulents) (C.arborea, C.monstrosa)
Crinum spp. (swamp/ river lilies) (C.flaccidum, C.pedunculatum, C. X powellii)
Dampiera rosmariniflora
Derwentia perfoliata (Parahebe perfoliata)
Dianthus spp. & cv.s (pinks) (D.chinensis, D.caryophyllus (carnations))
Doryanthes spp. (spear lilies) (D.excelsa (Gymea lily), D.palmeri (spear lily))
Dudleya anthonyii (succulent)
Dymondia mangarten
Echeveria spp. & cv.s (succulents)
Echium spp. (bee balms)
Encelia farinosa
Equisetum spp. (horsetails) (NB: some of these are noxious weeds in Australia)
Eriogonum umbellatum
Eryngium spp. (sea hollies) (E.alpinum, E.amethystinum, E.variabilis)
Escholtzia californica (Californian poppy)
Euphorbia spp. (spurges)
Felicia amelloides (blue daisy)
Festuca ovina ‘Glauca’ (dwarf blue fescue grass)
Furcraea selloa (Mauritius hemp)
Gambelia speciosa
Gazania spp. (black eyed Susans) (G.argentea, G.ringens)
Geranium maderense (giant geranium)
Helianthus annuus (sunflower)
Helichrysum spp. (H.argyrophyllum, H.petiolarum & H.p.’Limelight’)
Helictotrichon sempervirens (ornamental grass – blue)
Hemerocallis spp. & cv.s (day lilies)
Heuchera sanguinea (coral bells/ alum root)
Hibbertia spp. (H.scandens (guinea flower)
Homoranthus flavescens
Iris spp. (rainbow flower, iris, flag, Orris) (I.douglasiana (Pacific), I.germanica (flag). I.g.var.florentina (Orris root), I.purdyi, I.sisynchrium, I.tingitana, I.unguicularis (Algerian), I.xiphium (Dutch))
Kalanchoe spp. & cv.s (K.fedtschenkoana)
Kleinia spp. (succulent) (K.mandraliscae, K.villosa)
Knifofia spp. (red hot poker) (K.uvaria)
Lampranthus deltoides (ice plant)
Liriope muscari
Lobelia cardinalis
Lomandra spp. (mat rush)
Lotus spp. (lotus)
Macropidia fulgens (green kangaroo paw)
Malva spp. (mallows)
Marrubium vulgare (horehound)
Matricaria chamomilla (German chamomile)
Melissa officinalis (lemon balm/melissa)
Mentha rotundifolia (apple mint)
Mesembryathemum spp. & cv.s (ice plants)
Miscanthus sinensis cv.s (ornamental grasses)
Muscari spp. (grape hyacinths)
Narcissus spp. (daffodils, jonquils)
Nepeta spp. (catmints)
Oenanthera spp. (evening primroses) (O.biennis, O.missouriensis)
Onosma spp.
Ophiopogon spp. (mondo grass)

Opuntia basilaris (beaver tail)
Origanum spp. (oregano, marjoram)
Orthrosanthus spp.
Osteospermum spp. (Star of the Veldt/ Cape daisies)
Panicum virgatum (Rotstrahl bush)
Pelargonium spp. & cv.s (geraniums, pelargoniums) (P.x citrosum (lemon), P. domesticum cv.s (geraniums), P.graveolens (rose), P.tomentosum (peppermint))
Pereskia atriplicifolia (Russian sage)
Phlomis spp. (Jerusalem sages)
Pulsatilla spp. (Pasque/ bishop's flower)
Puya spp. (bromeliad/ succulent like) (P.chilensis)
Rhomneya coulterii (Californian tree poppy)
Ruta graveolens (rue)
Salvia spp. (sages) (S.apiana (white), S.argentea, S.leucophylla (silver), S.mellifera, S.sclarea (Clary), S.turkestanica
Santolina spp. (cotton lavenders)
Scilla spp. (bluebells, squills)
Sedum spp. (stonecrops)(succulents) (S.acre, S.cauticola, S.serpiphyllum, S.spectabile)
Sempervivum spp. (houseleeks)
Senecio mandraliscae
Sisinchrium striatum
Stachys spp. (S.byzantina, S.lanata (lamb's ear), S.thirkei)
Strelitzia spp. (bird of paradise flower) (S.reginae, S.spathulifolia)
Thalictrum fendlerii
Thunbergia natalensis
Thymus spp. (thymes)
Tulipa spp. (tulips)
Ursinia spp. (Veldt daisies)
Verbascum thapsus (great / black mullein)
Verbena officinalis (vervain)
Yucca spp. (Adam's needle, Spanish bayonet) (Y.filamentosa, Y.glauca (Spanish bayonet), Y.gloriosa (candle yucca), Y.recurvifolia, Y.whipplei)
Zantedeschia aethiopica (arum lily)

[B] Other specific lists

Are downloadable from the 'Ornamental Trees' website:www.arbolesornamentales.com/jardineriamediterranea.htm

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Appendix X:
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General/ Spanish & Islamic Gardens/ websites of relevance:

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