

THE PORTUGUESE GARDEN AND THE HISTORY OF WATER IN GARDENS

PORTEKİZ BAHÇELERİ VE BAHÇELERDE SU TARİHİ

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ABSTRACT

Portugal is both an Atlantic and a Mediterranean country. In the South the climate and the landscapes are similar to those of North Africa and the irrigation during the 5 dry months is indispensable in gardens. Strategies such as subterranean dripping canals, and lifting the water from underground, collecting it in large reservoirs have been developed from early ages. During the last 3 years the restoration of water system in 11 portuguese historic gardens confirms the influence of many hydraulic systems henerited from islamic mediterranean culture. This influence fused with others will be presented.

ÖZET

Portekiz, hem bir Atlantik hem de bir Akdeniz ülkesidir. Ülkenin güneyinde iklim ve çevre Kuzey Afrika'ya benzemekle beraber bahçeler için beş ay boyunca sulama gerekmektedir. Erken çağlardan itibaren su, yeraltı suları kanalları ve damlama yöntemiyle büyük rezervuarlarda biriktirilmiştir. Son üç yıldan beri Portekiz kentinin 11 tarihi sulama sistemi üzerinde yapılan restorasyon çalışmaları, su sağlama sisteminin birçoğunun Akdeniz İslam kültürünün etkisi altında olduğunu göstermektedir. Bu çalışma kapsamında bu etki tanılacaktır.

FOUR FEATURES OF THE PORTUGUESE GARDEN

The Portuguese garden has characteristic features that enable it to be distinguished from the gardens of other cultures (Cabral 1993: 115-128): the diversity in flowering trees and shrubs, the views, the presence of tiles and large water tanks. Four features endowing «character» and a consequence of the location of Portugal between the Mediterranean and the Atlantic and the country's socio-political and economic history. These features emerge in each Portuguese garden, whether in isolation or in combination and when all are found present they serve well to define its difference and essence.

The first feature — the diversity of flowering trees and shrubs — is determined by history and by the climate which proves propitious not only to plants from temperate regions but also subtropical zones, which both find here a perfect habitat for their growth and reproduction and renders possible this extraordinary multiplicity of flowers and foliage along the year. The history of a curious people who opened up maritime routes to other continents is reflected in their gardens through the sheer variety of trees and shrubs that Portuguese travellers and explorers have long since been bringing back and acclimatising. And when once naturalised, they become plants common to the backyards, gardens and estates of Portugal. Such cases include the camellia and loquat from Japan, the orange tree and wisteria from China, the *Lagerstroemia*, cane and *Melia azedarach* from India, the jacaranda, chilli and the *Aloysia citrodora* from Brasil and so many others able to live under the open skies in Portugal. This diversity in trees and flowering shrubs is one living legacy both of this history of maritime trading between the continents and the benign climate welcoming them.

The second facet — the views — results from the accidents of topography and, consequently, a system of urban settlement that favoured hilltops and filling them downwards thereby favouring views and great openings whether onto the sea or over valleys. Gardens have followed in this tradition and distant views are practically a given for any Portuguese garden. In around 1550, D. João de Castro was rewarded by King D. João III for his toils and sacrifices in

India with «(...)two slices of land that adjoin your Sintra estate and that peak to straddle a hilltop (...)» with extraordinary views over the castle of Moors, over to the sea and the open valley. The Quinta da Penha Verde estate, where he wished to plant «pilgrim» trees, makes full recourse of the waters of the Serra de Sintra hills and thus sublimely combining the four features of the Portuguese garden.

The history of this country and its geographic location determine the two other distinctive facets of the Portuguese garden: the presence of tiles and large water tanks. Islamic culture, with a five century duration in the lands now making up Portugal, impacted on its agriculture throughout centuries and made its mark on decorative forms, especially clear in the utilisation of tiles. Highly durable ceramic pieces, strong colours and repeated geometrical patterns, the tiles in Portuguese gardens may serve to finish all the pieces installed for ornamental impact: fountains, niches, banks, stairways, garden houses, walls, turrets and flowerbeds, even appearing in discreet rows along walls so as to reflect the waters of lakes. There have been periods when they were very much in fashion, only to fall into forgetfulness only to burst back onto the scene with even greater vibrancy. Tiles are an integral facet of Portuguese gardens, innovating originally on the Islamic tradition to put forward new forms of artistic expression and distinguishing such environments from their counterparts around the world.

Arab wisdom, particularly in the utilisation of water in agriculture was absorbed into Portuguese culture. Crucial to the survival of plants, whether in vegetable or ornamental gardens, through the four arid months of summer, water stored in cisterns and tanks, gathered from mines and extracted through complex lifting systems, is distributed around gardens in an equally varied fashion. As from the 15th century, water, even prior to fulfilling its purpose of irrigation, was placed in the service of art and deployed to create refined spaces of comfort and beauty in the Portuguese garden through its reflections of the sky and the light captured in droplets issuing forth from fountain spouts.

Joining these water based learnings was another culture and also of Islamic origins. The discovery of the maritime route to India in 1498 and the subsequent four hundred years of commercial life in India fostered contact between the Portuguese ruling classes and Mughal culture, whose taste for gardens is both well known and documented (Fig. 1). The need for large expanses of water, sacred areas and places of worship where everything is reflected and the pavilions resting over channels of water, points of repose and where water provides the centrepiece for the entire garden were all aspects impressing the Portuguese and enabling them to understand the garden as a space of constant enjoyment, whether by day or night.

The presence of water in Portuguese gardens represents the pinnacle of the different cultural heritages of the country: the need to store water for irrigation ensures the appearance of great tanks alongside the pavilions «to enjoy the cool» and walls decorated with tiles reflecting in the water, together create a feature differentiating the Portuguese garden. Examples of this intermingling of cultures appeared immediately after the point when the first Viceroys of India, on return from their great feats, set about building gardens as refuges whose overriding purpose was to establish places of calm, charm and wellbeing where these heroes of the Indies could partake of their well earned rest and leisure. Ostentatiousness and gaudy displays of power played no part in these construction programs, with examples being the estates of Bacalhoa, Penha Verde Torres, Ribafria, and Jardim do Nuncio at Penha Longa (Fig. 2).

«(...) Water in western gardens is a constant manifestation of the human soul, which in more arid climates gains in symbolic density as a sign of life and the dream of making the desert flower (...)»¹. Should we not take this rectilinear chronology into account but rather consider the evolution of the art of water in the gardens by contact, we may state that the forms taken by water in gardens as well as evolution in its usage, through culture, is due to geographic expansion with the original found in the Persian gardens that went onto influence Mediterranean cultures. The nature of the work carried out by the APJSH with the support of the EEA Grant incorporated the study and restoration of the water systems of Portuguese gardens so as to better be able

to grasp the evolution in the usage of water down through history within the scope of an international matrix stretching back to the Nile Valley.

The Origins of Water in Gardens: from Egypt to Persia

In Egypt, the water features were sited symmetrically within the layout of gardens. We know of them mostly from funereal paintings. The most complete example is the tomb of a senior official in the service of Amenhotep III, in Thebes, 1400 BC. Such constructions then appear down throughout the course of history in a range of variations revealing an emerging concept associating the quiet surface of water with the idea of repose, spiritual wellbeing and comfort. The aforementioned painting portrays a pavilion alongside water and drawing our gaze towards the water through its shadow with the humidity in the air pacifying our feelings and predisposing us towards contemplation. The Egyptian civilisation have made widespread usage of water, essentially in still and contained surface areas, to establish sacred lakes that would be supplied by channels in turn drawing upon aqueducts and small dams alongside the Nile.

When the Persians invaded Egypt in 525 BC, the walled and geometrical gardens that they found there must certainly have inspired their foundation of an art of gardening, an exuberant heritage that remains alive and has fed into other countries over the course of many centuries: the Persian garden in which water plays a primordial role. Persian culture, and within its scope, Islamic gardens expanded along the northern and southern reaches of the Mediterranean and into the Iberian Peninsula — particularly Andalusia, the Alentejo and the Algarve —, while eastwards extending as far as India — Udaipur, Agra and in Kashmir, along the banks of lake Dal. This aspect referred to by various authors divides the Persian influence in gardens into the West and the East and enables an understanding of the way in which the Iberian garden has a shared origin – in a far distant collective memory of the Portuguese – with the Mughal garden, enabled an easier absorption of the building styles found in India after 1500. «(...) It is even possible to state that the characteristics of the Portuguese garden (...) derive from the

formal models and decorative art of landscaping that was one of the bequests of these cultures (...)» (Marques 2003: 146).

The Islamic Influence in Andalusia: Water Engineering in Gardens

Gardens reminiscent of Arabian culture in Europe, in Córdoba, Granada and Seville, only provide us with a very pallid idea of the constructions embarked upon in the wake of the consolidation of Muslim positions on the Iberian Peninsula after 750 AD: *Medinat Al-Zahra*, the Alhambra and Alcazar do still provide some insight into the type of ambience existing in Muslim gardens and where water stood out as the ornamental feature attributed greatest impact. Beyond its aesthetic qualities, there is also the important evaporation effect, lowering the air temperature, raising the overall comfort level and creating pleasant and welcoming environments.

«(...) the utilisation of water never seems excessive. We find it on entering and leaving buildings, running down balustrades, reappearing in basins set into pavements, organised across successions of geometrical spaces that would never achieve completion without its presence. Stored in tanks and supplied by means able to ensure it later feeds grand fountains, its structures command the entire arrangement of the outdoor environment (...)».

In 936, Abdal-Rahman III founded Medina al-Zahara (Zangheri et al.: 381), in Córdoba, which was irrigated by a series of channels that ran alongside the pathways into flowerbeds home to aromatic plants (orange and lemon trees, pomegranates, myrtle, rosemary, etcetera) planted a metre or more below the pathways. The irrigation function was blended into the aesthetics of the myrtle patio in Alhambra, Granada, «(...) the central lake creates a mirror reflecting the building. Geometrical formality is respected to the extent that the central axis of the tank extends out of the palace through two windows that cut through the darkness of the pavilion and reflect in the water. Such a well organised result obviously does not come about by chance. It is rather the result of mastery, itself the fruit of much experimentation and experience and that well demonstrates the technical knowledge and aesthetic effects of implementation in the Muslim gardens of the

Middle East. The expansion of the Islamic world westwards brought with it a great deal of accumulated gardening knowledge, repeating the recurring motives of Paradise in these new environments (...). Henceforth, a previously overlooked trend emerged transforming usage of water into a fundamental resource for a whole range of artistic purposes. (...) The point of departure in this artistic pursuit lies in the engineering skills of Arab masters who approached water as their favoured feature and set it in motion, making it appear, jump, fall, sparkle, be collected and reappear all over again in surprising patterns. The artifice would stage its triumphal arrival and it had come to stay (...)».

In Portugal, surviving testimony is scarce but the wisdom and attraction for its aesthetic effects remained and resurged again in the 16th century following contact with Mughal India.

The Tanks and Canals in Persia that Spread to India

Persia represented the source of the experience of gardens as favourite places whether for working meetings or for contemplation, culture, leisure and courtship. Water, within this scope, represents an essential factor. «(...) The usage of water as an ornamental feature in Persian gardens started out without any form of moving water whatsoever, neither in streams nor in falls, and throughout several centuries water was deployed only in large storage tanks supplied by small distribution channels. Their designs and sizes, while evolving over time and mushrooming into multiple varieties, remained restricted to geometrical motifs, predominantly rectangular and circular, without engaging in any experimentation in hydraulic effects and pressurised waterspouts (...)».

The great driver of the expansion of Islamic culture towards India was Tamerlane, a powerful 14th century conqueror, great appreciator of architecture and in his sacking of the city of Damascus sparing only architects and glassmakers. The sublime gardens that he ordered built, which were endowed with artistic expressions of his power, exuberance and glory, influenced a number of emperors across the Middle East: «(...) The gardens of Samarkand, ordered built by Tamerlane between 1336 and 1405, became renowned due to their descriptions by Clavijo, the ambassador sent by the king of Castile and

Leon in 1404. On moving his capital here, Tamerlane ordered the building of eleven gardens within and beyond his palace, laid out in a garland pattern. Still others were then built and named after the great cities of the era, such as Cairo and Damascus. The shock and bewilderment of Clavijo must have been immense. This was the end of the Middle Ages. Nowhere in Europe did they consider gardens as integral entities to planning and building new cities and far less so those with all the exuberance of those found among the Persians (...).

The arrival of the Portuguese in southern India, in 1498 and their establishment throughout the following century, coincided with a feverish wave of garden building under the influence of Muslim architecture that had spread out of the North, due to Babur, a descendent of Tamerlane. Babur would finally conquer Delhi in 1526 and his memoirs complain of the poverty of the gardens that could be found there and across India.

«(...) Throughout the 16th century, three major empires divided up the central regions of Islam as far westwards as the Balkans through to Bengal in the East: the Ottomans, based in the Mediterranean, the Safavids in Iran and the Mughal dynasty in India. Although the three groups tended to throw up distinctive cultural domains, with clearly differentiated forms of artistic expression, all derived from the same fulcral point: Tamerlane's rule and conquests of the 14th century (...).

The Mughal Empire was founded with a succession of emperors who, over the course of four generations, would perpetuate the symbiosis between power and palaces with water gardens. «(...) For the construction of each new city, built from scratch for the glory of their founders, came artists from every corner of the empire's vast extent, Ethiopia, China, Greece. Their efforts were concentrated around projects without budgetary limits and displaying highly detailed planning (...).

Babur physically expressed the glory of his conquests through «architectonic euphoria» and, as his empire expanded eastwards, he sought out ideal places with an abundance of water for building his gardens and found in Agra, by the banks of the river Jumna, his single most favourite location. A

large walled garden, Rambagh, which is today in a state of total dilapidation, is attributed to him.

In his memories, Babur revealed an unquestionable passion for his gardens and «(...) would visit them whenever a military campaign brought him into the vicinity, appreciating the various seasons of flowering and issuing clear and precise orders as to the handling and maintenance of the vegetation (...). And as he himself affirmed: «(...) I plant gardens in each place that seems suitable to me, in each garden I plant roses and daffodils in symmetrical and exactly equal flowerbeds. Three things torment me in India: the heat, the dust and the strong winds. The construction of tanks would be one way of overcoming these three inconveniences (...)

(Babur 1996). The distinctive lines of Mughal gardens derive from Persian concepts brought in alongside Muslim culture and adapted to the climate and topography of each region. «(...) In launching this process, Babur very clearly introduced Iranian features: quadripartite spacing, the usage of running water, the formal and symmetrical layout, every aspect was first transplanted and only subsequently adapted. By the date of his death, in 1530, a school had become firmly rooted and would remain active and able to influence all cultures that came into contact with the heritage bequeathed by the great Mughals (...).

When Akbar conquered the Kashmir region (c. 1556), the fashion for building summer residences was founded and the garden played a fundamental role as «(...) within would be distributed the pavilions for sleeping, living and bathing, positioned in such a way as to represent no more than another form of adorning the garden as a whole (...)

(Gothein 2008). Shalimar Bagh, in Kashmir, represents an example of the presence of these pavilions along the extent of the watercourse and how much of an innovation they proved to be. «(...) The euphoria induced by an abundance of water enabled new variations. In Udaipur, there appeared a groundbreaking composition in which the square tank had an unreachable pavilion at its centre and as if emerging from the lake. The still water functioned as a mirror and created a place of tranquillity and meditation in perfect isolation (...).

This ornamental feature may well have guided the construction of lakes in the gardens of Portugal. The lake-pavilion solution would re-emerge in Quinta das Torres in Azeitão (c.1598), where the central lake pavilion was an absolute novelty to Europe and a distinctive badge of Portugal's ties with India.

The Portuguese and Reencountering the Muslim Art of Gardening in India

In the Hindu culture that the Portuguese would encounter in the regions of Goa, Daman and Diu, there was much that was different. Nevertheless, the architecture of the great Mughal Empire was easier to grasp and they would not have been immune to the extent of the power expressed through this apparatus of palaces and gardens, recognising and easily assimilating these originally Islamic forms of art.

Before arrival in India, and despite Arabic culture forming an intrinsic component of the pedigree of Portuguese gardens, water was not treated with any sense of grandeur with the tanks small, the channels irregular and the pavilions non-existent. Only after contact with India and Mughal architecture did the Portuguese garden gain in dimension and the recognition that it represented a fundamental piece of any architectonic innovation to establish the ornamental palace-garden-tank trilogy, while also serving to meet whatever the prevailing irrigation requirements.

It is easy to accept, whether due to the 16th century descriptions of outer spaces left by the Mughal emperors or due to the still existing remains that bear testimony to the splendour of these gardens, that experiencing and exploring these, the effects of the water and the open air sense of comfort were both admired and assimilated. This was further fostered by just how easily recognisable they were to the Portuguese given their proximity to Islamic culture and the influence it played in construction practices in Portugal. The ease with which the Portuguese adapted to the practice of building gardens and absorbing their respective vocabulary reveals a meeting with latent cultural forms.

These water features in large tanks, with pavilions in arcades directly connected with the water and with

pavilions in the geometric centre of the lake thus begin to appear naturally and innovatively in Portuguese gardens of the 16th century. First, there was Bacalhoa in around 1530, then in Ribafria in 1550 before the Quinta das Torres gardens was similarly adorned in around 1590. The appreciation of water in the Portuguese garden and its art form is interlaced with the country's Arabian heritage, Italian influences and in celebration of India. The *giochi*, a fashion imported from southern Italy and itself a product of Arab learning and the art of recreating in Naples (Castel-Branco 2008: 22-25), had already found its Portuguese expression in the gardens of Cardinal D. Henrique (Núncio Garden) in Quinta da Penha Longa, Sintra where the Cardinal would host the young ambassadors from Japan escorted by the Jesuit priest Diogo de Mesquita, in August 1584 and of which Father Luis de Froes provides a detailed description:

«(...) Those Gentlemen shall be in admiration of those paintings, those antiquities, especially when taking them to their water house packed with waterspouts that spurt out all over, and where, if you close the gates, whoever is inside inevitably gets soaked and not least to see the Penha Longa Monastery, both for its construction and the site with the freshness of the vegetable garden and the water artifice that is there (...)» (Pinto et al. 1942: 35). These *giochi* were very well integrated into Portugal and reappeared in the Summer House and SS's Lake in Fronteira Palace (Fig. 3) as well as the Marquês de Pombal Palace *grottoe* in Oeiras. In these Portuguese gardens, built on the orders of an aristocratic class in constant contact with India, we find how the Islamic component and its reinterpretation in Mughal India is legitimately incorporated into the body of artistic expression contained within.

Within the political conjuncture of the beginning of the Spanish Filipe dynasty, Portugal saw its artistic production tail away and similarly went the adaptation and evolution of new models such as the large garden tanks and pavilions. However, the restoration of independence and the corresponding recovery of Portuguese culture launched a revival in pieces demonstrating these influences with the Fronteira Palace gardens (Fig. 4) completed in around 1668.

Roman Gardens and their Renewed Popularity in the Renaissance. Water Held in Tanks, Geometry and Utilitarian Gardens

In the evolution of water within the framework of Portuguese gardens, the Roman heritage can never be overlooked with its hydraulic knowledge and capabilities in manipulating its courses. Roman treatises on aqueducts and the means of supplying cities are well documented and enable us to perceive the extent of knowledge of Rome's engineers. In Pompey, water was highly scarce until the construction of the Augusto aqueduct that transformed the city's supply and impacting on its public spaces and private gardens that were able to expand their areas and use more water for ornamental purpose. In the Alentejan towns of Estremoz and Elvas, there are four known Roman aqueducts (Quintela et al. 1990) that, according to their own respective scales, repeated the solutions put into practice in other Roman cities, distributing water via underground pipes and filling public lakes. Other important Roman constructions enabled water to be collected and pooled in places where there were greater concentrations of populations or where there were irrigation needs: the dams in the Alentejo and the Algarve (Quintela et al.: 48) with systematic surveying revealing both their construction techniques and the importance for the development of each region under Roman rule.

One of the best examples of the usage of water in private Roman gardens is to be found in Conímbriga (Fig. 5). The effects of lakeside borders finished in stone mosaics, the tanks fitted with waterspouts, the boilers, baths and the entire subterranean system collectively set out the accumulated knowledge that the Romans handed down to Portuguese gardens.

Water took on a central role in any Roman villa and appeared throughout all the lands conquered and in accordance with a pattern that displayed only some variations and regional adaptations. Analysis of a Roman type house in the suburbs of Rome, built on the orders of Horace, finds a rectangle and a house facing southwards and the garden laid out so as to ensure a transition between the house and the garden marked by pergolas sharply exposed to the south. Gardens were still walled with water covering a significant area, contained and still in a swimming pool in the centre of a rectangle and establishing the

axis point of the prevailing symmetry. Beyond this perimeter, water also made an appearance in small fountains over secondary axes. The space is approached as a compositional whole and the way water is deployed reveals the intention of generating a harmonious environment, designed to nurture wellbeing both individually and for groups of guests. The pavements enhance the ease of moving between the pergolas and encourage strolling and the garden was clearly made to be admired in a healthy relationship between man and his microcosms. There are neither surprises nor dramas in the handling of this space contained within walls rather what is most striking is the refinement and simplicity that may also be found in the design and architecture of the Conímbriga gardens.

Other large scale Roman houses and gardens were laid out with greater imagination, introducing innovation and sublime water effects. The villas at Plínio-o-Novo, perching over the sea, near Ostia, of which we have a good description given by Pliny in a letter written to his friend Apollonius, are attributed highly refined and imaginative water effects. The Laurentium *villa*, described in a letter from Pliny to Gallus, represents still another case. Some passages duly highlight the importance of water to the Roman garden: «(...) in the grounds around the villa there suddenly appears before us as if a feature of the countryside, an area surrounded by plane trees, behind acanthus and followed by painted figures and names. At the end, a stone table in white marble in the shade of a trellis held up by four small Caryste marble columns. From the bed, as if the weight of one who has sat down there has caused to issue forth, tubes spill water that falls into a deep slab before passing into a finely worked marble bowl that thanks to some invisible technique fills but does not overflow. The entrance table and the main dishes are set on borders of the bowl, the lighter dishes float to the back and to the fore are saucers depicting boats and birds. In front, there is a foundation that emits water and then collects it as once thrown into the air, the water falls back in upon itself with a system of openings absorbing it and making it disappear (...)». The spouts, the drainage tanks, these invisible techniques were developed in imperial Rome and became known in its subject regions and, while on a lesser scale, in great variety.

Hadrian's villa, whose ruins still today provide an insight into the immensity of its scale, was built close by the Tivoli. The emperor ordered the construction of a villa that would remind him of his campaigns in the East, eternalising them in this residence that concentrates in its features the accumulated knowledge of artists, architects, engineers and gardeners, repeating a situation similar to that found in Persian capitals: a city planned from scratch and with a vast budget.

The architecture of the outer space received as much attention as the buildings themselves and each construction, square, garden or tank bore some meaning that would add on yet another new factor to the set: each piece made sense to the memory in terms of recalling situations and landscapes that Hadrian nominate as the most impressive moments on his travels. Thus appears the Canopus, described in *História Augusta* as the navigable valley that unites Alexandria to the ancient city and transformed in Hadrian's villa into a grand lake 120 x 19 metres in size, finishing in a circular construction to form a shell. The Canopus was built in a valley and surrounded by a row of columns interspersed with statues. The water is contained and still at floor level with the statues reflected upon its surface. The scale and the fact that it is located at ground level generate a magisterial open air water mirror effect and fully capitalising on the grandeur of large water tanks.

The abundance of water, or its simulation, depended upon its storage with the construction of cisterns a common practice in Lusitania and which survives the fall of the Roman Empire and the period of occupation by the Moors. Identified Roman cisterns dot the Algarve and the Alentejo and, due to their level of utility, remained in usage practically right through to the 20th century.

Forgetting any linear historical sequencing, we would here take a detour and link Rome directly to the Renaissance, a period when pretty much all of the features of the Roman imperial gardens once again emerged. The garden again became a signal of the prestige of the major bourgeois and noble families with water approached in a similar fashion but with one important modification following the addition of a new feature: terraced gardens, first arising in Tuscany and soon to spread across Europe and becoming common in France, Spain, Portugal, Aus-

tria, Germany and also later in the Netherlands and England. Only with sloping land formed into terraces does it become possible to have water falling over steps, in cascades and sloping channels as in Villa Lante and in Villa D'Este and inventing spouts with the most extraordinary effects. The 16th century might be termed the «century of gardens», given the period was marked by the emergence of gardens with unity, coherence and meaning. Despite dating from the 17th century, the Fronteira Palace garden and the Convent of Bom Sucesso lake are precious examples of this approach to enlivening gardens through water and tiles.

The allegorical relevance of gardens is based upon classical themes. «(...) With the passing of the centuries, sourced from and inspired by the ancient texts and poetic themes, growing vectors of erudition and symbolism were introduced into paradisiacal microcosms. This recreation of rereading begins through exploring the water theme, worked through the representation of river-gods, the birth of Venus, the four rivers of Paradise. Subsequently, this moved onto illustrating images contained in the classical poems, such as *Metamorphoses*, by Ovid, before rapidly moving onto celebrating the victory of Man over Nature (...). In Vila D'Este, «(...) the blending of the association between the poem and the water becomes ever more perfect the closer one is able to approach the decorative set within the described ambience. An allegorically ever more entwined meaning in which water played a fundamental role (...)» in portraying Ovid's *Metamorphoses*.

The Middle Ages and its Romantic Interpretation in the 19th Century

From the Middle Ages and the Arabic occupation between the 8th and 9th centuries, already mentioned above, the legacy left by Arabian culture with the mosque and madras of Córdoba served as the connecting bond between classical knowledge and medieval Europe.

All the treatises on the construction of Islamic gardens repeat the fundamental elements: rectangular flowerbeds dividing up the garden and with perennial plants symbolising eternity, colour and the fragrances of their flowers, the shadow of trees and the privileged and highly varied presence of water.

The palaces, made up of rooms connected by patios and corridors in a varied play on the concepts of indoors and outdoors, remained on a human scale and the area of partial shading under the arcades is comfortable and highly adorned with tiled wainscots and plastered ceilings.

In Portugal, the Arabian civilisation left the hydraulic structures in Santarém, where there are around 260 cisterns on private patios and in Sintra, in Palácio da Vila, and despite multiple adaptations, there remains an intricate web of patios with water features, with plays on the outer and the inner and shadow effects.

From the Medieval Christian communities, there remain the cloisters and, based upon a document with the plan of the Canterbury Abbey, dated 1165, we can clearly recognise the structure of water systems with raised tanks and fountains and channels regularly laid out. The most highly worked fountains are located under a construction in one side of the cloister, symbolising the source of life with all the significant meanings associated with paradise.

So as to run vegetable and medicinal plant gardens, monastic orders and especially orders such as the Benedictines (Quintela et al. 1990: 27), who commit themselves to becoming self-sustaining units, were careful to choose locations with sufficient quantities of water for the respective religious communities.

Of castle and medieval palace gardens, we have information deriving from two different fields, the literary and the illustrative: the *Roman de la Rose*, the *Decameron*, *Les Très Riches Heures de Jean, Duc de Berry*, the document by Piero de Crescenzi, *Liber Ruralium Commodorum* — with the latter representing the first ever *Manual on Landscape Architecture*, written between 1304 and 1309. The layout of the medieval garden was irregular, does not obey any complete symmetry even though its centre is always given over to a fountain with or without a bowl and water falling out of it into a basin. The expressiveness of the water is minimal when compared with the aforementioned eras as much of the hydraulic knowledge had been lost and only recovered with the onset of the Renaissance period. The Paço do Senhor da Serra, in Belas, and the medieval garden of the Quinta das Lágrimas estate in Coimbra still contain some channels and

fountains from these far distant eras (Fig. 6).

The Naturalist Garden and the Romantic Interpretation of the Middle Ages

The naturalist garden returned to the irregular lines of the Medieval garden but the scale moved on to become the landscape and extending beyond the confinement of walls. Water occupied enormous areas with lakes constructed to signpost the appreciation of natural lines and boundless gardens that incorporate all of the surrounding rural landscape. This emerged out of a society with access to illustrations and thorough readings of classical authors leading to landscape innovations in gardens. Landscape architects, in Britain, were attributed a status equal to philosophers, poets, painters and scientists within a period that represented a change in attitude towards the position of man in the world.

It was not the reflection of nature sought after in a landscaped garden but rather an image of a nature understood, assimilated and celebrated in the paintings of artists. The *picturesque* was one means of appreciating the landscape, not in its pure state but literally as a picture after having been filtered by the sensibility of the painter in which the human presence is sporadic and distant.

In 1794, William Beckford sublet the Quinta de Monserrate estate in his much loved Sintra from Gerard de Vismes before proceeding to build his self-invented landscape involving the bringing in of hundreds of gardeners. This became the first landscaped garden in Portugal. Water crossed the entire property, falling over an enormous 10 metre waterfall before descending down between stones and rushing down as far as a large lake flanked by aquatic plants. «(...) In Painshill, built in 1765, the stone imitates natural caverns and is related directly to the more mysterious and wild paintings of Salvatore Rosa (...). The garden-scenarios that were built in this period were a re-transmission of the primordial landscape but subject to that same artistic filtering process. Within the scope of this sudden new trend, the *grotto* is the only feature that survived the transition from the French garden to the English garden. The symbolical meaning associated and the unquestionable importance of water in the garden enabled it to make the bridge between styles and cultures

(...)» (p. 89). The *grotto* connected to large surfaces of water, no longer twisting, was its source and issuing a stream of water. This effect would be imitated in the 18th and 19th century gardens and we find a *grotto* in the Marquês de Pombal palace, in Oeiras, and in Vila Morais, in Ponte de Lima. Of these streams, waterfalls and irregularly shaped lakes, we also come across examples in the romantic garden of Quinta das Lágrimas (Fig. 7), in the José do Canto Garden in Ponta Delgada, and in the Quinta de Santo António estate in Lisbon, all 19th century constructions.

Having avoided the usual chronology, we have now reached the landscaped garden of the 19th century and having skipped the Baroque period that preceded it and that we now turn to. The invention of the Baroque garden is attributed to Le Nôtre (1613-1700) and his championing by Luís XIV (1661-1715), who reigned for fifty years and established the then dominant power in Europe. The civilisation expressed by the monarchy was superficially based upon material pleasures and the garden would prove an excellent scenario for this form of social life. «(...) From the average scale that the Italians had stamped upon gardens through to the 17th century, the French suddenly leaped out with a substantially expanded area: the axis of Vaux measures some eight hundred metres with Versailles standing at five kilometres (...), the most insistent effect generated by these processes is undoubtedly that of magnificence (...). The French garden is a scenario prepared for grandiose effects in which the ostentatiousness of power is the great philosophical rule (...)».

In Vaux-le-Viconte, the first Baroque garden designed by Le Nôtre, was dedicated to a «(...) grand encounter between literary erudition, scientific knowledge (...)» (p. 76) and the art of making gardens. The discoveries of Torricelli were put into practice in service of the art of gardens with the La Gerbe waterspout, 1 x 5 metres across, in Vaux-le-Vicomte is the very first fountain with an elaborate hydraulic system that was to open the gates to thousands of imitations and greatly diversifying the utilisation of water in gardens. Buried hydraulic networks were at the very core of the garden's success and its grandiose effects. The results of the experiments of Harvey (1576-1657) on the circulation of

blood in the human body had become available to the scientific community and their proximity with the incorporation of hydraulic means into gardens coincide in both dates and concepts: «(...) Before Harvey, nobody had been able to explain the circulation of blood and the theories existing were based upon analogies between the problems of water circulating on sea and on land (...)» (Andresen 1992).

Other effects resulted from the law of optics and making recourse to water as a mirror leading to the installation of enormous surfaces of motionless water. «(...) The experimentation and scientific postulation, then fully flourishing, instigated and enabled each of these feats of engineering in an association between technology and art in the strictest possible fashion given that the image of the palace reflected in the tank of water in front represents a precise demonstration of the law of optics announced by Descartes — the angle of incidence equals the angle of reflection (...)».

The scientific advances gave a new push to liberty which was also put into practice in the abolition of compartments and the subordination of the entire space to a total organisation in accordance with principles of clear composition: the garden is no longer a continuation of the house but rather reaches out to connect with the landscape, a three dimensional geometry based on axis highlighting the relief of hills and new optical knowledge served to firmly direct gazes through illusionary tricks in perspectives. In Vaux-le-Viconte, the palace is surrounded by a moat, with the palace/garden axis stretching from inside to outside and into the infinite, pointing to a focal point defined by its statue of Hercules. Prior to building the garden, and underlying its entire layout, it was necessary to invent a system of channelling and taming the natural water flow that ran through it and create a channel contained between stone walls that enabled all of its magisterial effects and boosted the profile of water as a fundamental factor in gardens.

However, contrary to what took place in Vaux-le-Viconte, «(...) the environmental condition in Versailles were not totally favourable to this type of landscape sculpting (...)» where even now, the adaptation to natural facets of the ecosystem limits the channelling and shaping of river courses, the construction of terraces and ledges and the optimisation of expo-

sure. Immediately noticeable in Versailles is the leap from adaptation to pure importation. The water comes from beyond as does the actual energy needed to raise the Marly wheels and also sourced externally. We once again encounter another turning point and the beginning of a previously unknown process but soon to take root throughout the West: the characteristics of a self-sustaining garden ecosystem are swept away through the intervention of imported motorised forces and the restrictions imposed by natural conditions no longer represent dominant factors in planning its architecture (...).

Queluz is the landmark Portuguese Baroque garden but across the country the style led to the installation of large lakes of water, terraces and whenever such investment was not possible, involving smaller tanks in granite and fitting into an axial geometry that obeys all the granite adornments, with water serving as the element able to unify the entire layout. The majority of the gardens restored under the auspices of the EEA Grants Project are derivatives of

Baroque gardens (Fig. 8). They are the gardens in Lima valley, of which we would highlight Paço Vitorino, Quinta da Boa Viagem (Fig. 9), and also Casa de Juste in Lousada, as well as the large Baroque tank in the Quinta das Machadas (Fig. 10) in Setúbal, the geometric levelling of the Coimbra Botanical Gardens and the regular outlines of Quinta da Francelha, in Loures.

The history of water in gardens worldwide has followed a course reflected in Portugal with specific aspects and adaptation to our scale. Furthermore, the influences all had their own respective timings and the beauty of the water features in our gardens is a constant that led the Portuguese Association of Historical Garden Sites to try and recover and restore abandoned systems for collecting water locally and provide gardens with the quality and the comfort that the tanks, the channels, the fountains and waterspouts endow them with just as they have always done down through the long history of civilisations.

NOTE

¹ Many of the texts in these chapters are integral or adapted quotations from the book *Os Quatro Rios do Paraíso* (Edições D. Quixote, 1994), rewritten in co-authorship between Prof. Clara Pinto Correia and I based upon research carried out for my doctoral degree

thesis in Landscape Architecture, *Os Jardins dos Vice-Reis: o Lugar e o Significado* (Universidade Técnica de Lisboa, 1992), and hence sources are only provided when an exception to the aforementioned book.

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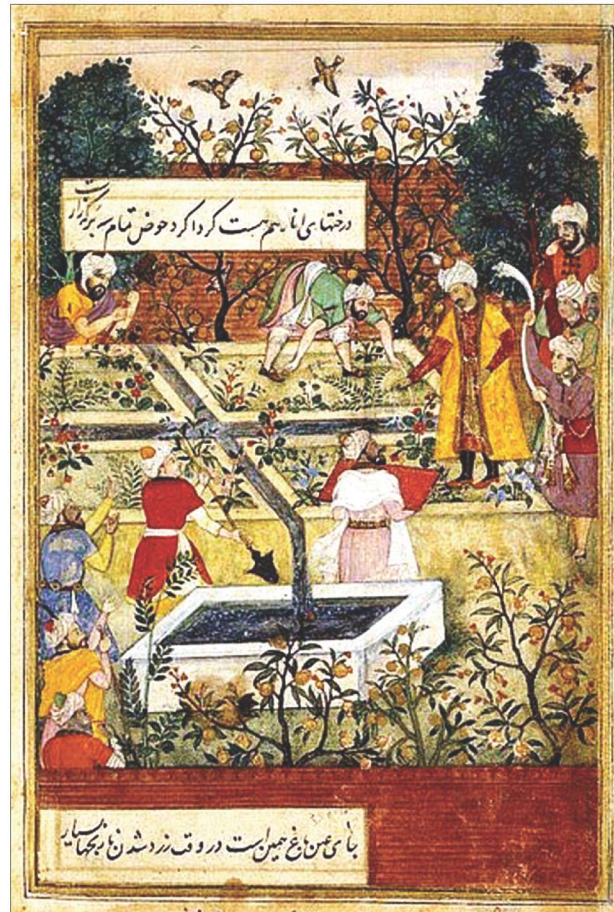


Fig. 1. Illustration from a Mughal book of manuscripts, water-colour and gold on paper, India or Pakistan, about 1590 (Vectors of influence of the Persian garden and the trajectory of the Portuguese in India subsequently carrying the Mughal influence back to Portugal)



Fig. 2. Portugal, Quinta da Penha Longa, the 16th century Nuncio Garden (Cristina Castel-Branco)

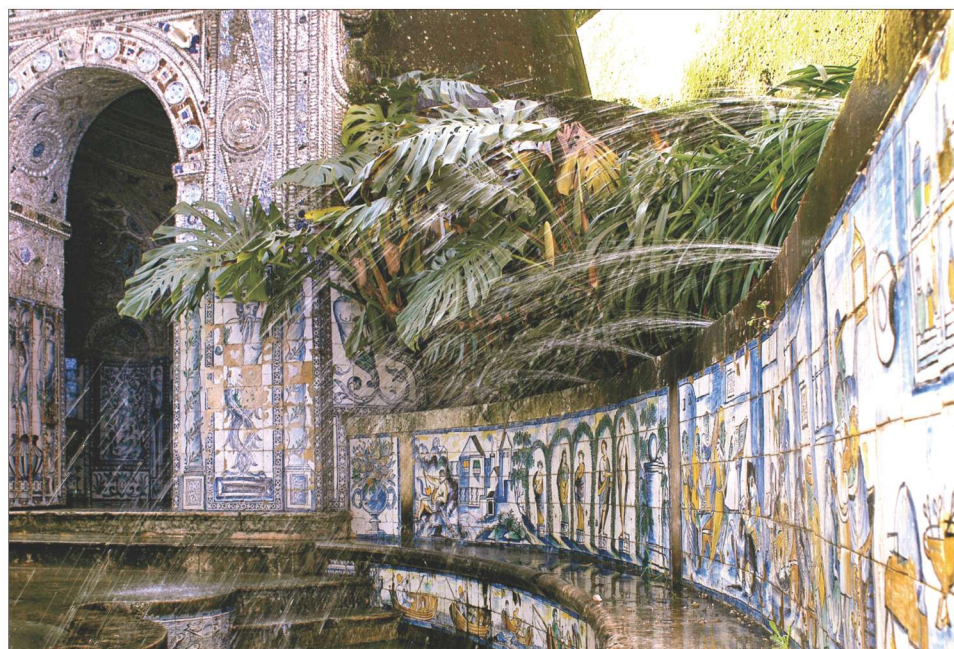


Fig. 3. Lisbon, Marqueses de Fronteira palace garden, spouts hid den (*giochi*) in the tiled bench supports, 2010 (Antonio Sacchetti)



Fig. 4. Portugal, Palácio Fronteira Gardens large decorated and tiled tank, 2008 (Antonio Sacchetti)

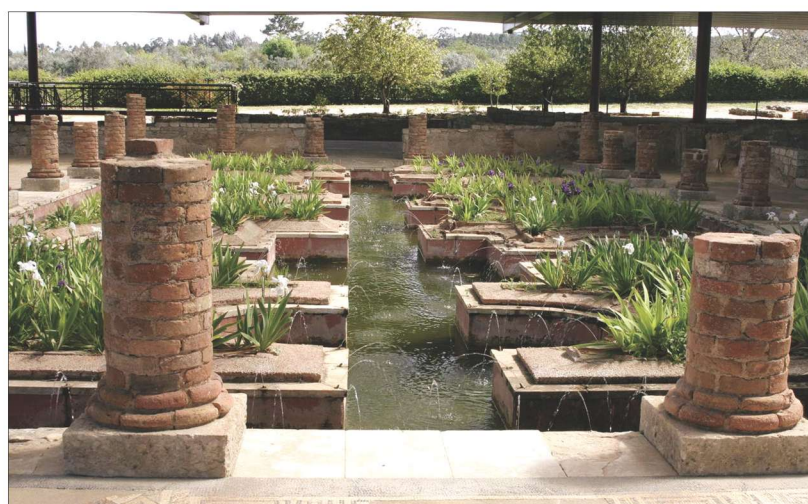


Fig. 5. Portugal, Conimbriga, private Roman garden tank, 2006 (Cristina Castel-Branco)



Fig. 6. Portugal, Quinta das Lágrimas, the simplicity of the Fountain of Lovers profile, built in 1326, 2011 (Antonio Sacchetti)

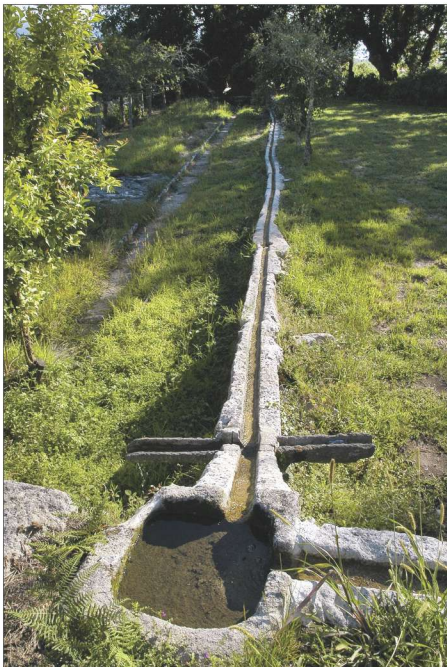


Fig. 9. Portugal, Quinta da Boa Viagem, granite guttering with the original water distribution system, 2010 (Antonio Sacchetti)

Fig. 10. Portugal, Quinta das Machadas, Moorish noria (estate typology), sketch by Cristina Castel-Branco, 2010 (Cristina Castel-Branco)



Fig. 7. Portugal, Quinta das Lágrimas, 17th century tank storing water both for irrigation and powering the olive mill water wheel, 2006 (Antonio Sacchetti)



Fig. 8. Baroque garden in Portugal, general view, 2010 (Antonio Sacchetti)

