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NORDISK ARKITEKTURFORSKNING
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THE POTENTIAL OF TOPKAPI PALACE TO CONTRIBUTE TO URBAN GREEN INFRASTRUCTURE PLANNING

PINAR KOYLU

Abstract

Green infrastructure encompasses a variety of green spaces at all spatial scales. Historical gardens, when considered as a type of green space, are significant for today's cities and societies, not only for their cultural, historical and aesthetic value, but also for their natural features. Therefore, historical gardens can be thought of as part of a wider natural and/or constructed system. This paper focuses on Topkapi Palace, which dated from the Ottoman period, and originally consisted of an inner core and outer gardens. Whilst the inner core had four main sequentially-located courtyards and a harem section, the outer gardens covered a vast area of land in which various crops were grown, and where both wild and domestic animals were raised. Moreover, significant change has occurred in the outer gardens due to the ongoing processes of urbanisation and westernisation, resulting in the loss of various plant and animal species. Despite this, the remaining gardens and courtyards, with their existing endowment of monumental trees and plant species, could still support the formation of a structured network of urban green spaces in today's metropolitan city of Istanbul. Thus, this paper focuses on the potential of historical gardens, in this case those of Topkapi Palace, to contribute to urban green infrastructure planning.

Key words:
Green infrastructure, green space, historical gardens, Topkapi Palace

Introduction

Green infrastructure, which is a relatively new concept, has various definitions. Depending on the context, it means different things to different people (Benedict and McMahon, 2002; Sylwester, 2009). Benedict and McMahon (2002, p. 5) define green infrastructure as «*an interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations.*» The definition of green infrastructure offered by the South Yorkshire Community Forest Partnership (2005) highlights that the term green infrastructure indicates «*the network of open space, woodlands, wildlife habitat, parks and other natural areas, which sustain clean air, water, and natural resources and enrich their citizens' quality of life*».

The concept of green infrastructure underlines both the quality and quantity of urban and peri-urban green spaces (Turner, 1996 and Rudlin and Falk, 1999, both cited in Tzoulas, et al., 2007, p. 169). In this sense, a description of the term presented by Natural England (2012) puts an emphasis on the quality of green spaces and defines green infrastructure as «*a strategically planned and delivered network of high quality green spaces and other environmental features.*»

Other definitions consider strategic planning and the management of networks of natural lands, working landscapes and other open spaces (The Conservation Fund, 2012), as well as strategic approaches to land conservation (Benedict and McMahon, 2002).

There are many social, environmental, economic and health benefits associated with green infrastructure. It provides places for recreation and physical activity, increases quality of life and interaction in the community, improves opportunities for environmental education and experiencing nature, preserves habitats for wildlife, enriches biodiversity, protects aquifer recharge, minimises inversion, absorbs air pollution, and raises property values. It decreases the cost of public infrastructure and public services, including the costs of storm water management and water treatment systems, supports local business and tourism, maintains opportunities for local food production, and reduces stress (Benedict and McMahon, 2002; Centre for Green Infrastructure Design, 2011; Natural England, 2012). Furthermore, green infrastructure improves the aesthetic quality of cities and creates a sense of place.

Green infrastructure planning takes place at a broad landscape scale (The Conservation Fund, 2012). However, elements of this network can be found on a wide variety of scales, from an individual parcel of land to local, regional, and state-wide scales. At the parcel level this could mean designing homes and businesses around green space while at the community level it might mean creating greenways to connect existing

parks. In a more comprehensive context, at the state-wide level it could, for instance, entail the protection of broad wildlife movement corridors connecting state and national forests (Benedict and McMahon, 2002).

Green infrastructure comprises «*all natural, semi-natural and artificial networks of multifunctional ecological systems within, around and between urban areas, at all spatial scales*» (Tzoulas, et al., 2007, p. 169). Thus, urban green infrastructure encompasses a variety of green spaces such as parks, urban forests, roof and vertical gardening, private gardens, green corridors, public green space and allotments, as well as green elements such as street trees (Cameron, et al., 2012). Green spaces can be regarded as multifunctional. A green space, for instance, may be a recreational area and a historical garden at the same time (Sandström, et al., 2007).

Historical gardens are an important part of our cultural heritage as they provide a setting for period buildings and are evidence of the past and of cultural and social change. They also provide an opportunity to understand the usage of plants and to recognise historical plant cultivation procedures (Looker and Patrick, 1987). Some of them may still encompass a wide variety of plant (and animal) species. In this context, historical gardens (i.e. palace gardens) can be deemed not only cultural assets, but also natural assets as well.

Palaces and their gardens, which were often built centuries or even many centuries ago, are thus of both significant environmental and cultural importance for today's cities and the societies that inhabit them. Among other features, some cities are often closely identified with their famous palaces inherited from the past, for example, Schönbrunn Palace in Vienna, the Palace of Versailles in Paris, and the Alhambra in Granada. Istanbul, together with its other natural and cultural features, is also intimately associated with its historical endowment of palaces.

Istanbul (figure 1), which is the most populated city in Turkey (General Directorate of Population and Citizenship Affairs, 2012), possesses a number of palaces, namely Topkapi, Dolmabahce, Ciragan, Yildiz, and Beylerbeyi, all legacies of the Ottoman Empire (figure 2). All these palaces had gardens which included a variety of plant and animal species. The oldest one among them is Topkapi Palace, located on the peninsula where the Bosporus, Golden Horn and Marmara Sea interconnect (see figure 2). Topkapi Palace was for centuries both the seat of government of the Ottoman Empire and the residence of the sultans.

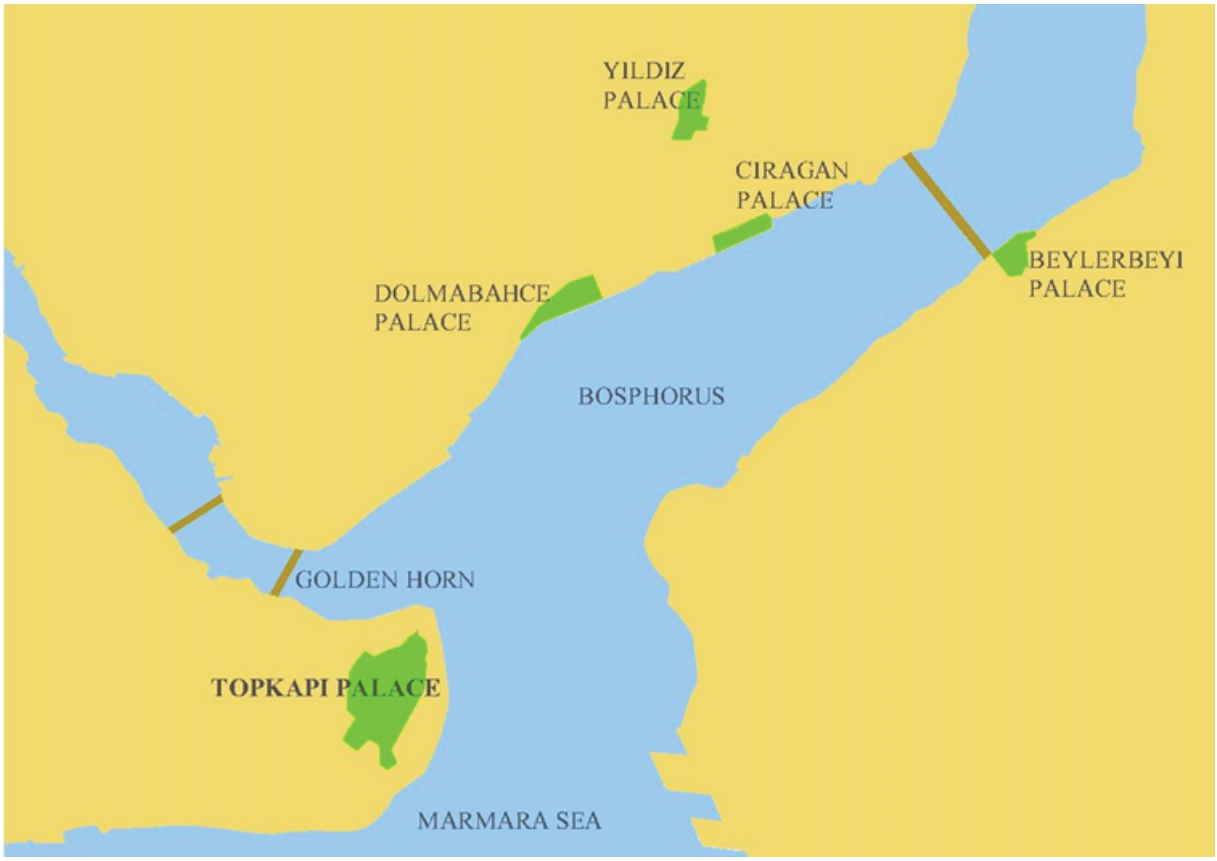


Figure 1 (top)
Location of Istanbul (after Google Earth, 2012).

Figure 2 (bottom)
Palaces in Istanbul.

This paper seeks to examine whether or not historical gardens can make a significant contribution to urban green infrastructure. By using Topkapi Palace as a specific example, this paper supports an affirmative response to this question. This positive conclusion has been developed through a review of the scientific literature and of a number of historical maps, in addition to site visits. Various definitions of green infrastructure have been explored in relation to the review of the literature. Thus, both scientific articles and NGO publications related to green infrastructure have been analysed. Data relating to Topkapi Palace was obtained through publications, plans, maps and site visits. In order to demonstrate the spatial distribution of green spaces in Istanbul, *Google Earth* images have been utilised. On following this line of research, the paper intends to explain how, historically, the gardens of Topkapi Palace contributed to the sustainability of the palace and to the biodiversity of the city, and how even today, they retain the potential to support the formation of an urban green infrastructure.

General Layout and Courtyards of Topkapi Palace

Long before the conquest of Istanbul, the Ottomans first came across Byzantine gardens when they set foot in Rumelia and became close neighbours of the Byzantine world. After the conquest of the city in 1453, they continued working on Byzantine land, gardens, farms and vineyards, not only protecting those green areas, but integrating them with their own cultural knowledge, tastes and experience (Atasoy, 2007).

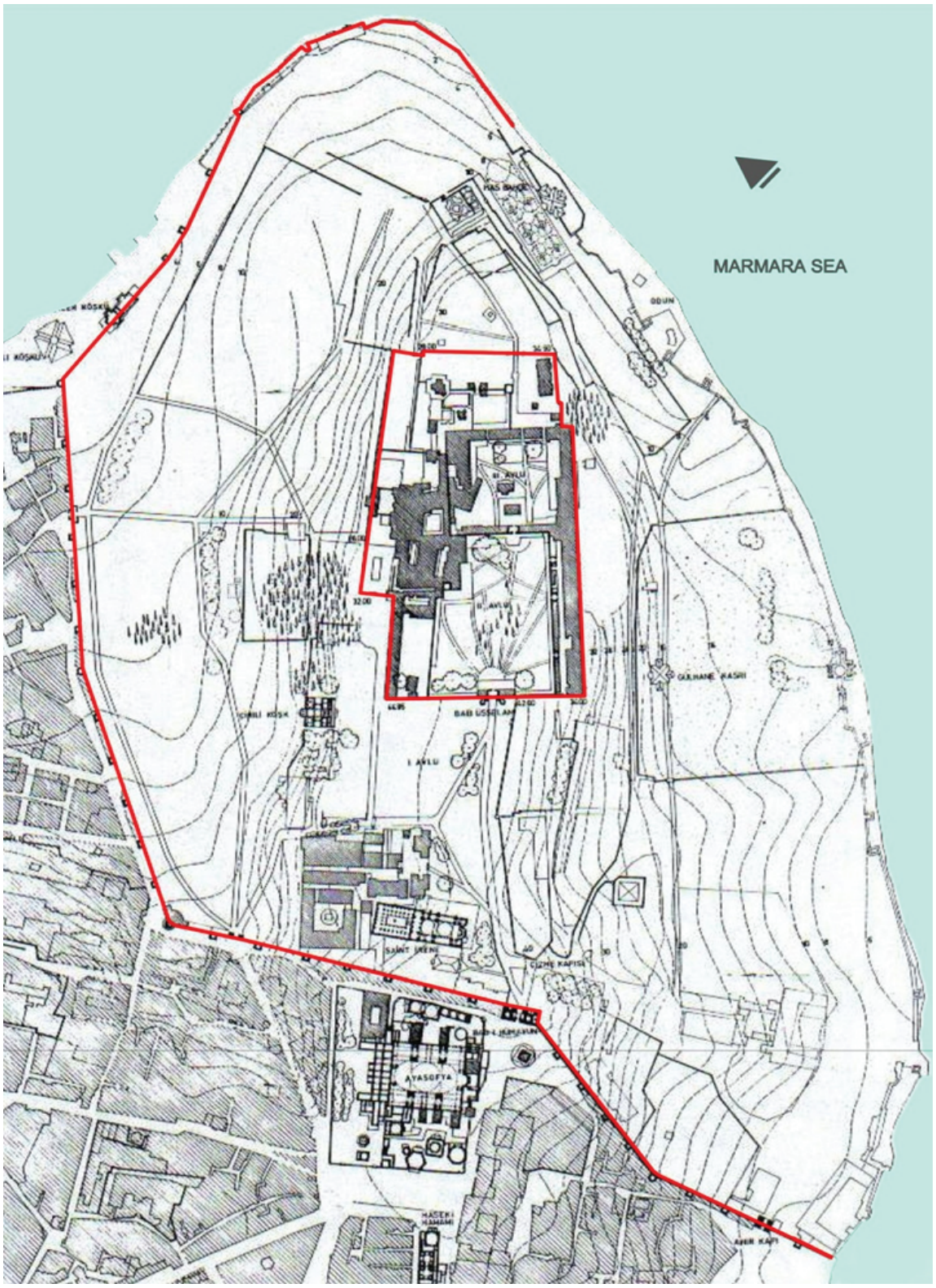
When Mehmet the Conqueror sought out an area for his new palace, he conferred with his advisors and the leading engineers of the age. A land survey was made in order to determine the availability of water and the cost of building a new palace. Following these consultations, it was decided to construct the new palace of the Ottoman emperor on the ancient acropolis of Byzantium, which had formerly been an olive grove and a residential area. Consequently, Topkapi Palace was built up on top of a hill from where vineyards and gardens sloped down to the seashore (Necipoglu, 1991).

Although the construction of the palace was completed in the second half of the 15th century, it was subsequently expanded over the course of centuries, with various structures being added and others rebuilt and enlarged as a result of fires, earthquakes and the increasing number of people living in the palace. Hence, the irregular and asymmetrical plan of the palace had acquired its present appearance by the end of the 16th century (Necipoglu, 1991; Müller-Wiener, 2001).

As it was not considered appropriate for the sultan to live close to the public, Topkapi Palace was isolated from the city by high, irregular walls, some of which dated back to the Byzantine acropolis. Thus, when viewed

from the outside, the palace presented a powerful image and resembled a fortified castle (Necipoglu, 1991; Müller-Wiener, 2001). In order to improve the safety measures within the palace, the area containing the main buildings was also surrounded by high walls (Uzuncarsili, 1984). Hence, Topkapi Palace consisted of an inner core and outer gardens (figure 3).

Figure 3
The inner core and outer gardens of Topkapi Palace (after Eldem and Akozan, 1982).



The inner core had four sequentially-located main courtyards and a harem section. These courtyards gradually proceeded from public zones to more private areas. Various buildings enclosed these courtyards, in which trees, fountains and some animals were to be found (Eldem and Akozan, 1982; Uzuncarsili, 1984; Necipoglu, 1991; Müller-Wiener, 2001). In addition to these main courtyards, there were also other mid-sized to small courtyards. The outer gardens, on the other hand, lay beyond this inner part, between the outer and inner walls, and covered a vast area.

The First Courtyard is the largest of all the courtyards of Topkapi Palace. It includes royal buildings, functional structures, and a number of fountains. During the Ottoman Period, various exotic animals were exhibited within this open space, which acted as a gathering place. With its tall trees planted in the centre, this place gave the impression of a village square (Kocu, 1960; Eldem and Akozan, 1982; Ministry of Culture and Tourism, 1983; Uzuncarsili, 1984; Necipoglu, 1991; Goodwin, 1999).

The Second Courtyard is surrounded by the Imperial Council (*Divan-i Humayun*) Building, the Tower of Justice, the kitchens, the Imperial Stables, the Dormitories of the Halberdiers with Tresses, and the Imperial Treasury Building. Foreign ambassadors and officials were permitted to enter this enclosed space which reflected the character of a garden. Various animals and birds such as gazelles (*Gazella dama*), peacocks (*Pavo cristatus*), ostriches (*Struthio camelus*) and nightingales (*Luscinia magarhynchos*), and a number of trees, especially cypresses (*Cupressus sempervirens*), were to be seen in this courtyard (Kocu, 1960; Eldem and Akozan, 1982; Ministry of Culture and Tourism, 1983; Uzuncarsili, 1984; Anhegger-Eyuboglu, 1986; Sozen, 1990; Necipoglu, 1991; Sehsuvaroglu, n.d.).

The Third Courtyard was a semi-private space. The sultan, his family and some of those who worked in the palace lived in the buildings located around this part. Important officials could enter this place only when they were granted the authorisation of the sultan. Similar to the First and Second Courtyards, the Third Courtyard is also enclosed by various buildings. These include the Audience Chamber (also known as the Chamber of Petitions), the Hall of the Privy Chamber (*Has Oda*), which was formerly the dwelling of the sultans and housed the offices of the sultan as well as the sacred trusts, the Conqueror's Pavilion, which housed the Imperial Treasury, dormitories of various officials, and a small mosque. In addition, there is another building, called the Library of Ahmed III, standing in the centre. The size of this courtyard is almost equivalent to that of the second one, and it also had the appearance of a lush garden. In one of the corners, birds were raised for the sultan's table (Kocu, 1960; Eldem and Akozan, 1982; Uzuncarsili, 1984; Sozen, 1990; Necipoglu, 1991).

The Fourth Courtyard acts as a transition zone between the successive courtyards and the outer gardens surrounding the palace. It has views

towards the Golden Horn, the Bosporus and the Sea of Marmara, as well as the Asian and European shores. Both the Marble Terrace of Sultan Ibrahim and gardens at different levels make up the Fourth Courtyard. As stated by various writers, this part of the palace was allocated to the sultan to be used for recreation and other activities. The Marble Terrace, with its marble pool, was a place for musical and theatrical entertainments. The terraced gardens, as well as the numerous kiosks dispersed around in the Fourth Courtyard, were used by the sultans for relaxing, thinking, eating, reading, writing, listening to music, watching sports activities, and for surveying their vast surrounding land holdings. Various plant species were found in these gardens. An account book of 1564–1565 tells us that the private hanging garden of Suleiman the Magnificent had an orange grove, potted jasmines (*Jasminum* sp.), and carnation (*Dianthus* sp.) fields. Other account books of later years also pointed to the existence of jasmine and vine pergolas, as well as orange and lemon trees (*Citrus sinensis* and *Citrus limon* respectively) (Kocu, 1960; Eldem and Akozan, 1982; Necipoglu, 1991; Goodwin, 1999; Atasoy, 2002; Albek, 2006).

The Harem of the palace is located on a steep slope. High walls isolate this part of the palace from the Second and Third Courtyards and from the outer gardens. It consisted of the apartments of the queen mother, the favourites of the sultan, the consorts, the concubines and the rest of the family, including sisters, children, and their servants, as well as the harem eunuchs (black eunuchs). These apartments enclose courtyards of various sizes. Among them, the largest belonged to the queen mother while the smallest was for the sultan's consorts and concubines. The paved Courtyard of the Black Eunuchs, a long and narrow space, led to the main entrance of the Harem. Although no traces of plants can be found in the courtyards of the Harem, some of them have good vistas. For example, the Courtyard of the Favourites has a view over the Boxwood Garden. This courtyard was used by the women for playing ball, strolling about or sitting. Formerly, it featured a pool, 18.40 x 32.40 m in size and 1.10 m in depth, which had been the gathering place of the sultan's family. However, this pool was covered with soil and later used as a garden (Anhegger-Eyuboglu, 1986; Necipoglu, 1991; Evren and Girgin Can, 1997).

As well as the courtyards, the Harem also has small gardens enclosed by high walls. Until they reached adulthood, the crown princes, while training in the discipline of the Ottoman harem, were housed in apartments in the Boxwood Garden. Today, only the traces of these apartments can be seen in this garden. The other garden of the Harem, located at the basement level in front of the dormitories of the concubines, is called the Harem Garden. Neither the Boxwood Garden nor the Harem Garden has a panoramic view because of the high walls enclosing them (Eldem and Akozan, 1982; Anhegger-Eyuboglu, 1986).

Outer Gardens of Topkapi Palace

The inner core of Topkapi Palace was surrounded by outer gardens which lay along the triangular cape on which the palace had been built. The outer gardens covered the greatest amount of green space within the palace complex by including cultivated lands, vineyards, pastures, meadows, the Privy Gardens of the Sultans (*Hasbahce*), as well as stables, menageries and sports grounds. This vast area of land was used by the sultans for recreational activities. The sultans hunted and strolled in this area and watched the grandees at horseback javelin tournaments after Friday prayers. Wrestling games and the performances of lion trainers also took place in the two arenas, the Javelin Maidan and the Sand Maidan. The sultans also practiced horseback archery and javelin throwing there (Necipoglu, 1991; Goodwin, 1999).

The daily routine of Murad III was described by the Venetian Gianfrancesco Morosini in 1585:

> *When he remains outdoors, he retires to some part of his gardens to practice archery and to play with his mutes and buffoons. He frequently has noisy instruments played, and enjoys artificial fireworks very much [...] He also frequently has comedies acted [...].* (Necipoglu, 1991, pp. 94–95).

There were a number of summer palaces, pavilions and kiosks in the outer gardens. The sultans visited them to rest after hunting and practicing at archery and the javelin. From the kiosks, they could also watch the departure and arrival of the fleet, races among soldiers, wrestlers, parades of tradesmen, performances of the military band, acrobats and horses, or simply enjoy the view. They could also discuss political, philosophical and religious issues with important officials and religious men in the kiosks (Necipoglu, 1991).

The facilities of the outer gardens supported the sustainability of the facilities of the inner core of the palace. A fish market, boat houses, a windmill for grinding flour, storehouses for flour and wheat, a bakery, a rose-water distillery, baths, a kitchen, a hospital, a small mosque for the gardeners, sewing rooms for tailors and tent-makers, and dormitories for gardeners, millers and oarsmen were all located in the outer gardens. Cold water and ice were stored in numerous Byzantine cisterns and in the cellars which were built by the famous Ottoman architect Sinan (Necipoglu, 1991; Goodwin, 1999). Moreover, various crops were grown, and both wild and domestic animals were raised in this vast area.

Both visuality and functionality were considered in the arrangement of the outer gardens. The most elaborate formal gardens were located towards the Golden Horn. While cypresses (*Cupressus sempervirens*), which symbolised immortality, were the dominant trees of these gardens, roses (*Rosa* sp.) and hyacinths (*Hyacinthus* sp.) were the main flowers used in

the Privy Gardens of the Sultan (*Hasbahce*). On the other hand, green areas which lay along the Sea of Marmara, directly below the kitchens, were mostly functional. This part of the palace gardens consisted mainly of vineyards, vegetable gardens and meadows. In addition, some tamed wild animals such as lions and elephants were kept in pens and stables, while birds were raised in aviaries (Necipoglu, 1991).

The outer gardens, filled with pavilions, fountains, and pools, and planted with cypresses (*Cupressus sempervirens*), pines (*Pinus* sp.), tulips (*Tulipa* sp.), narcissus (*Narcissus* sp.), jasmine (*Jasminum* sp.), as well as cultivated and wild roses and herbs, have been compared to the Garden of Eden by various writers, historians, and travellers. One, Kritovoulos, described many species of plants, an abundant supply of clear, cold water, and many sorts of wild and domestic animals. Another, Angiolello, also mentioned the existence of many species of plants such as fruit trees, grapevines (*Vitis vinifera*), roses (*Rosa* sp.), lilacs (*Syringa vulgaris*), saffron (*Crocus sativus*) and other species of flowers, and many kinds of animals including roe deer (*Capreolus capreolus*), foxes, hares, sheep (*Ovis aries*), goats (*Capra hircus),* Indian cows (*Bos primigenius indicus),* birds, wild geese (*Anser anser*) and ducks. We can understand from the words of Lorenzo Bernardo that there were also wild boars (*Sus scrofa*), bears, lions (*Panthera leo)* and horses in these gardens (Necipoglu, 1991). Therefore, we can say that the outer gardens of Topkapi Palace were rich in terms of biodiversity.

The gardeners, who also acted as guards, were in charge of the maintenance of the outer gardens. Flowers, fruits, vegetables, animals and raw materials were ordered from all over the Ottoman Empire, and were gathered, grown or stored in this vast area. Various animal and plant species that provided food for the royal table and for visitors to the palace could be obtained from these gardens, and water could be supplied through the underground cisterns. The excess of vegetables and fruits which were harvested in the gardens of the palace, as well as those brought in from various places throughout the Empire, were sold by the chief gardener in the public square which was located in front of the Imperial Gate. The money gained from the sale of food produced in these gardens was used to pay for the expenses incurred in connection with the palace kitchens (Necipoglu, 1991). Thus, Topkapi Palace functioned like a city within a city, and it could sustain itself for days.

Deterioration of the Outer Gardens

Despite their beauty and functionality, the outer gardens of the palace began to deteriorate in the 19th century, due both to neglect and ongoing 'Westernization'. After the sultan's residence had moved from Topkapi to Dolmabahce Palace in 1856, the historical peninsula lost its significance. The very few guards who were left behind to care for Topkapi could not

keep up the maintenance of the gardens. In addition, a destructive fire swept the coastal area of Topkapi in 1863, and a new railway was constructed there in 1871. The gardens were abandoned, factories were built in their place, and the traditional appearance of the city was transformed as a result of the chaotic industrial growth which took place from the mid-19th century onwards (Ministry of Culture and Tourism, 1983; Ergun, 2004).

The deterioration of the outer gardens of Topkapi Palace has been described in various sources. A detailed plan of Istanbul dating from 1875–1882 illustrates the loss of gardens and kiosks, and The Guide of Istanbul which dates back to the beginning of the 1900's draws attention to a park and an outdoor café located in the area between the railway and the seashore (Kayra, 1990).

The Privy Garden of the Sultan known as Gulhane Park (Rosehouse Park) was transformed into a public park (Aslanoglu Evyapan, 1972) in the 20th century. As noted by Müller-Wiener (2001), that part of the gardens was granted to the Municipality by Mehmed V in 1913. Before the most recent renovation, the park contained recreation areas, coffeehouses, playgrounds and a zoo (Yaltirik, Efe and Uzun, 1997). As stated by these authors, more than ninety species of exotic plants have, over a long period of time, been planted in Gulhane Park. These include, to name but a few, European hackberries (*Celtis australis*), London plane trees (*Platanus acerifolia*), box maples (*Acer negundo*), Norway maples (*Acer platanoides*), sycamore maples (*Acer pseudoplatanus*), horse chestnuts (*Aesculus hippocastanum*), pink sirises (*Albizzia julibrissin*), silver birch (*Betula pendula*), downy birch (*Betula pubescens*), Lebanon cedars (*Cedrus libani*), deodars (*Cedrus deodora*), blue Atlas cedars (*Cedrus atlantica* 'Glauca'), Mediterranean cypresses (*Cuppressus sempervirens*), Judas trees (*Cercis siliquastrum*), Norway spruces (*Picea abies*), silver limes (*Tilia argentea*), false acacias (*Robinia pseudoacacia*), and stone pines (*Pinus pinea*). The park was renovated by the Metropolitan Municipality of Istanbul in 2003 and has subsequently begun to function once again as a public park.

After the foundation of the new Turkish Republic, Topkapi Palace with its second, third and fourth courtyards (70,000 square metres in total) was transformed into a museum, under the control of the Directorate of Antiquities and Museums, while the remaining 630,000 square metres were left in the charge of other foundations. However, the deterioration of the gardens continued over the course of time. As a result of the construction of the coast road in the 1950s and the new Asia-Europe water pipeline in 1980, most of the walls and pavilions were demolished and many historical monuments were destroyed (Ministry of Culture and Tourism, 1983). Thus, the formerly productive outer gardens of Topkapi Palace have been fragmented and replaced by grey infrastructure (figure 4).

Figure 4
Present day situation of Topkapi Palace and its gardens (Google Earth, 2012).

Conclusion

Over time, the buildings and gardens of Topkapi Palace have evolved or been altered in the face of natural disasters, population growth and industrialisation. Although the two courtyards housing the sultan's governmental service buildings and the offices where he conducted relations with the outer world, as well as the Third Courtyard which separated the public and inner zones of the palace, have been preserved (Necipoglu, 1991) significant changes have occurred in the outer garden areas.

As demonstrated by various studies (e.g. Duran, Musaoglu and Seker, 2006; Kaya and Curran, 2006; Balik-Sanli, Bektas-Balcik and Goksel, 2008; Geymen and Baz, 2008), not only the gardens of Topkapi Palace, but also other green areas in Istanbul have been demolished by uncontrolled urbanisation. In the European part of the city, approximately 75 % of the metropolitan area, the land covered by forests and semi-natural vegetation decreased from 45 % to 39 % between 1987 and 2001. As noted by Hostetler, Allen and Meurk (2011), adjacent residential and commercial areas threaten the urban green infrastructure. Indeed, Benedict and McMahon (2002) have already directed attention to this problem by stating that fragmented patterns of green spaces are created by the modification of land by human beings; and consequently, that this fragmentation of land into smaller and more isolated patches of open space greatly alters the way in which natural systems function, threatening native plant and wildlife communities and associated ecological functions and processes. In the case of Topkapi Palace, the outer gardens have deteriorated and have been fragmented by the construction of roads and

buildings, resulting in the loss of plant and animal species. Yet today, the land occupied by the palace can still be perceived within the dense urban pattern as a large green area supporting various plant species. In their work, Yaltirik, Efe and Uzun (1997) identified fifty-six species of trees and bushes existing in the Second, Third and Fourth Courtyards of the palace. While the Second Courtyard is still dominated by cypresses (*Cupressus sempervirens*), some other plants are also to be found in this courtyard. These include London plane trees (*Platanus x acerifolia*), scarlet firethorns (*Pyracantha coccinea*) and bigleaf hydrangeas (*Hydrangea macrophylla*); these species can also be seen in the Third Courtyard along with a number of other species, such as roses (*Rosa* sp.), Adam's needles (*Yucca filamentosa*) and southern magnolias (*Magnolia grandiflora*). The Fourth Courtyard also has a variety of plants including tree peonies (*Paeonia suffruticosa*), roses (*Rosa* sp.), deodars (*Cedrus deodora*), Norway spruces (*Picea abies*), and walnut trees (*Juglans regia*), to name but a few.

As Sylwester (2009) notes, green space is often perceived in terms of isolated parks, recreation sites or natural areas, whereas the term green infrastructure calls attention to the *interconnected system* of natural areas and other open spaces that are protected and managed for the ecological benefits they provide to both people and the environment. Thus, the notion of 'green infrastructure' has its origin in two important concepts. The first is the connection of parks and other green spaces for the benefit of people, and the second is the preservation and connection of natural areas to benefit biodiversity and habitat integration (Benedict and McMahon, 2002). In the case of Istanbul, while large green areas cover the northern parts of the city, patches of green areas of various sizes, associated mostly with historical places, generally lie along the Bosporus. Yet, those patches exhibit a linear interaction of blue-green infrastructure, as does Topkapi Palace (figure 5). Therefore, the remaining gardens and courtyards of Topkapi Palace, with existing monumental trees and plant species, should be preserved. These gardens should also be connected to green areas in the other parts of the city, in addition to those along the Bosporus. In this way, cultural and historical areas as well as fragmented habitat units could be integrated, and become part of a wider natural and/or constructed system. In this context then the Topkapi Palace complex would support the formation of an urban green infrastructure for the metropolitan city of Istanbul.

Figure 5
Blue-green infrastructure along the Bosporus.

As historical gardens often contain various plant (and animal) species, their preservation necessarily also contributes to the conservation of biological diversity, which is considered an integral part of the sustainability of cities and landscapes. Topkapi Palace, with its rich historical legacy in terms of the variety of species it has nurtured, thus serves as a good example in respect of the opportunities now available to support the sustainability of today's cities. Productive and recreational green spaces like the former outer gardens of Topkapi Palace could be created in cities. In this way, food could be produced in urbanised areas and the inhabitants, especially children, could witness and experience the growth of the various everyday crops which they consume. These productive green spaces could also meet the recreational needs of modern urban dwellers.

When considered as an element of urban green infrastructure, historical gardens offer not only environmental benefits, but also generate numerous social and cultural advantages. The outer gardens of Topkapi Palace, with their kiosks, sports areas and privy gardens, met the recreational needs of the sultans in the past, whereas the inner core was mainly used for official and ceremonial events. Today, the inner core of Topkapi Palace is a valuable historical and cultural asset, and is visited by great numbers of tourists. On the other hand, Gulhane Park, part of the former outer gardens, has functioned as a public park since 1913, meeting the recreational needs of modern-day users. Thus, the courtyards located in the inner core of Topkapi Palace along with Gulhane Park also contribute to social and cultural sustainability by bringing people together, and carrying the past into the present. As Manenti (2011) puts it, if we regard the concept

of sustainability as related to being sustainable over time, then transmission to future generations should be considered. In this context, existing green spaces should be protected and, if necessary, be restored (Sandström, et al., 2007).

When cities are considered as entities in terms of systems, urban green infrastructure can be deemed as a subsystem of the whole urban system, and each green space within a city contributes to the formation of the urban green infrastructure. As stated by Murphy (2005), each element that makes up the system interacts with every other element, influencing the whole. In this sense, the conservation and maintenance of historical gardens, when considered as essential elements of urban green infrastructure, contribute to their own well being, the urban green infrastructure, and the urban system as a whole.

Maintaining the sustainability of cities and landscapes more generally requires holistic thinking. Therefore, historical gardens should be afforded importance not only for their environmental, cultural, historical, and aesthetic value, but also for their potential to contribute to green infrastructure planning.

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