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HORTICULTURAL TRADITIONS OF SOUTH CHINA GARDENS AS A WAY TO PRESERVE THE LOCAL FLORA

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ABSTRACT

The Yangtze River Delta area is a center of the emergence of Chinese civilization. Classical gardens survived to the present day, located in the Jiangnan region are of the greatest interest in terms of the authenticity of Chinese garden culture, which escaped the strong influence of nomadic tribes. This work studied 62 gardens of the Jiangnan region, located in 15 large and small cities of Jiangsu, Zhejiang and Greater Shanghai, which differ in their functional purpose and were built in different historical periods. Also, the history of gardens and parks was studied, their typology was determined during the construction period, and the structure of the complex was analyzed. The article provides a list and detailed description of mandatory planning elements, as well as an analysis of the climatic and natural features of the research region. Special attention is paid to the plant components, namely the species composition and origin of the species most commonly found in the gardens of the Jiangnan region, as well as plant symbolism. The species composition of trees, shrubs, tree lianas and bamboos in the region was found as represented by 294 species, excluding varieties and cultivars. The ratio of native and introduced species of woody plants and bamboos characteristic of the gardens are that more than 90% of the plants of the local flora are found. The study found that gardens in the Yangtze River Delta remain historically reliable and can play the role of potential resource banks in the restoration of disturbed natural areas.

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1 INTRODUCTION

The lands south of the Yangtze River in its lower course are known in Chinese history as the Jiangnan or Pinyin region, and the ancient cultural traditions of the peoples who inhabit this area are contained in the concept of *the Jiangnan Culture*. The Jiangnan region (that is, the land “South of the river”) coincides with the region called the “Yangtze River Delta Economic zone” in the modern administrative division. It includes Shanghai with its suburbs as a city of Central subordination, the southern part of Jiangsu province, the Eastern and southern parts of Anhui province, and the Eastern and Northern regions of Zhejiang province (Fitzgerald, 1998; Suzhou gardens, 1999; Qingxi, Lou, 2010; PRC, 2002).

The area of the Yangtze River Delta is considered one of the centers of the emergence of Chinese civilization. Its history can be traced back to the 5th Millennium BC: the area was part of the state of Wu with its capital at the site of modern Suzhou, which in the IV century BC was conquered by the neighboring state of Chu, and annexed to the Qing Empire a hundred years later.

Since the beginning of the IV century, the area in the Yangtze River Delta has become the main cultural and economically important center of China, especially actively cultivated and populated in the VII-IX centuries (the period of the Tang dynasty). Different seaports appeared and disappeared in different historical periods in China, but at the end of the Ming dynasty, the role of the main seaport passed to Shanghai.



Figure 1: Taihu lake Rock in the landscape of Xihu lake. Hangzhou, Zhejiang province

This region with a humid climate due to the numerous rivers and tributaries flowing into the East China Sea occupies low-lying territories and abounds in large reservoirs. There is the largest lake in China, Taihu lake, famous for its quaint rocks, Xihu lake, and many others (Figure 1). The Yunho, the Great Canal that connects Hangzhou with Beijing, also passes through this area. The canal was built by hand for almost two thousand years and passes through seven major cities (Hangzhou, Jiaxing, Suzhou, Wuxi, Changzhou, Zhenjiang, Yangzhou) crossing the basins of major rivers-Haihe, Huanghe, Huaihe, Yangtze, Qiantan, several of natural lakes and many smaller rivers. During the reign of each of the dynasties, it was the most important transport artery connecting the Northern and southern cities.

The Jiangnan region has been considered the center of Chinese culture, crafts, and trade for many centuries, and remains largely so in the modern period of history.

The construction of gardens for all countries of the world is a bright example of the manifestation of the spirituality and culture of Nations. Chinese gardens and parks can be considered as one of the most striking phenomena of world culture, reflected in the list of UNESCO world heritage sites (PRC, 2006).

The harmony of the Chinese garden is based on many philosophical theories, including the Confucian doctrine of the "Golden mean", which warned against extremes in decision-making, and required a balance between nature and human activity for gardens.

Classical gardens that have survived to the present day, located in the Jiangnan region, as well as modern parks, as a continuation of the horticultural traditions of the region, are of the greatest interest in terms of the authenticity of Chinese garden culture, which escaped the strong influence of nomadic tribes (Manchus, Jurgen, Mongols), compared to the Northern provinces of China. The southern provinces (Yunnan, Sichuan, and Guangxi) were the last to join the Empire, and the culture of their peoples did not have a significant impact on the classical gardens (Fitzgerald, 1998).

The main feature of Chinese culture as a whole is the unity of myths, legends, historical facts, geographical objects, real people, and deities of different ranks. It is impossible to separate all these concepts.

The preservation of traditions and maintenance of the established social hierarchy in Chinese culture was facilitated by a unique combination of beliefs and the cult of the heavenly order, and the divine ancestors, and the real history of peoples.

A set of mandatory planning elements in the form of a reservoir with one or more Islands, pavilions of various functions, and imagery, an artificial mountain is firmly rooted in the garden art of China.

Ancient myths about the existence of Islands of immortal deities are reflected in the landscape of the gardens. The gardeners' task was to try to create a miniature copy of the landscape, as close as possible to the natural originals and the ideal space of the mythical Islands.

The master always forms Islands in each reservoir in Chinese gardens; one island is required in small reservoirs; three or five Islands in large reservoirs (Figures 2 and 3).



Figure 2: Geyuan garden island, Yangzhou, Jiangsu province.

The prototype of the mountain in the garden is the really existing Kunlun Mountains - the large mountain system of Asia, which extends from the Pamirs to the Sino-Tibetan mountains in eastern China. Its length is about 2500 km, with the highest point at 7167 m above sea level (Aksai-chin peak) (Zaychikov, 1964). The ancient Chinese were convinced that on the top of the mountain grow the magical gardens of the goddess Xiwangmu with peach trees, the fruits of which grant immortality. The tradition of modeling the Kunlun mountains led to the inclusion of the hill as an indispensable element of the garden in an attempt to create an ideal space. Plants planted in gardens have also come a long way in the selection and have never been an accidental choice of a master. They were valued for their useful properties: food, medicinal, aesthetic, and evens in a person (Poot-Pool et al 2018; Alexandrova&Tatueva 2019; Boni, 2019n for a number of intangible characteristics that cause positive emotions).



Figure 3: A hill with a gazebo at the top. Zhen Zhu Taoyuan Garden, Tongli Water Town, Jiangsu Province.

The desire to approach the Gardens of Eden from their own legends in an attempt to create an ideal space encouraged residents to turn to the only available analogs of the “Gardens of Eden” - the beautiful natural landscapes of mountain, forest, lake, and river landscapes found in abundance in the Jiangnan region.

2 METHODS AND OBJECTS

The objects of study were 62 gardens of the Jiangnan region, located in 15 large and small cities of the provinces of Jiangsu, Zhejiang, and Greater Shanghai. The gardens studied are of four different types: parks based on natural landscapes, gardens of temples and shrines, gardens of residential residences, and modern urban gardens and parks (Golosova, 2011).

The gardens cover a significant historical period by the time of their creation (Table 1). the oldest ones, such as Hutsue Park (Chinese - *Hu giu*, 虎丘), are known to B.C., while the modern parks were built in the XXI century.

Table 1: The distribution of gardens and parks in this study is classified according to the historical periods and functional purposes.

Historical period	Number of investigated gardens	parks built based on natural landscapes	gardens of temples and shrines	Residential gardens	modern city gardens and parks
BCE.	1	1	0	0	0
Qin	1	1	0	0	0
Han	2	2	0	0	0
Threekingdoms	1	1	0	0	0
EasternJinandJin	2	0	1	1	0
Northern & Southern Dynasties	2	1	1	0	0
Tan	3	1	1	1	0
Song and Southern Song	5	1	0	4	0
Yuan	2	1	1	0	0
Min	14	0	0	14	0
Qing	14	2	0	10	2
Republic of China	2	0	0	1	1
People's Republic of China	13	1	0	0	12
IN TOTAL	62	12	4	31	15

The study examined the history and period of creation (fame) of gardens and parks, determined their typology (functionality) during construction, analyzed the structure of the complex, the species composition of tree plantations, and the origin of species most commonly found in the gardens of the studied region.

One of the features of the Chinese garden is its strict structure in terms of volume indicators. That is why the authors, considering the range, paid attention exclusively to trees, shrubs, woody lianas, and bamboos.

Although bamboo is not a tree plant, it is traditionally positioned on a park with tree plants in terms of its participation (influence) in the formation of the spatial structure of plantings in China (Golosova, 2015).

Also, methods of system, comparative and historical analysis, and standard methods of statistical data processing were used.

3 RESULTS AND DISCUSSION

The lower reaches of the Yangtze River is a region generously endowed with the natural beauty of landscapes and rich resources; It has been home to intellectuals and wealthy merchants for many centuries, which have greatly influenced Chinese culture. They built their unique gardens to express their attitude to life and fight with each other for prestige. The inextricable link between man and nature has developed into the cultural tradition of creating and admiring the garden. Many gardens preserved in this region help contemporaries appreciate the life, ideals, thoughts, and feelings of their creators.

Gardens are a material expression of the aesthetic consciousness of society and are intended primarily for the "rest of the soul." Each Chinese garden consists not only of pavilions, terraces, artificial hills, ponds, and plants, but also of a certain intangible substance, a centuries-old cultural tradition that has been preserved, enhanced, appreciated, and trusted by many generations of Chinese gardeners. They took the concept of the natural development of the garden from Taoism, imitating the

natural course of rivers and creating a mirrored world in the smoothness of man-made lakes. The idealized images of landscape elements - hills, water, plants, and their connection with human characteristics and emotions came from Confucian philosophy to the gardens. The practice of meditation has come from Buddhism to the gardens; this ability to deeply and meaningfully admire the pictures of the garden. Being a manifestation of respect for the cultural traditions and wisdom of the ancestors, the gardens also have a direct information component - inscriptions on stones and on wooden boards in the pavilions that help to appreciate the poetic feelings of artists, poets, scientists who owned the gardens and created these gardens.

The relationship of man to plants from the natural environment and planted in gardens over the centuries has formed a stable relationship, bonded by economic and emotional, and spiritual components.

According to the plan, plants in Chinese gardens should demonstrate natural beauty. The main aesthetic criteria for selecting plants for a garden in European culture and countries that have adopted European values are height, crown shape, silhouette, bark, color and texture, size and shape of leaves, flowers, and fruits. Plants are selected for a number of characteristics in China and other South-East Asian countries that have been subjected to its cultural influence, which are not taken into account by the European materialistic tradition. Plant symbolism comes out on top – the close centuries-old connection of the ethnic group with its natural environment (Werner, 1961; Williams, 1999). Thus, numerous species of bamboo, which grow in the region of about 20 species, are considered a symbol of noble character and purpose embodies the continuity of generations (*Bambusa multiplex* Raeusch, *Chimonobambusa quadrangularis* (Franceschi) Makino, *Indocalamus latifolius* (Keng) McClure, *Pleioblastusamarus* (Keng) Keng f. 11 species of the genus *Phyllostachys*, etc.) (Figures 4 and 5).



Figure 4: Bamboo forest in the vicinity of Issin city. Jiangsu province



Figure 5: Bamboo grove in Geyuan garden, Yangzhou, Jiangsu province.

Peach (*Prunus persica* (L.) Batsch) and six species of native pines (*Pinus armandi* Franch, *Pinus bungeana* Zucc. exEndl., *Pinus densiflora* Siebold.&Zucc, *Pinus parviflora* Siebold&Zucc., *Pinus tabulaeformis* Carr., *Pinus thunbergii* Parl) represent longevity and are not afraid of low temperature. (Somkina, 2009) (Figure 6).



Figure 6: Pine tree in Huangsushanzhuang garden, Suzhou, Jiangsu province.

Plum for local residents is an indisputable symbol of moral purity and loyalty (Filimonova, 2003; Polyakova, 2015). Local representatives of this subfamily of almonds or plums have about 10 species, the most popular is the Japanese apricot (*Prunus mume* (Siebold) Siebold&Zucc.), which is most often depicted on scrolls. Other representatives of this group are also often found in gardens (*Prunus glandulosa* Torr.&A. Gray, *Prunus japonica* Thunb., *Prunus triloba* Lindl., *Prunus serrulata* Lindl., *Prunus glandulosa* Torr. &A. Gray, etc.).



Figure 7: View of the plum blossom of the Meiyuan Garden from Quilou Tower on a foggy day, Wuxi, Jiangsu.

Spiritual purity is associated with the Lotus (*Nelumbo nucifera* Gaertn.), revered in Taoism as a symbol of longevity; it has become a symbol of spiritual purity in Buddhism. Its contrasting "purity" is associated with the ecology of places of natural growth – dirty from the point of view of human representations of reservoirs and swamps from which rises a beautiful large flower on a high peduncle.

The Orchid is a symbol of the hermit and has been especially loved by Chinese scientists since

ancient times, as it symbolizes the integrity of nature, nobility, and friendship in Chinese culture, which are the virtues of a perfectly cultured gentleman and scientist.

Symbolize good luck in Chinese gardens such plants as Magnolia (*Magnolia denudata* Desr., *Magnolia liliflora* Desr., *Magnolia officinalis* Rehder&E. H. Wilson, *Magnolia sieboldii* K. Koch). The symbol of immortality and harmony of Yin-Yang is Ginkgo biloba (*Ginkgo biloba* L.), and death is associated, oddly enough, with Chinese hibiscus (*Hibiscus mutabilis* L.)

The tree peony (*Paeonia suffruticosa* Andrews) as an ancient symbol of wealth, happiness, and splendor is considered an unofficial national symbol of the country (Guo Rongjun& Yang Haiyun, 2020), and osmanthus fragrant (*Osmanthus fragrans* Lour.) marks prosperity and wealth. Even a plant pomegranate (*Punica granatum* L.), which is China's native range and imported from Asia during the period of active operation of the silk road, bought in China a new symbolic meaning for the last two thousand years and revered as a symbol of gentility and numerous families. Roses, camellias, rhododendrons, Wisteria, daffodils, and chrysanthemums, as well as other garden plants of the Jiangnan region, contain a significant layer of cultural information that makes it possible to understand the reason for choosing the assortment for the garden (PRC, 2020).

Seasonal changes and morphological features of plants often determined their specific place in the garden. So the late flowering of fragrant osmanthus associatively resembles the imminent arrival of winter. It was planted on the North side of open arbors so that the prevailing Northern winds in autumn and winter filled the arbor with its subtle aroma. Plants with large leaves not only provided shade, but also the sound of raindrops falling on them, which caused a poetic feeling and creative inspiration. Plants such as Paulownia (*Paulownia fortunei* (Seem.)Hemsl) or liriodendron (*Liriodendron chinense* (Hemsl.) Sarg.) they were especially revered by poets, scientists, and officials; they tried to plant them from the side of their workrooms. Pine trees were located closer to the house, and bamboo was placed where under the pressure of the wind it can demonstrate its resilience, associated with the character of the owner.

The climate of the Jiangnan region has pronounced seasonal changes: summers are dry and hot, winters are cool and humid. In the initial period of the formation of traditional gardens, the selection of plants was carried out and based on the associative connections of the person of that period with natural phenomena. The natural need to protect yourself from the scorching sun in summer led to the use of tall deciduous trees in the first tier of plantings. Evergreens with dense crowns are good in summer, and in rainy winter and autumn periods, they would also not let in sunlight, increasing humidity. Therefore, deciduous trees were introduced mainly in the first tier; they give dense shade in summer and shed their leaves in winter. Much attention was paid to plants in the height range of 1.5-2.5 m, which were included in the direct life of the human habitable space. In winter, residents of the residence with gardens shortened their stay in the garden but tried to enjoy the garden more from the Windows of pavilions and gazebos. In this regard, evergreen shrubs and small trees were planted in the vicinity of architectural buildings to create plant compositions of a permanent period of decorativeness of various types of pines (often formed), Holly, Privet, rhododendrons in the line of sight from windows, galleries and entrances to pavilions.

The rich flora of China is only partially reflected in the gardens. About 450 species of higher plants in China out of about 30,000 species are used most frequently throughout the country in gardens (Golosova, 2011). Among these most popular plants, representatives of the Chinese flora include 79%, the rest are introduced (Table 2).

Table 2: The origin of plants in the China gardens

Origin of plants in Chinese gardens	The origin of plants in the gardens of the Jiangnan region
1 - China (79%)	1 - China (91.2%)
2 - Japan (8.1%)	2 - Japan (5.4%)
3 - Europe (4.2%)	3 - Europe (1.4%)
4 - The rest of Asia (0.8%)	4 – The rest of Asia (0.3%)
5 - North and South America (6.7%)	5 - North and South America (1.7%)
6 - Australia. Oceania. Africa (1.2%)	6 - Australia. Oceania. Africa (0%)

The oldest preserved gardens in China are located in the lower reaches of the Yangtze river, in the Jiangnan region. The climate and wealth of the inhabitants of this economically prosperous region allowed the construction and preservation of many unique gardens, most of which belonged to the intellectual elite. Species diversity in gardens has not always depended on the area of the garden. The most diverse range of woody plants among private gardens in the region is represented in the ZhuozhengYuan garden (Suzhou), where 85 species of woody plants grow on an area of more than 4 hectares. However, 46 species of woody plants are concentrated in the small garden of Wanshi Yuan with an area of 0.47 ha, which is 4.5 times more in terms of 1 ha. Also, the number of species is directly related to the age of the garden through the nature of the layout: the older the residence, the more complex its planning structure due to the increase in the number of pavilions and other space delimiters (galleries, walls). The increase in the number of buildings over time contributed to the appearance of numerous small courtyards, separated from the Central space of the garden, where their own plants were planted (Golosova, 2015; Meshcheryakov, 2004). Therefore, a larger number of plant species grow per unit area in older gardens.

The floral composition has certainly changed over the centuries, but it nevertheless reflects a characteristic picture of the region. The species composition of trees, shrubs, tree lianas, and bamboos in the region was determined by us in 294 species without taking into account varieties and cultivars. Table 2 shows the ratio of native and introduced species of woody plants and bamboos typical of gardens located in the Jiangnan region.

The data shows that the proportion of native species in the gardens of the study region is 12 % higher than the national average of 91.2%.

The advantage of native plants has historically been determined by the simplicity of their cultivation within the natural range. They successfully reached a pre-known height that could be predicted when planting. The use of foreign, uncharacteristic, and little-known plants was the exception rather than the rule since the movement of plants in previous centuries was not yet sufficiently developed. The reconstruction and restoration of the gardens, which took place periodically, was not associated with a drastic replacement of the species composition. During reconstruction, substitutions were made within the genus, but with the same local plants. This explains the stable preponderance of native species in the gardens: gardeners were concerned not with the decorative qualities of the plants, but their symbolic significance for the owner of the estate and people visiting the garden. Local species were preferable also because the creators of the gardens sincerely believed in a close energy relationship between man, plant, and the land on which they live and grow. The theory of the unified positive energy “Qi” is well described in both ancient and modern literature on Feng Shui, where there is a lot of mystical beginnings, but also laid down thousands of years of experience of human observations of nature.

4 CONCLUSION

The gardens of the Jiangnan region in China demonstrate how General cultural and partly religious traditions contribute to the preservation of local flora in the gardens, which accounts for more than 90%. Against the background of accelerating globalization processes that lead to the loss of cultural identity, gardens in the Yangtze River Delta remain historically reliable and can play the role of potential resource banks in the restoration of disturbed natural areas.

5 AVAILABILITY OF DATA AND MATERIAL

Information can be made available by contacting the corresponding author.

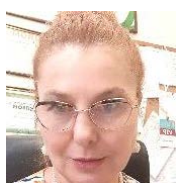
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7 REFERENCES

- Alexandrova, M. V. & Tatueva, O. A. (2019). Features of the development of the economic belt of the Yangtze River. *Problems of the Far East*, 6, 59-70.
- Boni, L.D. (2019). Chinese village on the eve of the 70th anniversary of the formation of the PRC (the Decisive battle for Xiaokang). *Problems of the Far East*. 5(1), 73-86.
- Filimonova, E.N. (2003). Symbolism of plants in translated works. Noble plants (based on translations from Korean and Chinese) Language, consciousness, communication. Moscow: MAKSS Press, 26-53.
- Fitzgerald, C.P. (1998). A brief history of culture. China. Translated from English by R. V. Kotenko, scientific editor E. A. Torchinov., Saint Petersburg: Eurasia, 456p.
- Golosova, E.V. (2011). China and the landscape art of Eurasia. *LAP LAMBERT Academic Publishing GmbH & Co. KG*, 417p.
- Golosova, E.V. (2015). Analysis of the flora of gardens and parks in China. *Bulletin of the Moscow state University of the forest “Lesnoy Vestnik”*, 5(19), 58-65.
- Guo Rongjun, Yang Haiyun, (2020). Flower symbolism in Chinese culture-on the example of the image of a peony. *Culturology - International Journal of Humanities and natural sciences*, 3-1(42). DOI: 10.24411/2500-1000-2020-10199
- Meshcheryakov A. N. (2004). Book of Japanese symbols. The book of Japanese customs, Moscow, 556p.
- Polyakova, E.A. (2015). Color symbolism of China linguistic and cultural aspects. *Philological sciences*.
- Poot-Pool, W.S., Cetral-Ix, W., Basu, S.K., Noguera-Savelli, E., Noh-Contreras, D.G. (2018). Urban Home Gardens: A Sustainable Conservation Model for Local Plants Based on Mexican Urban Agri-Horticultural Practices. *Urban Horticulture, Springer*, 73-88.
- PRC. (1999). *Suzhou gardens*. China architecture & building press, 251p.
- PRC. (2002). Chinese classical gardens. Hangzhou: Zhejiang People's Fine Arts Publishing House, 175p.
- PRC. (2006). World heritage of China. 550p.
- PRC. (2020). Flora of China. <http://www.efloras.org> (Accessed January 2020).

- Qingxi, Lou (2010). Chinese gardens in search of landscape paradise. China intercontinental press, pp. 170.
- Somkina, N.A. (2009). Chinese tradition of benevolence: symbolism of animals and plants. *Bulletin of St. Petersburg State University*, 13(2), 77-86.
- Werner, E. T. C. (1961). A Dictionary of Chinese Mythology. New York: Julian Press, 627p.
- Williams, C.A.S. (1999). Chinese symbolism and Art motifs. Singapore, 472p.
- Zaychikov, V.T. (1964). Physical geography of China. Academy of Sciences of the USSR. In-t geography, Moscow: Mysl, 739p.



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