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## 竹子在现代景观设计中的应用(英文)

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The Study of Bamboo Application in Modern Landscape Architecture

Ma Junshan; Bao Binfu; Yu Xuejun

Abstract: Bamboo is one of the earliest plants used in landscaping. It has been highly valued and widely applied in traditional Chinese gardens for its beautiful figure, elegant artistic conception, wide fitness and some other functions. In modern landscape, the environmental conditions are more complicated, the functional demands are more diverse and the aesthetic consciousness is to some extent different from what it used to be. Therefore, much more importance should be attached to the proper exploitation of the site and the realization of ecological effects. Only by making full use of the features of the bamboo through innovation in terms of artistic forms and aesthetic consciousness can we make bamboo better serve present landscaping.

Key words: landscape architecture, bamboo, planting design, ecology, modern art

### Part one: Introduction

The description of bamboo being used as appreciated object could be found as early as in the book called "The Complete Collection of Chinese Poetry". Research shows that it has been a habitual practice to plant bamboo in the imperial palace garden even since the Qin Dynasty. Later on, people showed more and more interest in bamboo and they finally found it impossible to live without it. Bamboo has been widely used in traditional Chinese gardens because ancient Chinese people admired its elegance, variety and great applicability. Due to its special configuration and structure, bamboo is always associated with such virtues as integrity, modesty and strong will, all of which fit the basic value of traditional Chinese people. This explains why bamboo has received such a wide homage. There are all together 1,300 species of bamboo belonging to 107 families throughout the world, laying out in the vast continents of Asia, Africa and America. In China, there are more than 500 species belonging to 39 families expanding across the nation with the exception of Heilongjiang province, Jilin province, Xinjiang and the inner Mongolia. Investigation shows that bamboo can be found in almost every private garden in the city of Suzhou. Even in Beijing, the northern border of bamboo distribution, proper conditions are being created for bamboo to live. For example, some amount of bamboo is planted in famous imperial gardens like the Yuan-Ming-Yuan Imperial Garden and the Summer Palace, let alone the Purple-bamboo Garden which is well-known for its bamboo planting. In Japan, bamboo is considered divine, bamboo gardens are regarded as refined places just like stone gardens and tea gardens. Bamboo is seldom seen in traditional western gardens partly because of the lack of natural distribution of bamboo in Europe, partly because the lack of bamboo culture there. Not only can bamboo serve as artistic subject for people to appreciate, it also produces fine ecological effects by providing sunshade and blocking the wind, by reducing the noises and holding the soil on the surface, by producing oxygen and holding carbon dioxide. Thus, bamboo is by all means a suitable greening plant for ecology, tourism and economic development.

Bamboo is more widely used in modern landscape architecture. Westerners, nowadays, already show great interest in bamboo and many modern landscapes are accompanied by the appearance of bamboo. The Bamboo Garden inside Parc de la Villette designed by Alexandre Chemetoff and the Irison Garden designed by Ion Herman are just two cases in point. Thanks to the more complicated construction environment in modern cities and the more diverse demands for landscape functions as well as the inevitable changes of people's aesthetic value and living ideals, there are bound to be some changes in modern landscape concerning bamboo's meaning and its application. Thus, carrying out

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research in this respect turns out to be imperative and vital.

Part two: properly making use of the site and planting bamboo according to the surroundings

Generally speaking, bamboo is fond of high humidity, warm climate, thick, slightly acid soil with a good ventilating condition and abundant in organism. There are many different types of bamboo, each of which asks for a different living environment. Thus, it requires of us a further understanding of the biological and ecological characteristics of bamboo in order to make full use of the site. Only by doing this way can we successfully meet the various greening demands of complicated environment in modern cities. For example, *Bambusa vulgaris* var. *striata* (Lodd.) Holttum, *B. ventricosa* McClure, *B. ventricosa* McClure cv. *nana* Wen, *B. multiplex* var. *nana* Keng f. and some other grouped-growing species have a relatively poor endurance against coldness; they get harmed when the temperature falls down below zero. Therefore, they can only survive when planted in the sub-tropical zones and in the southern parts of the country. *Chimonobambusa Makino*, *clavinodum wen*, *Indocalamus Nakai*, *Pleioblastus Nakai*, *Shibataea Makino* and some other mixed-growing species can endure low temperatures ranging from  $-10^{\circ}\text{C}$  to  $-15^{\circ}\text{C}$ , which can survive under the northern sub-tropical zones climate. And, such scattered-growing species as *Phyllostachys Sieb. Zucc.*, *Indosada McClure* can endure a temperature of  $-20^{\circ}\text{C}$ ; they are able to survive even in the temperate zones and the sub-frigid zones. According to what has been discussed above, we can safely come to the conclusion that it's better to grow scattered-growing species in the North or in places that are easily stricken by cold wind, while both scattered-growing and grouped-growing species can be attended to in the South and in places with a fine microclimate.

Most species of bamboo are sun-favor plants, however, there exist some shade species too, such as *Pleioblastus difichus* Muroi et Okemura, *Sasa argenteostraitus* f. *albo-strlatus*, *Sasa fortunei*, *Shibataea chinensis* Nakai, *Shibataea lanceifolia* and so on. We can use them as greening plants on the north side of a building, on the north slope of a hill as well as under the woods. Bamboo is afraid of drowning but at the same time needs water to stand alive. In places with damp depressions, measures of transforming the ground to suit the growing conditions of the bamboo are often taken to improve bamboo woods for sightseeing. There are still some damp tolerant species like *Phyllostachys heteroclada*, *B. multiplex raeuschel* var. *lutea* Wen, *bambusa oldhami* which can grow healthily by the water side. As to saline-alkali ground, it will be better to choose species like *P. maculosa* Chao et Chou, *P. vivax* McClure, *P. iridescens*, *P. prominens* and some other saline-alkali tolerant species. The case of Shanghai Pudong International Airport which successfully resolved the problem of growing bamboo on lands of high humidity and saline-alkali reflected the effectiveness of correct seed selecting and reasonable soil improvement. Although there lacks study concerning bamboo's resistance against pollutants, the material we grasp now is sufficient to prove that different resistant abilities exist among different species. In a word, there are so many species of bamboo that as long as they are appropriately chosen and planted, they can be used to create landscape, to improve ecology, to enhance people's living standards.

Part three: Landscaping artistically and combining diversity with unity

In the traditional bamboo landscape, priority was given to bamboo's integrity and poetic imagery. However, different species and their shapes, colors and special structures which were supposed to deserve due attention have been ignored. Traditional landscaping means and manners focus on the following aspects such as building the bamboo road leading to the isolation, planting bamboo in blockage of the window, casting bamboo shadow on the white wall, arranging bamboo and stone as small garden ornaments. Some people even believe that the shadow that bamboo casts on the wall or the window is more beautiful than the bamboo itself. As a matter of fact, there are a great variety of bamboos in terms of categories and shapes. When grouped according to the underground stems, bamboo can be divided into three kinds, namely, the scattered-growing, the grouped-growing and the mixed-growing. When grouped according to the heights, we have tree-like *Phyllostachys heterocycla* var., shrub-like *Bambusa multiplex* cv., ground-cover-like *sasa fortunei* and climber-like *Drepanostachyum luodianense* and so on. When grouped according to the color of the stem, except for a majority presenting the green color, we still have *Phyllostachys vivax* f., *Phyllostachys praecox*,

Phyllostachys aureosulcata and Phyllostachys nigra, all of which are of a high artistic value. Therefore, in the modern designing activities concerning bamboo, we should not only lay emphasis on traditional poetic imagery, but also try to get to know different features of various species, to differentiate their different heights, the overall physical appearances, the colors and shapes of their stems and leaves. At the same time we should explore their peculiar identities out of their common characteristics, find out the features of every species, finally combine them according to a certain formation law so as to bring about a concealed beauty. In an open space on a modern large scale, every species of bamboo should bear a certain quantity to ensure the ideal visual effects. This is in one way or another at odds with the practice carried out in traditional Chinese gardens where small garden ornaments like flora and living creatures can be easily seen everywhere.

In the eastern part of Hangzhou Botanical Garden there locates a bamboo theme garden. Established in the year 1962, occupying an area of 6 ha, this garden embraces a variety of more than 100 different species of bamboos belonging to 16 families. The entire garden is made up of two sections, the exhibition section and the operation section. The former one is intended to make the bamboo culture generally known to the public and serve as a visiting route; the latter one is used for fostering bamboo species which in turn will provide technical references for bamboo -woods production. In the exhibition section, bamboo is classified by the physical appearances, many unusual species with rare colors and figures are planted along the road in compact community for the visitors to appreciate. Some other species with conspicuous differences are intentionally planted together to form an artificial bamboo community. Through comparison, people are supposed to find some underlying beauty which cannot be easily found in the normal situation. In order to display the beauty of nature, this bamboo garden combines water body, topography and walk paths to create scenic spots like the Bamboo Reflection on the Water Surface, the Bamboo Road Leading to Isolation and Bamboo Seas , joining together to provide tourists with a fine occasion for sightseeing and relaxation.

In the design of China Bamboo Center (located in Hangzhou, with an inner yard area of 0.2 square kilometers), it also adapted the means of creating landscape with bamboo so as to embody the nature of their study institution and to demonstrate the beauty and scientific values of bamboo. What is different from Hangzhou Botanical Garden is that it is surrounded by a great number of high buildings ,lacking a natural scent. for that reason, they chose some grand and upright phyllostachys to block some of the plots on the landscape to create a green and natural atmosphere. They have also planted some precious bamboo at some of the important knot points. Along the curbs of the rockery and the pond, some bamboo species with elegant style are planted in between each other at different heights to form a group scenery. A small amount of Prunus mume, Jasminum nudiflorum, Prunus cerasiafera Atropurpurea are arranged in the garden in order to make up for the lack of enough seasonal appearance change of the bamboo. By doing this, the main feature of the garden has been stressed while the views have been greatly amplified.

Compared with traditional Chinese gardens, bamboo landscaping in modern landscape architecture displays more spirit of diversity and originality. In designing Sydney Garden, Vladimir Sitta planted bamboo and moss within regular green belts and created a spacious, open bamboo woods by the interval array of the green belts and the ground. Inside the woods he set up a simply-shaped rectangle pond and cut the reflection in the water with two oddly-shaped stone slates. Through the contrast of regular and natural styles the vitality of bamboo was successfully embodied. As the designer of the garden inside IBM's head office, New York , Robert zion scattered bamboos in the eleven tree boxes located on the hard ground. The close skyline and the neat ground present to the tourists an elegant and comfortable recreational place. A third case is the bamboo garden inside Shanghai Central Park, which is a totally different one. The whole garden was cut into twelve chunks with white gravels, three of which were planted with Loropetalum Chinese, Ligustrum vicaryi, Ilex crenata cv. Convexa , another three were occupied by three groups of Phyllostachys, the rest being lawns. This bamboo garden boasts both occidental fascination and occidental rationality through bamboo landscaping and space distributing. Obviously, these methods of bamboo landscaping stated above have already brokenthrough the model of simply imitating nature and traditional poetic imagery. what's more, modern arts have been successfully applied to landscape design. The creativity and diversity of art forms reflect the vitality of this age, which enriches the methods

and manners of bamboo landscaping.

Part four: the Coexistence of physical appearance and the inner spirit , and artistic conception out of the scenery

In the process of bamboo appreciation, it's important to scale up to the artistic conception from the physical one. This is a process that enables the appreciating subjects to get unlimited experience from restricted domain, to trust to it their personal emotions, and to be enlightened in the meaning of life. In history, the aesthetic activities concerning bamboo were frequent and of various kinds, totaling an awesome amount all together. Taking the Book Collecting Poetry in the Tang Dynasty for instance, about 17 percent of all the poems written by 2200 poets are relative to bamboo. To sum up, however, the hymn to bamboo largely concentrates on two aspects: appreciation of its outside look and homage paid to its symbols. It has always been people's common sense that the outside look of bamboo stands for chivalry, implicitness, elegance and delicacy. When it comes to symbols, bamboo is often associated with the virtues of modesty, uprightness, strength, fortitude and integrity. Chinese classical gardens treasure artistic conception and value true disclosure of internal feelings, consequently, landscaping should involve instilling emotions to the sceneries. With the changing of times, bamboo culture is continuously developing, so it is with the innovation of bamboo landscaping. With the aggregation of globalization, people tend to see bamboo features all the more from a perspective of the cultural distinction between the east and the west. They tend to regard bamboo as a sign of mysterious orient. That's the reason why bamboo is usually planted in places where there's an intention of displaying oriental culture or creating a relative atmosphere. This means is widely adopted by many international airports in Shanghai, Hangzhou, and by the headquarters of AT&T, Tokyo YKK research center, development centers of science and technology and the patio of Beijing Xiangshan hotel. In the classic gardens created by cultured people, the example of submitting one's own will to bamboo can be found everywhere, most of which reflected the basic personality values of the traditional culture. Just as Zheng banqiao, a famous poet in the ancient times put it in his poem entitled "bamboo and stone" : the bamboo has its root deeply embedded in the rocks up the hill; no matter how hard the wind blows, it consistently sticks to its fortitude. From this poem we can see that this kind of spirit was destined to surpass its own times, and continue to be applied in modern landscape. Certainly, there are some other aesthetic values which no longer fit for the modern times with the development of the society. In traditional gardens, poetic imagery served as the key point in bamboo arrangement, while personality symbolization served as the critical point in bamboo aesthetics. However, in modern landscape, the beauty resulting from its functions has already been paid due attention to some extent. People are gradually planting bamboo according to ecological principles and recreational demands. Culture is the product of historical sediment and all the more the result of development and transformation. Culture should keep abreast with times, should reflect time characteristics and should boost the progress of the society.

Part five: Suited to tourism and usage, the harmonious integration of man and the nature

In traditional Chinese gardens, as referred to bamboo scenery, the greatest attention was paid to its landscaping forms and cultural meaning. With the prevalence and popularity of gardens in people's daily life, the functional value of bamboo is playing a more and more important role day by day. Firstly, bamboo serves well as a slope-protecting plants and is especially suitable to grow in thin-soil environment such as the roof garden and the rubbish hill; its stems underground are thin and connected to each other, which makes it able to hold the soil and resist the harsh wind. Secondly, the dense leaves of bamboo present an excellent sun shade in the summer. Thirdly, it takes no more than one growing season for bamboo to attain its final height, as a result, many bamboo species are excellent guards in blocking the unpleasant background and meanwhile, they are competent labor in producing oxygen and holding carbon dioxide. Fourthly, the tall and upright stem of bamboo is fit for hosting many kinds of outdoor activities. Last but not the least, on top of all the other benefits bamboo brings to us, it is still an essential kind of economic plant. To combine bamboo landscaping with economic and social activities is another significant feature of modern bamboo landscaping, which is bound to exert an ever-lasting influence on the cause of modern

urban landscape architecture.

#### Part six: Conclusion

With its nice figure, enormous ecological effects and refined cultural symbols, bamboo has appealed to cultured people from generation to generation in Chinese history. With the development of the society, we should continue to demonstrate traditional charisma of bamboo culture on the one hand; on the other hand, due to the transformation of modern aesthetic values and more diverse requirements concerning its functions, it needs to carry out continuous innovation in the methods and manners of landscaping, hence to serve contemporary urban environmental construction in a wider sphere. People's life is changing all the time, our knowledge about bamboo is constantly deepened and enriched. Thus, our study concerning bamboo landscaping is to be developed unremittingly with the advancing of time.

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