Arborsculpture: a promising trend in the interior gardening of buildings

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Abstract. The article is dedicated to a special form of decorative gardening - winter gardens. Their formation will allow organizing an interior private space for human recreation and meeting the need for a comfortable rest and recovery. Designing winter gardens in residential buildings, in shopping and business centers etc. creates the possibility of year-round human-nature interaction, regardless of season, weather conditions, or daytime. Landscaping of winter gardens is diverse. According to current trends, it is necessary to consider the possibility of integrating arbor sculpture objects into the general composition of winter gardens of various stylistic directions, taking into account environmental, strategic, landscape-functional, visual and aesthetic aspects. Arborsculpture is the art of forming architectural and artistic objects of tree and shrub species adapted for humane growth correction. The use of arborsculpture is possible both in open and closed spaces. However, interior operation is characterized by a shorter formation of arbor sculptural objects and is most often represented by decorative sculpture and/or functional design objects. The use of arbor sculptural objects in winter gardens will improve the ecology, increase the aesthetics of the environment, create unique design solutions, as well as contribute to a more careful, responsible attitude of citizens to wildlife elements.

1. Introduction

Winter garden is a structural recreational element of a single architectural space, inextricably linked with the functional areas of a residential, public or industrial building. Greenhouse is a type of winter gardens, where a special microclimate has been created for growing plants (often introducers), which is most often not comfortable for a person to stay. Large-scale world examples of greenhouses are: Yomiji Botanical Garden on Jeju Island (South Korea); Changi International Airport in Singapore; the large-scale reserve Ecorium Project of the National Environmental Institute of South Korea; Eden Project Botanical Gardens, Cornwall, UK; Gardens by the Bay tropical park on the shores of Marina Bay in central Singapore [1].

“Interior green areas, which are a combination of architectural space, landscape and subject design, garden art and ergonomics, have an integrated multidisciplinary nature” [2].

The most significant scientific works on the study of ways to organize winter gardens are presented by the following scientists: S.S. Veselova [3], E.S. Zimireva [4], M.V. Lazareva [5], Y.Yu. Usov [6],
N.A. Saprykina [7], T.N. Kolesnikova [8], V.A. Pavlova and A.A. Kashitsyna [9], N.V. Novika [10], E.T. Ellingsen [11], A.G. Kwok [12] and others.

The article discusses the possibility of using arborscupture objects in the landscaping of winter gardens to create a unique design code for the interior space, as well as to improve the quality and representativeness of artificially created landscapes of winter gardens. The use of arborscupture in winter gardens is a new trend in landscape architecture actively developing today. Arborscupture is the art of forming architectural and artistic objects of tree and shrub species adapted for humane growth correction. The arborscupture objects in the interior are most often represented by decorative sculpture and/or may be objects of functional design. The tradition of using arborscuptures in the interior is known in the works of the following scientists, arbor sculptors: P Cook and B Northey [13], Ezekiel Golan [14], B Gale [15], T Link [16] and others. In the prospects for the development of arborscupture in the interior is the mass cultivation of garden furniture from growing tree and shrub species (examples of arborscupture in the format of garden furniture are known from the works of the following arbor sculptors: Kirsch K., Block H.F., Hartmann H.T., Kester D.E., Geneve R.L. and Davies F.T., Boonnett N., Mr. Wu’s, Cattle C. and others)

Study objectives: consider possible ways to incorporate arborscuptures as a landscape component in building interiors. The novelty of the study lies in a new concept of landscaping and landscaping of interior spaces, in particular winter gardens, using arborscupture.

2. Theory

2.1. Spatial solutions of winter gardens
Winter gardens can be attached to the building, and “constitute an extension, a glazed veranda adjacent to the building from one or several sides,” can be integrated into the building, i.e. “Constitute a volume penetrating into the building adjacent to the building from two or three sides” [17]. The optimal size of the winter garden used in residential development is considered to be an area of 100-150 m².

2.2. Functional zoning of winter gardens
The interior space of the winter garden is most often divided into three functional zones: recreational (lounge zone), decorative (natural) and entrance. In the recreational zone (lounge zone), places are organized for contemplation and meditation, for proper relaxation and recovery; in the decorative (natural) zone, an eco-sustainable space of human interaction with nature is formed using various methods of organizing plants and other landscape elements (for example, rockeries, garden beds, etc.) to form a stylistically harmonious, integral space aimed at the construction of natural objects in art rank; in the entrance zone there is an unhindered passage to the recreation (lounge zone) and decorative (natural) zone, as well as the entrance and exit from other rooms is organized [18]. Each functional zone of the winter garden should also be considered as a space for possible communication of citizens. It is possible to organize a public, children's play zone, sacred zone, etc.

2.3. Stylistic design of winter gardens
The stylistic design of the winter garden can be different: landscape and regular, take on ethno-style - Japanese, Chinese garden, etc.

In general, one can note the fundamental differences between the eastern and western models of landscaping, associated primarily with the traditions of park building, as landscaping in Asia largely depends on the teachings of Feng Shui (especially in China), and is implemented in accordance with Chinese traditional philosophy in more natural and landscape stylistics, while in European garden compositions more regular stylistics is noted, more attention is paid to contrast and harmony, stability and proportions, the interior elenenie thus occupies large areas [2].

The design of the winter garden can be based on modern garden styles: hi-tech, naturgarden, etc. High-tech allows one to realize many bold ideas in the interior space, mostly related to the use of
glass, metal and plastic in organizing the subject-spatial environment of the winter garden. It involves intensive work with black and white design space. Naturgarden, as a style of a winter garden, on the contrary, focuses on the elements of landscaping, is distinguished by a careful selection of plants according to the ecological passport and allelopathy. The colors that are most often found in nature emphasize this style - green, brown, etc., and their shades. Much attention is paid to the decorative component of mixborders and groups of tree-shrub species. Due to the specifics of modern culture, the stylistic design of interiors is not only preserved, but also integrated in the interests of their development.

Depending on its shape and purpose, arborsculpture can organically fit both in landscape style and high-tech style. For example, the curvilinear shapes of trees in the sculptural composition of an arborsculpture can complement the landscape style of the winter garden, and vice versa, an arborsculpture in the format of functional design elements with a complex organization of shape and the inclusion of glass or mirror in the overall composition will emphasize the hi-tech style.

2.4. Landscaping of winter gardens

The assortment of plants for conservatories includes: beautifully flowering herbaceous plants (including bulbs) for flower arrangements; curly and ampelous for vertical gardening; evergreens to create the background and succulents for compositions with stone. It is recommended to combine plants of different sizes, differing in habitus and shape of the crown, leaf color, etc. [19].

To expand the arsenal of tools for interior gardening, it is proposed to use objects of arborsculpture - these are unique design solutions from growing tree-shrub species. The technical component of the formation of objects of arborsculpture in interiors is as follows. It is paramount necessary to decide on the design project of the arborsculpture, so that the environmental object harmoniously blends in with the styling of the interior gardening, and focuses on the overall composition of the garden. The most suitable option may be a sculpture of tree-shrub species. After a retrospective analysis of the formation of objects of arborsculpture, we can consider several original options for the formation. The first option is that the grown sculpture from plants can grow directly in the ground, for this they often use ordinary bird cherry, berry apple, felt cherry, maple ash “golden”, etc., while this composition from tree and shrub species will differ static in space, but at the same time it is possible to organize dominant sculptural compositions (Figure 1). The second option involves the landing of objects of arborsculpture in flowerpots, flowerpots, flower pots, etc., for this option indoor plants are used, such as: dracaena, dear, fragrant, etc.; codium of Peter; ficus of Benjamin, Benedict and others, wax plant; rhomboid treebine and others [20], and in this case one can change the location of this flowerpot, thereby the space becomes more dynamic, can be played differently every season of the year (Figure 2).

One of the interesting options could be the formation of elements of functional design from objects of arborsculpture, in particular, it can be coffee tables made of ficus, holders for umbrellas, etc. Thus, the Ezekiel Golan arbor sculptor of the Yale Stav are the founders of plantware company from Tel
Aviv (Israel) possesses more than ten patented technologies for creating “interior items” of ficuses (Figure 3).

After coordinating the design decisions of the arborsculpture, it is necessary to determine the method of growing the shape of this type of object. The first method consists in the formation of arborsculpture objects directly in the place of growth of woody plants (soil and/or in a flowerpot); the second method involves the cultivation of the form of arborsculpture in special nurseries for plants with subsequent transplantation to the place of further growth (soil and/or in a flowerpot). To summarize, it should be noted that if indoor plants, the most preferred option is the formation of objects of arborsculpture in the place of their growth (soil and/or in a pot), if these are large trees and/or shrubs, then the most effective option to reduce the formation time will be preliminary cultivation of the shape of arborsculptures in specialized plant nurseries. The duration of growing arborsculptures depends on the type of plant, the complexity of organizing various architectural and artistic forms, the method of formation, etc., and ranges from one to 4 years when forming arborsculptures from indoor plants, and 8-10 years (less often 15-40 years) when cultivation of complex objects from shrubs and trees, for example, such as: decorative sculpture or garden furniture (small architectural forms).

2.5. Compositional solutions of winter gardens
Arborsculpture as an original landscape component of the winter garden should be placed in the center of the composition, if it is a sculpture of large dimensions, while taking into account the possibility of its perception in the interior space, co-scale with other elements of the environment. Arborsculpture can be organized parallel to the composition axes, for example, planting arborsculpture objects of similar shapes in flowerpots to create a rhythmic and dynamic environment. When placing it is important to take into account the preferences of plants for insolation and humidity and place them in such a way as to create the most favorable conditions for growth.

“Vegetation can give discreteness to space, separating functionally interconnected volumes by“ pauses “in the form of groups of trees or green surfaces, structures the space, delimiting its static and dynamic parts, and also emphasizing important fragments” [quot.: 21].

3. Findings
The following methods were identified for integrating arborsculpture objects in winter gardens: the first method is to use arborsculpture objects as a decorative sculpture (used often enough); the second - elements of functional design (rarely used); the third - in the format of garden furniture (it is used extremely rarely). Moreover, the mold can be grown directly at the place of operation (soil and/or flowerpot), or in specialized nurseries for plants with subsequent transplantation to the place of use (soil and/or flowerpot). The choice of method depends on the type of plant, on the complexity of the architectural and artistic forms of arborsculpture, as well as on the location in the compositional plan.
of the winter garden. The method of growing arborescences affects the timing of formation, and varies from year to 10 (less often up to 40 years).

Integration of arborescences objects into interior gardening will allow:

**Finding One**: get original design solutions coupled with sustainable development of landscapes, increase visual comfort in the interior and improve the microclimate.

**Finding Two**: lay the foundations of environmental education for citizens.

**Finding Three**: expand the range of use of wood and shrub species for the formation of objects of arborescences, and as a result, one can reduce the growing time, because for example, exotic plants have high flexibility and high growth rates, which allows faster formation of arborescences. The choice of plant type will depend on the microclimatic conditions of the place of growth: temperature and humidity conditions, soil composition, area and dimensions of the room, lighting (natural and artificial), as well as on the characteristics of plants: habitus, adaptability to possible shaping (to correct plant growth) and allelopathy with other plants.

4. Conclusion
The art of arborescences is today a relevant direction in the modern architectural environment, coupled with the sustainable development of landscapes.

The accumulated historical experience of the art of arborescences brings into the practice of landscape designing trends in global environmental education, which make it possible to outline worldview guidelines that do not oppose man to nature.

The success of using arborescences in conservatories opens up prospects for the widespread use of these plants in the design of conservatories, and in particular greenhouses.

Arborescences create unique objects of the natural environment and design decisions in the spatial area of a person, thereby forming a new attitude towards design works based on the natural forms of nature itself.

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