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### Harmony of Architecture with Nature

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#### Abstract

The world of plants has its own characteristics, they grow, develop. It is known that some trees live for many years, give us oxygen and serve as an excellent material for construction. At the same time, without destroying trees and shrubs, it is possible to create a lot of interesting and useful things, in addition to household items – furniture. Such an action is carried out in the form of forming and grafting trees, and this is called arbo architecture, the art of arbo. Aspects such as environmental friendliness, naturalness of material and decoration are the advantages of arbo architecture.

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Architecture directly related to nature is called arbo architecture (from the Latin arbor- tree) or botanical architecture. This is a relatively new direction in the field of architecture, offering to use "live" plants as a basis for building structures [6]. Interestingly, it is not necessary to obtain a special permit for the construction of such unusual architectural objects. Over the past few years, this style has become very popular in Germany, and more than 10,000 examples of arbo architecture and arbo art have been created in this country. In particular, young architects from the University of Modern Architecture and Design in Stuttgart, Germany: Ferdinand Ludwig, Oliver Stors and Hannes Schwertfeger founded the Baubotanic research group. Their main goal was to build houses out of growing trees. One of his early projects is an object in the form of a tower "Baubotanic Tower" (Fig. 1) [10].



***Fig.1. "Baubotanic Tower"***

Such buildings are created without the help of any techniques and machines, without waste, without noise. Simple carpentry is carried out with the help of tools, using human manual labor and is a great place for communication, living alone, for creativity and relaxation. According to the young German architect F.Ludwig: "I feel that trees do not want to be walls, but even in this case, after much deduction and reflection, we will adapt them to a certain shape" [1].

German researchers found that the key to creating "living" buildings was the method of grafting known to gardeners, which allowed forming a single organism from several individual plants. They claim that arbo-art (arbosculture) was the impetus for the emergence of the architectural direction, since there was arbo-art that preceded this direction. Scientists from the Massachusetts Institute of Technology: Mitchell Joachim, Lara Greden and Javier Carbona also did not build a small residential building outside the city, but, on the contrary, planted it (Fig. 2) [2].



***Fig.2. (Mitchell Joachim) Small building project using a tree***

According to scientists, the creation of a "living" house begins with planting trees. As the trees grow, the creators unite to join the branches together and give them a certain shape. As a result, the branches that grow from each other are repeatedly twisted, forming a visible shape. This style is also known in landscape art as a way to create bright walls and mosses. In order for the trees to form the desired shape and integral composition, metal pipes are used as frames, while the process of their growth is carefully controlled. This process also mentions topiary, bonsai and "land art" in landscape design.

Today, in many cases, the concept of arbo-art ("arbosculture") refers to one of the ways of forming a shape using tree trunks. The art of Arbo was proposed by the American Richard Reims in 1995 . His views on this are set out in "How to grow a chair: topiary art for a tree trunk" and "arbo art: solutions for a small planet" [3]. The most important feature of arbo art is that with this method you can make changes not with the help of buds, but with the help of the trunk of the tree and its main branches. Arbo art differs from topiary and bonsai art not only in its decorative aspect, but also in the fact that it can have a functional purpose. At this stage, you need to reflect a little on the story.

The first "swallows" of Arbosculture were American entrepreneurs John Krabsak and Axel Erlandson. In 1903, in the U.S. state of Wisconsin, John Krabsak began growing a saddle-shaped shrub in the body of several species of American maple (Fig. 3). This process took eleven years. By that time, in 1915, this wonderful piece of furniture was exhibited at the international exhibition in San Francisco, at which he achieved great success.



***Fig.3. Axel Erlandson., wooden chair***

Arbo art today is an important trend in the modern architectural environment associated with the sustainable development of landscape design. Thousands of arbo art objects are created in the world every year [4]. This kind of art is still new and has not been tested enough. However, today the need to improve the environmental situation in cities is an urgent problem. In this regard, according to the principles of landscaping of building areas, the need for integration of small architectural forms is becoming more and more obvious. To create an example of arbor art, the basic principle of operation is to firmly fix the branches of various trees on the frame to give the desired shape. Combining the bodies of different trees together is a much more difficult task. Therefore, the principle of grafting is used here. The trunks are cleaned of bark and bound together with a special material. Until they get stronger and can not hold their shape, they are immediately attached to the carcass and stored in this form for a year or two.

Modern designers offer to make an arbo art object on a special bioplastic frame. As "experimental" trees, a fast-growing willow is used, which can grow up to 2 meters in a year. This easily solves the main problem of arbo art, which will last a long time. According to the authors of a Dutch project called "Tree", such trees can be given any shape, such as a circle or similar geometric shapes [5].

In America there is a special park called the "Circus of Trees", which consists of such wonderful trees. In 1947, the park, founded by Erlandson, by that time had become the pride of California. Millions of tourists come here every year from different parts of the world.

Although this kind of art is not developing in Uzbekistan, today Western designers grow chairs, stools, rocking chairs, tables, clothes hangers and various household items with the help of trees. All of them are unique design products and a special interior decor. Each such item is considered an irreplaceable unique item. They have been produced for several years and, therefore, are of great importance and

value. Of course, no one goes to buy such a thing, but any specialist in this field can try to create such items that he needs to create an attractive arbo art on his site.

We can also conclude that the creation of such objects is a logical continuation and development of the methods that ancient people used to build their huts. In addition, in the process of studying and researching the above types of art, the following trends were identified: the first is the development of arbo architecture as landscape art; the second is the use of Land Art experience in landscape design; the third is the development of land art as a component of various levels of training and the following, the solution of some problems in the field of ecology of the environment with the help of this art.

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