Site selection of ecological buildings from the perspective of Chinese geomantic omen

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Abstract. Geomantic theory is a natural science integrating geophysics, hydrogeology, astrology, meteorology, environmental landscape science, architecture, ecology, and human life information science. Its purpose is to carefully examine and understand the natural environment, to use and transform the nature, to create a good living environment, to win the best time, place, and people, to achieve the perfect realm of the unity of nature and man. In today's rapid economic development and social progress, how to effectively combine architectural geomantic omen with contemporary architectural design is the concrete embodiment of modern geomantic omen culture keeping pace with The Times, and is also an important subject faced by Chinese traditional culture to benefit contemporary people and promote economic development. This paper combines Chinese geomantic omen with modern architecture and discusses the site selection of modern architecture under the guidance of geomantic omen based on the current ecological environment construction. This paper studies the site selection of ecological buildings under the guidance of geomantic omen, which provides a new idea for the application of ancient geomantic omen in the future site selection of buildings. To treat Chinese geomantic culture correctly, Chinese architecture, as the carrier of Chinese culture, should inherit critically, explore its scientific essence, and use the past for the present or use it with a little modification. This paper attempts to learn from the traditional Chinese geomantic concepts, such as wind, air, sunshine, water, and so on, and apply them to the current ecological building site selection. According to the natural environment analysis, starting from the current actual environment, applying ancient geomantic in modern construction site, adjust measures to local conditions, such as mountain gives a new meaning, while retaining the maximum illumination area, environment, plant more traditional geomantic meaning, create more appropriate, good living environment, also accord with the demand of the national ecological construction. In this paper, the attitude of advancing with The Times to look at geomancy, let geomancy theory towards the direction of the development of the real society, which is the contemporary people to study geomancy, promote geomancy theory, use geomantic omen for the benefit of modern architecture of the main task.

1 Introduction

“The core content of geomantic omen is the selection and treatment of people's living environment, and is committed to selecting the topographic conditions that are both physically and psychologically satisfactory to human beings.” [1] Some arguments even claim that “the Geomantic Omen is the ancient Chinese art of location selection and layout.” [2]. Traditional buildings are inefficient in energy use, which leads to pollution in the city. Although the construction waste generated by traditional construction is increasing year by year and brings a series of environmental problems. The environmental impact of construction waste undoubtedly undermines the harmonious development of habitat and urban ecology.
Table 1 Some of the old buildings in northern China city A and B of the southern city demolition waste and construction waste consisting of relatively new buildings. [3]

| Ingredient                  | Old building demolition waste | New building demolition waste |
|-----------------------------|-------------------------------|-------------------------------|
|                             | City A in Northern China      | City B in Northern China      | City A in Northern China | City B in Northern China |
| Concrete                    | 32.0                          | 54.21                         | 20.7                     | 18.42                     |
| Masonry, ceramics           | 40.5                          | 18.11                         | 46.5                     | 28.87                     |
| Slag, slurry                | 11.0                          | 13.35                         | 15.6                     | 32.25                     |
| Wood                        | 6.1                           | 7.46                          | 4.6                      | 10.95                     |
| Metal                       | 3.4                           | 3.41                          | 2.5                      | 4.36                      |
| Glass                       | 1.1                           | 0.2                           | 0.2                      | 0.56                      |
| Plastic                     | 0.6                           | 0.61                          | 0.3                      | 1.13                      |
| Other                       | 5.3                           | 2.65                          | 9.6                      | 3.46                      |
| Total                       | 100                           | 100                           | 100                      | 100                       |

As can be seen from the graph, China's construction waste consists mainly of concrete, masonry, ceramics, slag, and mortar. These are all unsustainable environmental pollutants. The reason for the use of these materials is often due to site selection. "In the context of the deteriorating environment, ecological architecture with the concept of sustainable development has attracted profound attention." [1]. The concept of the ecological building is beneficial to ecology, health, energy-saving, convenient work, and life, which shares much common ground with geomantic omen. By putting forward new requirements for architectural design and site selection, the concept of ecological architecture is committed to maintaining ecological balance, that is, "to make the building itself and the surrounding natural ecological environment produce an interdependence and mutual coordination mode" [1]. Thus, a building environment with high efficiency, low consumption, no waste, and no pollution is constructed. Therefore, this study believes that the core appeal of geomantic omen and the concept of the ecological building are two similar concepts to some extent. Some scholars claim that "Historically, China has attached great importance to the conservation of resources and the beauty of the environment. Its houses, villages, and cities are designed in a unique style that is in harmony with and evolves with nature." [4]. The connection between Geomantic Omen and the theory of ecological buildings can be seen where both of them try to find a mode that enables human beings to live in harmony with nature. By studying the practice and effect of traditional Chinese geomantic omen theory in the current site selection of ecological buildings, as well as analyzing its influencing factors and main motives, it is available to seek the feasibility of the balance between Chinese geomantic omen and ecological buildings and provide a potential new path for future environmental protection. This paper will try to analyze and present the guidance and help of traditional Chinese geomantic omen for the site selection of ecological buildings from multiple perspectives. Geomantic omen can provide more perspective and opinion on site selection in terms of water resources, solar lighting, and wind direction.

2 Methodology

The ecological building is increasingly popular as one of the architecture types in a few years, it mainly explores the relationship between architecture to human beings and the natural environment. The purpose of ecological architecture is to provide the most suitable, reasonable, and sustainable environment for the development of human beings. The design of sustainable development principles requires comprehensive consideration of the utilization efficiency of resources and energy, the impact on health, and the selection of materials. The ecological view, the view of organic integration, the view of region and place, and the view of returning to nature in ecological architecture are all part of the construction of sustainable architecture theory and an important part of environmental value. Some research shows that when designing ecological buildings, most of the architects have considered and used various features that are integrated with the natural environment, such as building site selection, lighting utilization rate, circulation system, and wind direction so that they have achieved more efficient resource utilization and a better environmental experience for consumers. In many ecological buildings, architects have conducted a series of research and treatment on energy-saving systems, carbon emissions, lighting effects, and rainwater collection, which have become important considerations in architectural design. therefore, while people explore the method to construct better ecological buildings, they also pay attention to the requirements and application effects of the building environment in geomantic omen. In the research of geomantic omen, the concepts of "collecting wind and gas" and "harmony of the sky, earth, and human beings" are exactly similar and matched with the concept of ecological architecture. Thus, people are paying more and more attention to the relationship between geomantic omen and ecological architecture, and apply all of the concepts in architectural design.

3 The Element of Water

Ecological architecture explores the relationship between
humans, architecture, and nature. It aims to create the most suitable, reasonable, and sustainable environment for human development. The design of the principle of sustainable development needs to comprehensively consider the use efficiency of resources and energy, the impact on health, the choice of materials, and other aspects that meet the principles of sustainable development. The ecological view, organic combination view, regional and local view, return to nature view, and so on in ecological architecture are all part of the theoretical construction of sustainable development architecture and an important part of environmental values. Referencing the principles of geomancy, it provides several requirements for the site selection of ecological buildings.

Geomantic omen as the cultural heritage in China for thousands of years plays a significant role in architecture design and concept. Geomatic omen, in the basic context of geomantic omen, according to its natural characteristics, uses “relying on the mountains and the water, bearing the Tin and the Yang” as the central theme, thus, there are some conventional and rigid requirements of water using in the architecture [5].

On one hand, the outlet of water is a getaway paradise in geomantic omen [6]. In tradition, the assembly point of water can gather a larger amount of gas which is beneficial for people’s fortune of earning money bringing a prosperous and enjoyable life. Thus, the assembly point of water is an important feature in conventional significance. In traditional Chinese architecture, people mostly gather water in the form of waterfalls, to achieve the traditional meaning of wealth. In the field of ecological architecture design, adding the facility of water is beneficial to the circulation of the whole environment. In modern society nowadays, because of the architecture plurality, architects will more concentrate on the ecological cycle of architecture and its profound implication behind it. In the architecture of Jewel Changi Airport, the architect used a dome-shaped thin-shell structure glass roof, the center is recessed downward to form a rain vortex, and a waterfall as an outlet so that the water can gather together in the center of the airport, which used one of the features in geomatic omen and brings the fortune for the airport. Furthermore, the architect had a better environmental design by using the sun, plants, and water flow, which gives a better air circulation of the entire airport. While developing the interest and appreciation of the environment, the architect designs a better environment.

On the other hand, there is another significant factor in geomantic omen which is the speed of water flow. Traditionally speaking, the water flow should be slow, it should not be rushing and the sound won’t be roaring. [7] From the perspective of people, if the water flow runs directly may lead to the influence of not only road rushing but also anti-bow road, which may bring the bad effect of the fortune of both people and building. Therefore, the slow speed water flow not only can avoid the evil spirits, but also stabilize people’s psychology, which means the facility can affect comforting people. In many conventional Chinese architectures, we can see the water flowing slowly close to or behind the building. For instance, the region of the south-east side of China always has the bridge and brook nearby the house. “In Jewel Changi Airport, architect design multiple water-flows through constructing a lot of steps, which can soothe humanity and stabilize emotions for people when they go through this busy and fast-paced airport. At the same time, this kind of water recycling can not only save natural resources but also have better protection of the natural environment.

4 Wind Accumulation

This section mainly discusses the relationship between wind accumulation in traditional feng shui and building site selection. Traditional feng shui does not seem to thrive in modern times, but it has always been in line with the highest architectural planning environment we're looking for, and like a watery villa, Master Wright used his work to give the world an answer, and in his view, people should build houses with animal instincts like sparrows or bees nesting. It is also strongly emphasized that buildings should spread and cling to the earth like natural creatures that grow on the ground. In Wright's own words: "Architecture is a sense of unity in the surrounding environment, making the house part of its location." This emphasizes the relationship between architecture and nature, architecture should be integrated with nature, live in harmony, and from feng shui, is a reasonable way of building site selection, so it explains the need to study the location of buildings under feng shui. In the Book of Burials, there is the word "angry", the so-called angry, is yin and yang.[8] Fighting each other to a certain extent rises to the cloud. The anger in the sky met the cold anger of the outside world, and it fell into the rain. So, the wind, clouds, and rain are all made up of angry changes. In general, yin and yang, which develop and change in the earth, is called anger.

The ancients thought that the "Geomantic omen" structure of Shelter was the most ideal to explain, in the Book of Burials, there is the word "angry", the so-called angry is yin and yang [8] This yin and yang inside and outside the struggle between each other to a certain extent, on the overflow, by the external role and diffusion of the wind. In the "Yang House Ten Books" has a detailed description: Where the house left has running water, the meaning of the qinglong; [9] From the perspective of modern urban construction also need to consider the natural geographical conditions and ecosystem of the whole region, each region has its specific tectonic climate vegetation and hydrological conditions, only when the region's various integrated natural geographical elements coordinate with each other, complement each other, will be the whole environment of the "gas" smooth, lively and full of vitality, to create an ideal feng shui treasure land a good living environment. According to the article on The Ecological Interpretation of Traditional Architectural Geomantic omen and its Practices, for cities without mountains or rivers, the dragon, sand, water, and cave in geomantic omen are applied with new metaphors. For example, considering buildings as overlapping peaks and crisscrossing roads as rivers, it is the most direct and close relationship between urban residents and surrounding
5 Sun-Lighting

An important consideration in the site selection of an ecological building is the area's exposure to light. The site selection in Geomantic omen also has extremely strict requirements for sunlight. This ancient requirement is backed up by science. In geomantic omen, areas with high winds and insufficient sunlight are considered terrible places for a living [7]. It is generally believed that areas facing the south are excellent places for site selection [10]. This concept is based on actual observations of the movement of the sun in China. The sun rises in the east, passes through the south, and finally sets in the west. This pattern makes Geomantic Omen promote south-facing areas as prime sites for a living. Because such a place can get as much light from the sun as possible every day. For example, the Forbidden City, one of China's world-famous ancient architectural complexes, follows a south-facing architectural pattern. The main reason for this was the ancient need for warmth, and facing the sun maximized access to sunlight and kept the building's interior at room temperature. This also has a certain significance in the site selection of ecological buildings. Sunlight can provide enough light energy for plants to photosynthesize and promote the natural growth of plants. The importance of plants in ecological architecture is irreplaceable. Only enough sunlight will allow the growth of plants and ensure that the plants can absorb carbon dioxide and protect the environment from pollution.

Solar power can use sunlight as energy. Electric energy belongs to clean and sustainable energy. There is enough light to ensure a steady supply of electricity for the buildings. Sunlight kills harmful bacteria, creates a cleaner living environment for humans, and reduces the risk of disease for the occupants of the site. All these demonstrate the importance and indispensability of sufficient sunlight for the site selection of an ecological building. Taken together, these benefits brought by sunlight are essential for a successful eco-building site selection. Ensuring that the site gets the right amount of light is crucial. It can be seen that there are scientific explanations and reasons for the good location considered through geomantic science to build energy-save buildings. Although Geomantic omen, a traditional Chinese ecological site selection system, has existed for a long time, many of its concepts are still applicable today. The core content of geomantic omen is a kind of knowledge that people choose and deal within the living environment. "Geomantic omen pursues the coordination and cooperation between humans and nature rather than the opposition of each other." [11] The theory of geomantic omen is more inclined to adapt to nature rather than transform it. This point also coincides with ecological protection nowadays. In the increasingly deteriorating ecological environment, geomantic theory of site selection in light aspects can be better associated with the site selection of ecological buildings. Since the birthplace and practice of geomantic omen theory are both in China, it means that the ecological building site selection theory associated with geomantic omen is more suitable for the geographical characteristics of China. When it comes to the site selection of ecological buildings, more consideration should be given to the orientation of ecological buildings to the south, obtaining more sunlight. The theory of the Geomantic omen needs to be developed flexibly, rather than blindly following it, when choosing a site. It is important to remember that the Geomantic omen recommends buildings to face south to get more sunlight. So, getting more time and quality of sunlight is the primary goal. If the south side of the building has high terrain to block out the sun, this is obviously not an option to get full sun exposure. It is not suitable as an ecological building site.

6 Conclusion

This paper describes the application of geomantic omen to building site selection from three aspects. First, the point of concentration of water has traditionally been an important feature. The addition of water facilities is conducive to the circulation of the whole environment and better air circulation. In the application of water, the paper also pays attention to the velocity of water, pointing out that the velocity of water should be slow, not rapid. This can not only relieve your mood but also save water resources and protect the environment. Second, there should be air circulation in the building. Only when the comprehensive geographical elements of the region are coordinated and complement each other, can the airflow of the whole environment be smooth, lively, and full of vitality, thus creating an ideal living environment of Geomantic omen Treasure Area. But in today's society, the circulation of gas without natural mountains and water will be feng shui in the wind, gas has a new metaphor, also can receive good results. Third, we looked at the analysis of the lighting in feng shui for the site selection of the building and concluded that the south-facing area was the best site selection. The Forbidden City was cited as an example to illustrate this point. Secondly, the lighting in the building can also promote the growth of plants, providing a good natural environment for the building. Through the study of these aspects, it is of great significance to explore the application significance of geomantic omen in the site selection of contemporary buildings and to seek the feasibility between geomantic omen and ecological buildings.

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