

***Cultural Sustainability of China: The Relationship of the “Geomantic Omen”
and Microclimate***

Juntong Cui, Southeast University, China

The Asian Conference on Asian Studies 2019
Official Conference Proceedings

Abstract

Sustainability is understood to be one of the most important solution to environmental issues. Adjusting the microclimate elements around the building to ultimately achieve the building's own energy consumption is an important method for green building implementation. The aim of this study is to analyze the theory and methods of ancient people's regulation in the microclimate field through the study of the theoretical content of "Geomantic Omen", and then make a more valuable reference for modern microclimate regulation. This is a quantitative study whose methodology is based on theoretical analysis and experimental comparisons. The discussion part mainly includes comparison, analysis, and general discussion of the correlation between "Geomantic Omen" and modern microclimate theory. In the end, taking Ji'an Village, Jiangxi Province, China as an example to discuss the relationship between them. This research depicts that the traditional theory of "Geomantic Omen" has many inspiring significances for modern ecological architecture, especially in microclimate regulation.

Keywords: Sustainability, "Geomantic Omen", Microclimate, Ji'an ancient Village

iafor

The International Academic Forum
www.iafor.org

Introduction

As a hot topic today, the concept of sustainable development goes deep into all areas. As a building area that consumes a lot of resources, it has also been paying attention to the topic of sustainability, which has led to the concept of green building to measure the sustainability of buildings. In the process of continuous construction and experimentation, we find that the concept of green building promotes the harmonious development of man and nature coincides with the concept of “harmony between man and nature” advocated by “Geomantic Omen” in Chinese traditional culture. This can not help but let us begin to re-recognize the traditional Chinese architecture Geomantic Omen.

In fact, China's traditional architecture has a long history of Geomantic Omen, and it has formed three theoretical tools of ancient Chinese architecture with ancient construction studies and gardening studies. Ancient construction studies and gardening studies are similar to architectural design and garden design in the modern architectural theory system. The traditional Chinese architecture Geomantic Omen is similar to the modern urban planning and architectural monolithic design. The planning of the outdoor venue, the consideration of the architectural shape and the interior decoration have been considered and summarized. From the planning and construction of the Imperial Palace and the Imperial Tomb, to the construction of ordinary villages and houses, the traditional theory of Geomantic Omen is involved. However, due to the lack of scientific and rigorous theoretical basis, the vast theoretical system is the observation and summary of natural phenomena. In addition, the researchers are mixed and selfish, and the personal will of the ruler is also reflected in it, making the whole theory overshadowed by the color of superstition. Therefore, since the founding of New China, this theory has ceased to prevail. Nowadays, with the development of social economy and the liberation of people's minds, scholars believe that one-sided negation or one-sided affirmation does not conform to the scientific and rigorous research spirit. The exploration of the rationality of Geomantic Omen theory has also been carried out.

In modern architectural design, sustainable building is generally defined as “a development model that can satisfy our generation without threatening the ability of future generations to meet their own needs.” The most basic feature is to use or use natural resources or energy to prevent pollution (United Nations Conference on Environment and Development,1992). The suitability of climate is greatly guided by human behavior. As we all know, the distribution of climate has its natural laws, and it is not transferred by human will. We cannot change the overall climate. Therefore, people gradually turn to the study of microclimate. A suitable microclimate can greatly guide people from indoors to outdoors, thus achieving the goal of reducing energy consumption.

Architectural design aims to change the microclimate by utilizing ecological factors such as topography, wind, water, and plants in the environment to create a comfortable living space. The choice and adjustment of the site's ecological factors, that is, the perception of the comfort of the site, is exactly the same as the impact of the site's Geomantic Omen on the microclimate.

Basic theoretical research

Chinese traditional architecture Geomantic Omen

Today, it is said that Geomantic Omen is generally said to have been from the ancient book "The Funeral" by Guo Pu of the Jin Dynasty. (Fig 1.) Before this book, Geomantic Omen was mainly a comprehensive evaluation of various architectural elements such as climate, geology and ecology when the ancients chose the construction site. It originated from the early choice of human settlement, formed in the Han and Jin Dynasties, matured in the Tang and Song Dynasties (Fig 2.), and perfected in the Ming and Qing Dynasties. There are two broad categories of Geomantic Omen theory, one focusing on living people and the other focusing on the dead.

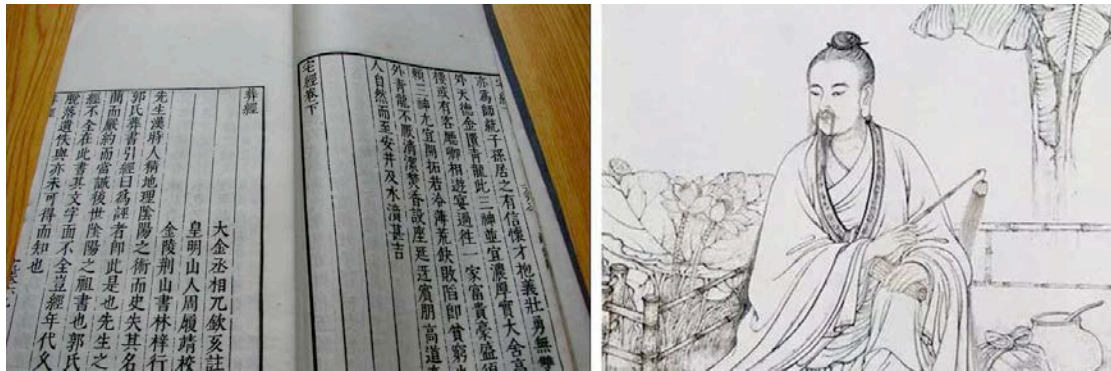


Figure 1: "The Funeral" by Guo Pu.



Figure 2: Yang Junsong of the Tang Dynasty made it mature.

Since ancient times, our ancestors have chosen to settle down as a top priority for living and working, and the experience accumulated in this kind of thing has formed a site-based learning-phase technique. As a kind of related knowledge, most of its theories and methods are derived from the observation and application of natural conditions such as geography, climate and environment, and its scientific components are many. With the development of the ancient economy, people who had left the war began to pay attention to the post-mortem environment. Influenced by the saying that "the death is like a matter of life," Geomantic Omen theory gradually affects the tombs. As people integrate traditional Geomantic Omen theory with factors such as the five elements of gossip, their superstitious colors are more and more intense. (Fig 3.)

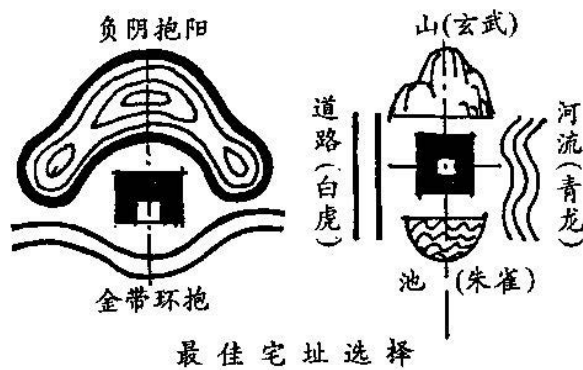


Figure 3: The form of “The Best area” in Geomantic Omen theory

Compared with the theory of the dead, in the theory related to living people, the experience summarization and application of site selection is still not outdated. Its adjustment and change of ecological factors in the environment is strikingly similar to the current method of creating a comfortable microclimate environment. Therefore, this article will focus on a part of the theory of living people in traditional Geomantic Omen.

Microclimate theory

With the influence of humanized design in modern architectural design, more and more designers turn the focus of the design from indoor to outdoor. One of the important means is to guide users through a variety of activities by creating a suitable external environment.

The urban climate, like all other climates, is the result of a cumulative accumulation of statistics on many weather conditions in a place, and any local condition is controlled by large-scale weather patterns. The interaction between large scale and microclimate is constantly changing. Sometimes large-scale climate dominates, and sometimes microclimate can exert its own advantages. Under normal circumstances, if there is rain, cloudy or windy weather, the microclimate is not obvious or even exists at this time; in sunny and windless conditions, the microclimate phenomenon is very obvious. Therefore, when studying urban microclimate characteristics, the main influencing factors can be roughly reduced into four types: solar radiation, temperature, humidity and wind speed.

The factors affecting the microclimate are adjusted. The means is to repair the surrounding environment of the building. The terrain, water and vegetation are all adjusted targets. (Fig 4.)

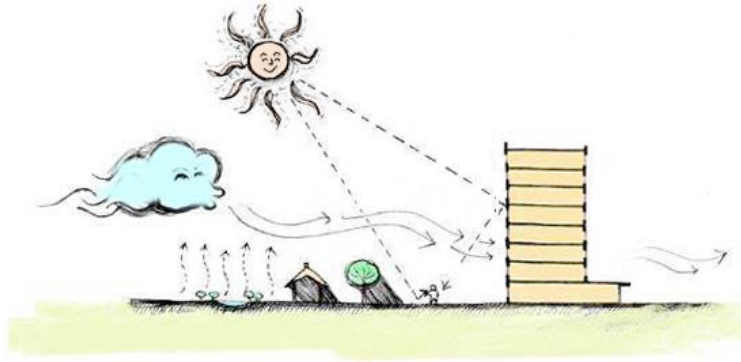


Figure 4: Brief diagram of microclimate theory elements.

Methodology

Control variates

One of the most commonly used methods in scientific experiments. A single variable is changed to test the effect of this variable on the overall effect. By changing one of the factors affecting the microclimate, we can observe the environmental changes of the “Best area” in Geomantic Omen theory.

Data simulation

The difficulty of retrofitting the field is not only time-consuming and labor-intensive, but also requires a large amount of capital investment. On the contrary, through software simulation, not only can it be modified at will, but its accuracy is also recognized by its peers. Therefore, the wind environment simulation of the site selection of ancient villages is used to obtain more accurate scientific data.

Field research

Through the field investigation of the ancient villages, especially the site selection of the village, the water environment and the surrounding topography, combined with the scene photos, objectively analyze the surrounding Geomantic Omen environment.

Case study

Case selection

The selection of cases in this paper is locked in Jiangxi Province, China. The Jiangxi region has a long history, beautiful mountains, deep cultural deposits, humid and warm climate, and abundant products. The specific reasons for choosing this place are as follows:

1. Jiangxi Province is one of the birthplaces of Geomantic Omen theory. The region has many mountains and waters, and the wind and soil are warm, which makes the theory of Geomantic Omen very popular. Many traditional construction methods have been preserved.
2. Jiangxi Province has more ancient villages. The terrain in the area is complex and the damage during the war is relatively small. The ancient villages are relatively intact.
3. The ancient village has not been overexploited. Compared with other neighboring provinces, the ancient villages in Jiangxi Province are mainly residential and have not been overexploited as tourist attractions, especially the ancient village of Ji’an (Fig

5.). This has greatly helped this study. You can get the most out of the traditional Geomantic Omen theory.



Figure 5: Ancient village.

Analysis around the Mei'bei village

There are many villages in Ji'an Ancient Village. The article selects the most representative village, Mei'bei village, as an example. Mei'bei ancient village is located on the west bank of the Minjiang River tributary in Qingyuan District, Ji'an village, Jiangxi Province. The ancient village is closely connected with the surrounding counties and cities. There are mountains in the northwest of the ancient village, the Fushui River in the east and the rolling hills in the south. It is located in a flat land. The village is a street-style layout of Lifang. The roadway is vertical and horizontal, focusing on Geomantic Omen. There are 28 villages in the village. The pond symbolizes the twenty-eight stars in the sky. According to the traditional building Geomantic Omen, there is a mountain in the north, which can effectively weaken the invasion of the northwest wind in winter. There is water in the east, so that the hot air in the southeast direction is cooled by the water body and turned into a comfortable gas. There is a continuous mountain in the distance between the west and the south, which makes the whole site fully enclosed and meets the defensive needs. It belongs to a better geographical location in traditional Geomantic Omen. (Fig 6.)



Figure 6: Analysis around the village.

In the overall planning of the village, “water” occupies a very important part. The water system mainly includes the naturally formed water-rich river, the Lishui River and the artificially constructed ponds and wells. Fushui River is located in the east of the village and is an important way of trade transportation at the time. The Qinshui River flows from south to north and runs through the entire village. The flow of water system makes the formation of public space possible, forming typical trees and wells. Living place. It can be said that the water system space is the most important concentrated activity venue for residents. It not only connects the spatial relationship of the entire village, but also serves as a spiritual link for the villagers to live and communicate with each other. (Fig 7.)

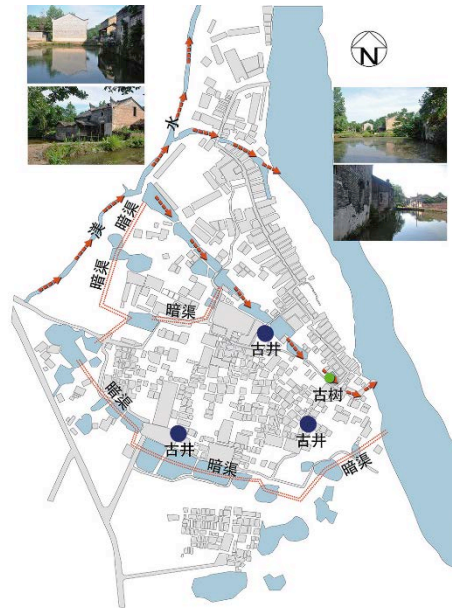


Figure 7: Analysis of the water system of the village.

Software simulation

Feature selection

As one of the main factors affecting the microclimate, wind speed was selected as the focus of this simulation. Compared with the other three factors, the wind speed is less affected by the big environment. In the winter, raising the temperature and the solar radiation have obvious difficulties, and reducing the wind speed is a relatively easy thing to do. As mentioned earlier, the standard of “Best area” in traditional theory is “Back mountain and Face water”. Among them, the requirement of “back mountain” is the result of long-term observation of the ancestors on the natural environment in winter. Most of the cold air in China's winter is blown from the north or northwest, and the dependence of the mountain will greatly reduce the impact of the northwest wind.

Among the current computer simulation wind speed software, PHOENICS software is recognized by most of its peers for its simple operation and accuracy. We mainly compare the village wind environment affected by the “Back mountain” and the difference of the village wind environment that is not affected by the “Back mountain” to compare the blocking effect of the “Back mountain” on the winter cold wind.

Simulation analysis

The more detailed the model, the more realistic the simulation effect is. Therefore, the author has established the general form of the village through his own field research and data collection. Due to the existence of many problems in the accurate mountain construction, and the focus of this article is not the model itself, the mountain is simplified.

First, the general form of the entire village is depicted by AutoCAD, and the house is simplified into a cube form. Then, according to the Google map, the surrounding mountains are captured, and the contour lines are drawn, and the simplified mountain model is built into the CAD. Subsequently, both were imported into PHOENICS for simulation of winter wind speed.

The village space will greatly affect people's lives when the wind speed is too high. According to relevant surveys and statistics, if the average frequency of wind speed $V > 5\text{m/s}$ is less than 10%, pedestrians will not complain; the frequency will be between 10%-20%, the complaint will increase; the frequency is greater than 20%. Remedial measures should be taken to reduce wind speed. (The Enlightenment of the Ecological Experience of Traditional Villages on Urban Design, Wu Yang. 2011)

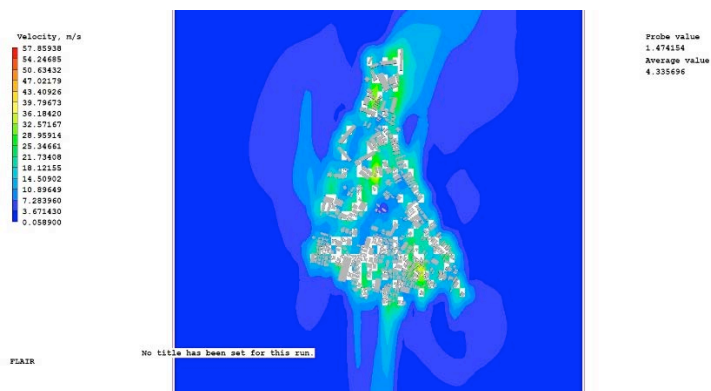


Figure 8: Village wind speed map without mountains.

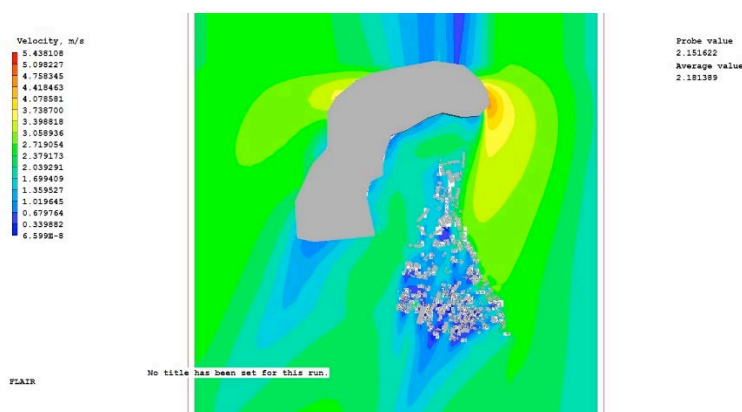


Figure 9: Village wind speed map with mountains.

It can be clearly seen from the comparison of the two images that when there is no mountain in the north and west, the wind speed in the simulated area is maintained between 7m/s and 14m/s, and the wind speed in parts of the village can reach 30m/s. (Fig 8, 9.) Great influence on people's travel and life. Such wind speeds make the human body feel colder in the winter. However, when the mountain is present, the

wind speed in the simulated area is mostly maintained in the range of 2m/s to 3.4m/s, and the wind speed in the village can be kept within 1m/s to 2m/s. The appropriate wind speed allows the entire village to be “protected” in the winter.

Conclusion

The simple ecological concept and ecological strategy of the ancients in the ancient village of Ji'an in Jiangxi Province is a valuable heritage of the world's history and culture. It maintains the organic combination of the primitive natural order and the rational artificial order. It is the materialized nature and humanization. Nature. In the process of the growth and development of ancient villages in Ji'an, the ancients gave birth to their ecological concept of "harmony between man and nature", leaving a valuable material and cultural heritage for our modern people.

This paper firstly combs the relevant theories of traditional building Geomantic Omen and microclimate theory, and studies the correlation between the two. Traditional architectural Geomantic Omen was once denied by all the superstitious factors. However, after careful study, it is often the result of the experience that the ancestors summed up in order to find a way to avoid natural disasters. This method of observation and summarization is a method that modern scientists also use, and the difference is only the precision and accuracy of the instrument. The modern microclimate theory aims to operate a small regional climate, which is in line with the traditional Chinese aggregation methods. Therefore, there is a strong mutual reference between the two theories.

Subsequently, through the literature and field research, the concept of Geomantic Omen embodied in the ancient village of Ji'an was studied, and the software simulation was carried out with modern science and technology. The experiment proves that the location of the ancient villages following the Geomantic Omen concept has a great advantage in terms of comfort, thus confirming the correlation between the two theories. Through the traditional theoretical research and analysis of ancient people's attempts in the field of microclimate regulation, it can provide a valuable reference for modern microclimate theory. This study shows that traditional Geomantic Omen theory has many inspirations for modern ecological architecture, especially in the regulation of microclimate.

References

- Aimin Lu. (2003). *The ecological strategy of continental climate*. Shanghai: Tongji University Press
- Baode Han. (2000). *Feng Shui and Environment*. (60-64). Tianjin Ancient Books Press
- Brian Edwards. (2004). *Sustainable building*. Beijing: China Building Industry Press,
- Chen Li. (2014). The Ecological Strategy Study of Huizhou Ancient Village——In Yixian County, Ping Shan Village as an Example:
http://www.wanfangdata.com.cn/details/detail.do?_type=degree&id=D782062
- Dudley E. (1997). *Rural Building Course*. (334-336). Habitat International.
- G. Carrilho da Graca, & Q. Chen, L.R. Glicksman, & L.K. Norford. (2002). Simulation of wind-driven ventilating cooling systems for an apartment building in Beijing and Shanghai. *Energy and Building*, 34(1):1-11.
- Derya Oktay. (2002). Design with the climate in housing environments: an analysis in Northern Cyprus. *Building and Environment*, 10(37):1003-1012
- Ian Enox McHag. (2006). *Design combined with nature*. Tianjin: Tianjin University Press
- Jia Xie, & Weicheng Liu. (2007). The Image of Architectural Space in the Ancient Village. *Sichuan Architecture*, 27(2): 65-67.
- Jianjun Cheng, & Shangpu Kong. (2009). *Feng Shui and Architecture*. (3-8). Jiangxi Science and Technology Press
- Kevin Lynch. (2001). *The city impression*. Beijing Huaxia Press.
- Liang Kang, & Yu Kang. (1999). *Feng Shui and Architecture*. (80-83). Baihua Literature and Art Press
- Liu Binyi, & Wei Dongxue. (2017). Review and Prospect of Thermal Comfort in Green Space. *Planners*, 03-0102-06.
- Qin Lu. (1982). *Wen'bei County History*. (30-32). Nanchang: Jiangxi Fine Arts Press.
- Qiheng Wang. (2000). *Research of Fengshui Theory*. (9-10). Tianjin: Tian jin University Press.
- Shanfeng Li. (1992) *Chinese Village: 9th Edition*. (12-15). Jinan: Shandong Fine Arts Press

Shahab Kariminia, & Shahaboddin Shamshirband, & Roslan Hashim, & Ahmadreza Saberi, & Dalibor Petkovi, & Chandrabhushan Roy, & Shervin Motamedi.(2016). A simulation model for visitors' thermal comfort at urban public squares using non-probabilistic binary-linear classifier through soft-computing methodologies. *Energy*, 101, 568-580.

Wei Yang, & Nyuk Hien Wong, & Steve Kardinal Jusuf. (2013). Thermal comfort in outdoor urban spaces in Singapore. *Building and Environment*, 59, 426-435.

Wei Gao, & Qinghua Zhou, & Mei Zhao. (2018). Mei Characteristics of Public Space of Traditional Villages in Central Jiangxi Province: Taking Mei'bei Ancient Village as an Example. *Huazhong Architecture*, 3(36):79-84.

Zhihui Zeng. (2010). The thermal environment value of Lingnan residential patio. *Huazhong Architecture*, 6(36): 39-41.

Contact email: juntong.cui@foxmail.com