

The natural environment control system of Korean traditional architecture: Comparison with Korean contemporary architecture

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Abstract

Modern architecture does not have the capacity to control its environment without resorting to methods involving high energy consumption, and these have caused many environmental problems. Architecture needs to recover its capacity to control its environment in an environmentally sustainable manner. Korean architecture has developed systems to control its environment in an environmentally sustainable manner from longstanding experience. This study examines methods used to control the architectural environment in Korean traditional architecture and compares them with Korean contemporary architecture.

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1. Introduction

Nowadays, there is a “well-being” fashion in Korea, where Koreans seek healthy food and homes [1]. During the latter part of 2003, many broadcasts and press notices expressed concern that some buildings have a negative effect on the human body. In particular, many people were shocked by a report about children’s atopic disease. Consequently, demand for healthy dwellings has increased. This concern must not be allowed to pass like other fashions.

It appears that architecture has been losing its ability to coexist with nature. Contemporary architecture seems to have lost the capacity to control the architectural environment itself. Control of the architectural environment tends to be reliant on scientific technology and a human being’s overconfidence in technology. Buildings have been filled with many types of equipment. However, technological methods to resolve environmental issues have caused other problems. Technology

cannot be the basic method for solving architectural problems associated with the environment.

By the end of the 20th century, a pro-environmental or ecological architectural trend began to appear. Global environmental disruption has continued since the industrial revolution in the 18th century, and finally human beings have encountered serious difficulties. Consequently, global concern has led to efforts to protect the environment. A new trend toward environmental protection has emerged in the architectural field. However, the method of approach needs to be changed.

It is essential that architecture recovers its close connection with nature and retains its capacity to control its own environment without resorting to energy-consuming methods. Nature should not be considered as a challenge to be overcome. Architecture needs to be harmonized with nature. Methods to improve coexistence between nature, architecture, and human beings need to be determined.

From this point of view, there is a need to examine early architecture. In particular, Korean traditional architecture, in its approach to “harmony with nature,” has formed a unique architectural culture. Korean traditional architecture has a diverse capacity to control

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the architectural environment in harmony with nature. This capacity of Korean traditional architecture can be called a “natural environment control system.”

This paper first examines the natural environment control system of Korean architecture in the 17th through 19th centuries. It then compares the traditional system with the environment control system used in Korean contemporary architecture. From this comparison, the problems of contemporary architecture from the viewpoint of the environment control system are identified. Application of a traditional environment control system to contemporary architecture is then discussed.

2. Environment of humanity and nature in Korean architecture

Without exception, all architecture is formed under the influence of many elements. These elements are largely divided into the human environment and the physical environment. In addition, elements that complement each other influence the architecture [2]. Korean traditional architecture was formed under the influence of various environmental factors. These will be mentioned to assist in understanding the natural environment control system of Korean traditional architecture.

2.1. Thoughts about the relationship between architecture and nature

Traditionally, Koreans have recognized nature, architecture, and human beings as one. In East Asia, including Korea, China, and Japan, the universe was envisioned as being divided into the great, the middle, and the small one. The great universe represented nature, the middle universe represented dwelling or architecture, and the small universe stood for the “I” in nature and dwelling. This idea has influenced the formation and development of Korean traditional architecture.

“Architecture is harmonized with nature.” That is one of the most general representations of the character of Korean, as well as of Chinese and Japanese traditional architecture. As an example, Feng Shui, which is the Asian theory of geomancy, explains these concepts very well [3]. It originated as a theory in the Tang dynasty of ancient China and spread abroad. Feng Shui has changed significantly over time and in different regions. However, the essence of the theory is to understand nature, harmonize with nature, and extract maximum profit from nature.

From these thoughts, Korean traditional architecture was developed to be one with nature. Koreans have recognized architecture as coexisting and maintaining harmony with nature.

2.2. Characteristics of the natural environment

Because Korea is located in the middle latitudes, it has four sharply distinguished seasons. In addition, as a peninsular country, the oceanic climate competes with the continental climate. In summer, from June to August, the climate is very damp and hot, characteristic of an oceanic climate. In winter, from December to February, the climate is very cold, characteristic of a continental climate. In spring, from March to May, and autumn, from September to November, the climate is mild in both humidity and temperature [4] (Table 1).

The annual temperature range is quite large. Although the climate differs between regions, in Seoul, the highest temperature is more than 30°C and the lowest is near -15°C. The annual range of temperature is approximately 50°C.

Korea is mountainous, with mountains comprising more than 75% of the country. As a result, at any given time of the year, there are large variations in climate between regions.

The sharply distinguished four seasons and mountainous terrain have influenced Korean traditional architecture. Architecture has had to cope with extreme hot and cold climates and has reflected the regional change in the climate. Korean traditional architecture has coped

Table 1
Climate of Seoul from 1971 to 2000

Season	Spring			Summer			Fall			Winter		
	March	April	May	June	July	August	September	October	November	December	January	February
Temperature (°C)												
Mean	5.2	12.1	17.4	21.9	24.9	25.4	20.8	14.4	6.9	2.0	-2.5	-3.0
Maximum	18.3	25.2	29.4	31.9	33.5	33.9	30.3	25.6	19.2	12.1	8.6	12.1
Minimum	-5.7	1.0	7.8	13.1	18.0	17.9	10.6	2.2	-6.1	-11.6	-13.5	-11.4
Amount of rainfall (mm)												
Monthly normals	45.8	77.0	102.2	133.3	327.9	348.0	137.6	49.3	53.0	24.9	21.6	23.6
Relative humidity (%)	61.2	59.3	64.1	71.0	79.8	77.4	71.0	66.2	64.6	63.8	62.6	61.0

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