Research on Body and Architecture

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Abstract. The topic of body is closely related to architecture. Based on the Anthony Vidler’s and others’ study on the relationship between body and architecture, this paper studies the relationship between body and architecture from a historical perspective, including the concept of body in philosophical context, the projection of body in classical architecture, and the metaphor of body in postmodern architecture. The theory of body has had an important influence on the architectural form at the beginning of the development of architecture, and then expanded the understanding of architecture at different stages. Recently, with the environmental issues and sustainable development getting more and more attention, the relationship between body theory and architecture will also face new development potentials and opportunities. Reconsidering architecture from the perspective of body perception and paying attention to the interaction between psychology and environment is an opportunity for the development of body and architecture, which may lead to theoretical and practical guidance of more contemporary significance.

1. Introduction
The topic of body was first mentioned from the field of philosophy and has always been a topic of concern in western culture. The western philosophy starts from paying attention to the human body and takes the body as the starting point to think and understand the objective world.[1] With the further research, the attention and research on the body have also affected the development of architecture. The formation of western architecture, especially classical architecture, was influenced by social culture, politics, economy and philosophy at that time, and it was the result of many factors. As an important concept in philosophy, people’s understanding of the body must also be reflected in the buildings and cities at that time. The relationship between the body and buildings is what this article discusses.

Since Vitruvius’s Ten Books on Architecture, the topic of body, as a representative of the humanistic tradition of architecture, has continuously promoted the development of architecture. Anthony Vidler summarized the development of the relationship between the body and building in his article The Building In Pain: The Body And Architecture In Post-modern Culture. The author mentioned that the discussion of architecture and body can be divided into three important stages from the historical dimension: the building as body; the building epitomizing bodily states or, more importantly, states of mind based on bodily sensation; the environment as a whole endowed with bodily, or at least organic, characteristics.[2] Vidler discussed the return of the body in the postmodern architecture.
2. Origin: The body in the philosophical context
The concept of body was first mentioned in philosophy. Plato first mentioned the concept of body in his works. He opposed the body to the soul, thinking that the body is the sinful body. Plato constructed a binary opposition framework for the body and soul. The body was considered as the flesh full of desires which dominated by the soul. Until the Middle Ages, the body was still condemned both by philosophy and religion.

Until the Renaissance, due to the development of humanism, the praise for the beauty of body began to appear. Since the 17th century, philosophy and science defeated the theology, and the body has gradually stepped out of the shackles of theology. However, the main goal of philosophy at this moment is to destroy theology, not to liberate the body. So the body is no longer a sinful body, but as an object opposite to the subject, it is dominated by the subject. Descartes' viewpoint of "I think, therefore I am" separates consciousness from body. The body was completely ignored in the subject's thinking and lasted until the 20th century.[3]

In the 20th century, three great scholars freed the body from the state of being ignored and gave it the leading position in philosophy. The first is Merleau-Ponty's phenomenology of body. The second is Durkheim, Moss and Bourdieu's anthropological tradition of social practical body. And the third is Nietzsche's and Foucault's view of historical political body. These three viewpoints are summarized by scholars as individual body (phenomenology of body), social body (the material body is used as a starting point for thinking, and is used as a symbolic language resource to transfer to a discussion of social and moral order) and political body (the control of body by power).

The concept of body always changes with the development of the times. In classical philosophy, due to ancient Greece's praise of the individual body, the focus on the body is more on the individual. In contemporary philosophy, phenomenological research does not go beyond the emphasis on individuals. Merleau-Ponty's phenomenology of body thinks that the body is materialistic, but it is not a simple organism. It is subject-conscious which embodied a concept of "body-subject". In the framework of Durkheim, Moss and Douglas, the body is divided into physiological body and social body, and the body becomes a symbolic system. The same is true of the political body, which is a power system. Since the 19th century, social science has made a great deal of discussions on the body from a social perspective. Marx emphasized the active body, collective and productive body. The study of the body gradually goes beyond the individual level.

The "body" shows more differences in architecture. In classical buildings, the body represents the order of the universe, is a microscopic world, and is the representation of Christ's perfect body. With the development of psychology and empathy theory, the physical and mental research replaces the material level, and the body and experience perception are related. In the study of post-structuralist philosophers, the body represents desire and the force carrying various factors, which are intertwined with space, society and power. The research on the body has promoted architects to think about the essence of architecture.

3. Historical development of the body and architecture

3.1. Body and architecture in classical architecture

3.1.1. Vitruvian Man. Marcus Vitruvius Pollio is recognized as the first person to establish the connection between body and architecture. He proposed the famous "Vitruvius" in Ten Books on Architecture. In a square and a circle, one's arm stretches, and the navel is at the center, as a guide to perfect proportions. (Fig.1) Vitruvius believes that the body is a natural form and suggests that this form should be embodied in architecture. He believes that the structure of artistic works should imitate the structural characteristics of the human body.[4]
Vitruvius proposed that the proportion and symmetry of the human body should be applied to buildings to create perfect visual images according to this rule (such as the Pantheon). This view of analogy between human body and architecture, known as Anthropomorphism, has always existed in the topic of western classical architecture and developed further in the Renaissance. [5]

3.1.2. Filaret. Filaret is the earliest representative figure of anthropometry. He believes that architecture originates from human beings, and therefore evolved from human body, human limbs, and human body proportion. At the same time, he also believes that architecture is not only deduced from the proportion of human body, it is a living organism, and it is a more obscure way to imitate human body.

Filaret further proposed that the body contains cavities, entrances and deep spaces, which form its proper functions. Similarly, buildings also have holes, namely doors and windows. This is true of buildings and cities. In addition, just like the body, buildings and cities can also get sick. The building can get sick and die while it can also be cured by a good doctor. His organic theory implies some ideas of functionalism.

Anthropomorphism was not the main idea of architectural design after Vitruvius, but Filaret extended it to the concept of architectural design. He believed that the form, order and decorates in architecture were inseparable from human appearance, human survival value, human activities and moral values. Filaret creatively interpreted the architectural form with people's moral and ethical class, which is closely related to humanism in the Renaissance.

3.1.3. Francesco di Giorgio Martini. Francesco was a famous architect during the Renaissance, who expressed Anthropomorphism in practice. His concern on body is that he uses the body as a comparison of the city and its components, as well as the form and proportion of the building and its components, from pillars and stigmas to the flat of the church. He proposed that cities have the human's quality, size and shape. In his paintings, a figure is superimposed on the plan of the cathedral and the city, with the navel in the main square. In order to plan a city, he suggested that people should stretch their bodies on the floor, fix a line on their navel, and then draw a circle, which followed the Vitruvius. [6] This provides an analogy not only in proportion but also in shape.

3.1.4. Summary. In Renaissance theories, the physical form of the body is directly projected onto buildings, which not only represent the body, but also express the perfection of the body ideal. Buildings take an organic and autonomous form from the body. Buildings can correct themselves by analogy of their own parts. During the Renaissance, a unique and attractive analogy between body and architecture was formed, which named Anthropomorphism. It’s the perfect embodiment of this organic form.

3.2. Body and architecture in postmodern architecture
In the post-modern period, through Nietzsche, Foucault and Deleuze's interpretation of the body, the classical body tradition disappeared, and the body was broken, becoming a fragment mingled in society and space. Many architects saw the vitality of body in this fragment. They want to feed the
body back into society and space to create a place where events can happen. It’s a space which does not stick to the rules and actively challenge the society.[7]

Deleuze believes that the body is the relationship between force and force. If there are two different forces, the body is formed, whether it is social, political, chemical or biological. The body is the difference of force itself. Force is always in the process of generation and flow. [8] For example, the "follies" designed by Bernard Tschumi in the park of La Villette are consistent with Deleuze's concept of body. They do not have a definite shape. They are constantly changing with the help of body movements and are in the process of change. (Fig.3)

The body is shown as movement in Tschumi's buildings, which is the carrier of events in space and acts as a generator and catalyst. At the same time, the body is also the creator of construction violence. Tschumi believes that there are two possibilities for violence in buildings, one is physical violence against a given space, and the other is physical violence in space. Influenced by phenomenology, Tschumi regards the body as the initiator of events and behaviors, but events and behaviors are the main body in Tschumi's space. The violent conflict between space and body is also inevitable. An uncomfortable space or mutating space always brings the body into violence, which breaks the taboo in architecture and makes the body happy. This is the pleasure of violence pursued by Tschumi.

![Figure 3. The Park of La Villette](image)

The posture of body in the post-modern period is no longer the perfect body in the classical period. Postmodern characteristics are manifested in the body, such as heterogeneity, instantaneity, split, uncertainty, etc. The post-modern body expands the intersection between architecture and multi-disciplines, also discusses the characteristics of architecture in the post-modern period.

4. Thinking about body and architecture in today's context

Body theory in architecture is closely related to research in humanities and natural sciences. With the increasingly environmental problems, people pay more and more attention to the relationship between man and nature. In the physical research which in the field of natural science, psychology pays attention to the related problems between psychology and environment and the interaction between psychology and environment. As an open system, human beings receive stimulation from the environment to produce perception, and through information processing to produce understanding of the environment or produce behaviors acting on the environment.

The rapid development of science is constantly giving birth to modern people's new understanding of the body. The built environment is seen as an external condition and external expression of human health. This new understanding of the requirements of the building is multi-dimensional. On the one hand, architects hope to change the past built environment by providing the building with plenty of sunlight, flowing air, space for sports, and a hygienic environment. On the other hand, this expression is symbolic, such as erecting the underside of the building to get out of the wet ground. [9]
In today's architecture, the environment is already an unavoidable issue. Rethinking architecture from the perspective of body perception and paying attention to the interaction between psychology and environment may become a direction of thinking about body and architecture. Space affects body perception, and body behavior in turn affects the interaction of space. This is an opportunity for the development of body and architecture, which may lead to theoretical and practical guidance of more contemporary significance. [10]

5. Conclusion
The article discusses the development of the relationship between architecture and body from classical architecture to post-modern architecture. The attention of the post-modern architecture to the body is a re-recognition of Vitruvian's body concept, a denial of the re-negation of the humanist body in the classical period, and a reflection on power and institutions. The theory of body has had an important influence on the architectural form at the beginning of the development of architecture, and then expanded the understanding of architecture at different stages.

After the rapid construction of the city, the relationship between buildings cities and people is alienated and indifferent. The torch of humanism spirit is gradually rekindled. Returning to body is the trend of architectural development. According our research before, we can know that the two organic systems, body and nature, are hostile to modernism, and the relationship between body and architecture is ignored by functional architects. In the 20th century, phenomenology paid attention to the physical experience in life, which leaded the architecture in the 21st century began to pay attention to the sensory experience of the body in space. It started emphasizing the connection between the experience and the real world.

In today’s architecture, the environment is already an unavoidable issue. The relationship between body and architecture will also face new development potentials and opportunities. Reconsidering architecture from the perspective of body perception and paying attention to the interaction between psychology and environment maybe can provide more theoretical and practical guidance.

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