Neo-Confucian Explanation of Geography

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Abstract

An explanation of the nature of geography is the purpose of this paper. Geography was established as one of the scientific fields in ancient times, so that it has contained very much the character of a natural history. It was therefore exposed to frequent criticism from modern systematic sciences. In one respect, theories of modern geography always had a feature as an answer to them. The modern geographer refused the criticism that geography should be separated into subfields of systematic sciences. Thus, geography has held its tradition in the present scientific order. Its theories are, however, not perfect, and only maintain consistency as one field. Especially, it is enough to be afraid of its fragmentation that there had been seen the rise and fall of many schools in current geography. This paper attempts to explain the nature of geography in order to establish its perfection.

In Chapter II, we detect a common radical problem of geography, which is considered as an assemblage of various views. Therein, we focus on the argument between Schaefer and Hartshorne about the criticism of "exceptionalism." This is one of the representative controversies over the basic theory of geography, and evaluated as the one of the philosophical origins of the "quantitative revolution" that divided itself from traditional geography such as Hartshorne's view. Then, if there is a problem in common among both the old and new views of geography, it also should be regarded as a radical problem of geography. On such supposition, we analyzed the statements of both.

A summary of their views is as follows. Schaefer considered that all studies have to be connoted by the systematic sciences that consist of the physical and social sciences, and denied the conventional traditional geography that has and does not have characters of both the physical and social sciences. According to him, true geography is merely a subfield of the social sciences, which concerns a concept of space that consists of part of the "morphological law." On the other hand, Hartshorne is representative of the traditional geography that denied the systematic sciences and its subcategories such as the physical and social sciences, so that geography is an independent field neither physical nor social and therefore not systematic. For him, the subject of geography is "space" or "region," which distinguishes the consistent complex of the phenomena from others.

Thus, their views are obviously opposed to each other. However, we also understand that their concepts as the subject of geography, the "morphological law" and "space/region," are outlines of the substances in common; their concepts of geography's subject are consistent with each other. Thus, there has been only one concept of space as the basis of geography.

Then, we analyze this concept of space in philosophical terms. As a result, we find that it is similar to Aristotle's concept of space; it is just like the "form" that encloses the "material." However, matter is enclosed by space according to Aristotle. In contrast, geographical space encloses some of the phenomena. This space, which conforms to theories of either Ancient Greece or the modern West, has a logical difficulty when it comes to the unity of itself as a concept. Therefore, it is considered as a radical problem of geography. Accordingly, we introduce Zhu-zi's concept of space,

which was born in Eastern philosophy.

In Chapter III, we introduce this Eastern concept of space. Zhu-zi xue (朱子學) is representative of the school of Confucianism by Zhu-xi (朱熹) called "Neo-Confucianism" due to its difference from previous ideas in the Western world. In Zhu-zi Xue, the concept of space has a multilayered definition. First, the concepts of "Tian-Wen" (天文) as infinite space-time and "Di-Li" (地理) as finite space are provided. They explain the epistemological principle called "Yin-Yang" (陰陽), and are divided according to whether they can be recognized or not. The infinite space whose boundaries can be recognized and the infinite time whose circulation can be recognized are defined as "Tian-Wen." The finite space whose boundaries can be recognized is defined as "Di-Li."

Next, these concepts of space and time have "Tian-Di (天地)" as their substance. "Tian-Di" is a monistic diffusion-condensation action based on the "Yin-Yang" theory and is the substance that is at the root of the universe. The total reality consists of not only "Tian-Di" but also "Ren" (人) as the action that gives order to everything. This "Ren," which literally means the "man," is based on the human principle of recognition. Nothing has any order without recognition by someone. After "Ren" as the recognition acted, "Tian-Di" begets order and harmony, and constructs the world by its diffusion-condensation action. In short, "Ren" is the logic.

Finally, there is the metaphysical-differential principle called "Yi-Yin-Yi-Yang" (一陰一陽) behind "Tian-Di" and "Ren." It is the reason why the concrete world is what it is, so that it is a denial of the absolute One (such as "*To hen"*); it is the plurality. Because of this principle that nothing can be the absolute One, it is concluded that there must be substances of each space, time, and logic as the minimal features of construction of the real world. "Tian-Di," "Ren," "Tian-Wen," and "Di-Li" are not only the entire world but also its minimal conditions.

In Chapter IV, we adopt "Di-Li," the Neo-Confucian concept of space as the subject of geography, and show the process for solving the difficulty mentioned in Chapter II raised by "Di-Li." This eastern concept of space does not have an outline like Aristotle's space; therefore, it is unnecessary to force ourselves to state that space is equal to the inner phenomena. "Di-Li" is a part of the entire world and is omnipresent as the framework of the world. If we define the subject of geography as "Di-Li," there will be no difficulties in the traditional concept of space such as Hartshorne's "space/region." According to it, geography should not be classified under any of the systematic sciences but as an independent field. Geography has held the proper subject in actual since ancient times. Thus, this paper agrees and confirms that all of geographical studies fall under one discipline.

Key words: Space, Neo-Confucianism, History of geography, Modern geography, Contemporary geography, Geographical philosophy

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I. Introduction

Geography is one of the oldest sciences in the world. This science had already occupied its own field when many modern sciences were mixed in the name of philosophy. Therefore, it is antiquated, and has a different theoretical basis from the standpoint of the modern sciences. As a matter of fact, there is criticism that geography has been a matter of natural history, which is an old-fashioned description. In this context, geographers study from a theoretical basis. What is geography? Why was this field independent in the ancient era? We need to answer these questions if we believe geography is not subordinate to other fields.

Geographers often discuss the definition of their own field, and there is no field like geography in this respect. Varenius, Kant, Humboldt, Ritter, and others are publicly honored as the great founders of modern geography because they attempt to convert geography into a systematic science. Their studies are a kind of identity that requires geography as a descendant of ancient philosophy such as mathematics or astronomy. All of them stated that geography is a unique field, so it should not be divided in many fields as a mother of sciences like natural history. Thus, modern geography started with a sophisticated basic theory, but it faced a lot of difficulties ahead. There is no doubt that geography is old. If it conforms to modern scientific logic while holding its old character, we have to define it precisely. Therefore, the history of the discussion on the nature of geography concerns the history of geography itself, and various theories repeat the field's rise and fall even now. For example, German geography has produced Humboldt, Ritter, Ratzel, Richthofen, and Hettner; French human geography is represented by Vidal de la Blache and Cholley; and American geography succeeds these traditions with Sauer and Hartshorne. Theorists from each country thoroughly investigated the concept of the subject of geographical studies. Moreover, quantitative geography, or the so-called "new geography," was started by Schaefer and Bunge; humanistic geography was born out of Relph and Tuan's criticisms; and more contemporary geographical schools also devoted themselves to this science. However, each of them has minute theoretical problems that may bring fragmentation upon themselves. Do these projects explain the nature of geography's collapse? Is geography divided as a mother of modern sciences, or is it absorbed in social science as one of its subfields?

This paper attempts to answer the questions. Through their dazzling and chaotic volumes, the fruits of theoretical studies stored as a history of geography have a consistent concept; geographical theories always have a concept of space in their core even if they have antagonistic views on other points. It is inferred from how Kant characterized geography as "spatial science" to the field's historical characterization as "temporal science" (Hartshorne 1958) to Ritter's statement that "spaces on the surface of the earth are an initial subject of geography" (Ritter 1991: 77); he called this a

purpose of geography (Noma 1963: 97-98). The quantitativists criticized traditional theory such as Kant or Ritter as well as spatial relationships as a main concept of geography. After that, the humanistic geographers resisted the "quantitative revolution," but they were also concerned with a kind of concept of space, for instance the "experience of space" (Tuan 1993), "placeness" (Relph 1991), and "spaciality" (Soja 1989). Of course, these contain mutually incompatible elements. However, because they conclude that geography is a spatial science in spite of their antinomies, it shows the theoretical importance of the concept of space in this field.

In light of the present theories on geography's basis, a concept of space that is not defined firmly even now has not carried out its function as a theoretical core. Perhaps it is supposed that a problem is hidden in the concept. If we explain the strange situation that geographers always trust the word "space" as the basis of the field as a science although many disagree regarding the term, we can also construct a basic theory that explains the nature of geography.

This paper first aims to clarify a radical problem in geography's thoroughly well-known argument: the so-called criticism of "exceptionalism." This criticism is an attack on Hartshorne by Schaefer (1953) and on the origin of the "quantitative revolution." It divided contemporarily from modern geography. Therefore, it may be shown that there is a theoretical problem with respect to a contrast between the new and the old.

Second, in order to solve the problem, we introduce a new basic theory. Here, we focus on Zhu-zi Xue (朱子學), which represents Chinese thought as Neo-Confucianism, and was denied until now because it is not western philosophy. Zhu-zi Xue is related to modern and contemporary geography. According to the current studies, Zhu-zi Xue, or the Neo-Confucianism of the Song-Ming era, influenced modern western philosophers, especially Leibniz (Horiike 1996: 2002). Leibniz's thought was succeeded by Wolff and Kant, and the influence of Zhu-zi Xue on Laibniz was also adopted by them (Igawa 2009; Schonfeld 2006). Geographers look up to Kant as the founder of modern geography, and consequently it is difficult to deny the existence of a theoretical relationship between geography and Zhu-zi Xue. There is, however, another reason why this paper focuses on this eastern, older thought. If Zhu-zi Xue was not related to modern geography, we supposed that the Zhu-zi Xue should be adopted as our basic theory because Zhu-zi Xue has an elegant concept of space that is suited to the explanation of the nature of geography. Although the relationship between this Chinese philosophy and western geography is profoundly interesting, it is not a pure subject of theoretical study. It is certain that Zhu-zi Xue is not western thought. However, if it has a logical and effective concept of space, we never need to ask its descent.

The above is an outline of this paper. In order to achieve the paper's purposes, we discuss the radical problem of geography; especially the argument between Schaefer

and Hartshorne in chapter II, and we introduce the concept of space in Zhu-zi Xue, which addresses the problem. Subsequently, in chapter IV, we explain the nature of geography on the basis of the results of a previous discussion.

II. A radical problem of geography

A series of discussions called a "quantitative revolution" are a prominent topic in the change of geography's basic theory. This is not only an adoption of a new mathematical method, but also a movement that tries to shake off the old regional geographic basis by Hettner and Hartshorne. Takahashi et al. (1976: 427) said that "quantitative revolution" is "a question about the philosophy and methodology of geography essentially" that "advocated reorganization of geography as a science based on the adoption of a so-called scientific methodology." In addition, it is Schaefer's "*Exceptionalism in geography: A methodological examination*" (1953) that is part of the origin of the movement at its philosophic basis. "Exceptionalism" is an offensive name in Hartsborne's view of geography, which rejects the "ideographic" methodology of a regional geography. This essay was not strongly considered at first, but later Bunge (1970) "discovered" it as part of the origin of the movement; it is appreciated as part of the theoretical basis of geography as a "spatial science" (Sugiura 1991: 303). Subsequently, the movement was researched briefly by Harvey (1979).

There were, however, criticisms regarding the theory of quantitative geography from the standpoint of behaviorism, humanism, Marxism, and so forth. It is like the confusion that Harvey, who perfected quantitativism, spearheads (Takeuchi 1980: 433). Now, there are schools that are succeeded by each principle in geography, so at a glance, "quantitative revolution" is merely a past event. However, this is not a reasonable understanding of the basic theory of geography. The movement is a division between the traditional basis and the new one. It will be discussed in detail later; the schools that emerged after the movement such as humanistic geography are also based on quantitative theory. Therefore, it is supposed that contemporary geography has two bases; one is the "ideographic" or holistic school of Hartshorne, and the other is the "systematic" or analytical school of Schaefer.

In order to accomplish the purpose of this paper by explaining geography, we have to reveal this problem regarding basic theory. Where does the problem emerge? It is, perhaps, expected that it will emerge from a kind of theoretical boundary, especially Schaefer's criticism of "exceptionalism" in Hartshorne's solid theory. We focus on both, and compare their characteristics to discover the radical problem of the basic theory of geography in this chapter.

1. Formation of contemporary geography and Schaefer's criticism of "exceptionalism"

a. Schaefer's geography

As stated above, "exceptionalism" is Schaefer's criticism of Hartshorne's traditional theory. Here, we shall show what the word "exceptionalism" means, or why it had been leading the "quantitative revolution" theoretically.

According to Schaefer (1953: 231), “exceptionalism” is a group of ideas amounting to the notion that “geography is quite different from all other sciences, methodologically unique, as it were.” He doubted the independence of geography as a sort of “integral science.” This sort of traditional “geography” is merely a “division of labor” of other systematic fields (Schaefer 1953: 227) for him, hence considering it as its own field is unnecessary. There are, however, a group of ideas and methodologies that support it; geography has two main subfields in the form of the systematic and the regional, and its independence is established by the latter. Schaefer resisted this prominence of regional geography and rejected its theory as faulty: “Its procedure is in principle not different from that of any other social or natural science which searches for laws of, what amount to the same thing, has reached the systematic stage” (Schaefer 1953: 229). He compared it with representative theorists such as the founder of modern geography, and indicated a difference; “Hettner thought that the core of geography was regional. Hartshorne believes that systematic geography is really indispensable to regional work. …but the heart of geography is nevertheless regional….Neither Humboldt nor Ritter were plagued by these pseudo-issue. As they clearly saw, systematic geography attempt to formulate the rules and the laws which are applied in regional geography” (Schaefer 1953: 230). Finally, he addressed the question of why this idea is recognized as important and declared, “One may conjecture that this notion is a hangover from the time when there were no social sciences and not much natural sciences, and when such quaint and encyclopedic endeavors natural history and cosmology still occupied their place” (Schaefer 1953: 231). He thought that traditional geography is antiqued natural history, which should be separated as a modern systematic science; despite this, because geographers refuse the systematic methodology, there are “exceptionalism” arguments like regional geography or “integral science.”

Schaefer also criticized Kant. He regarded Kant as “the father of exceptionalism” (Schaefer 1953: 232) who formed a kind of non-scientific geography, and said that “what Kant called geography Humboldt called more judiciously cosmology, at the same time emphasizing the scientific nature of geography proper” (Schaefer 1953: 235). Schaefer pointed out that this was Kant’s idea that was merely quoted from a transcript of a lecture, but his critique is as follows: “how unfortunate, then, that so many geographers kowtow to a patently immature idea of his youth” (Schaefer 1953: 233). Thus, he denied authority to Kant, who is traditionally recognized as the founder of modern geography.

How did Schaefer himself, who attacked the mainstream at that time, think about geography? The following is a summary of his views. First, he thought it is unnecessary to classify or describe geography because of the development of the natural sciences. Science should not describe phenomena, but explain it. In addition, he said that “to explain the phenomena one has described means always to recognize them as instance

of law" (Schaefer 1953: 227), so individual things are not its subject. Thus, he discussed not only geography but all sciences. The phenomena are the only embodiment of scientific laws. Therefore, the traditional geography that describes the phenomena simply is not a science. This was his statement. The phenomenon that was a subject of "true" geography was spatial, and so "all spatial relations, were governed by laws" (Schaefer 1953: 227). Regarding a place in which the phenomena existed, he said that "For, with successful rise of geophysics, astronomy, and geology, geography can no longer deal with the whole earth", "geography had to be convinced as the science concerned with the formulation of the laws governing the spatial distribution of certain features on surface of the earth" (Schaefer 1953: 227). He also regarded Humboldt as its founder to express his orthodoxy as a geographer. "For that matter, even in the introductory chapter of "Kosmos" Humboldt patiently explained to the general public the difference between science and cosmology. All science, according him, search for laws, or, as the later term goes, are nomothetic" (Schaefer 1953: 234). This comment was based on a comparison with Kant's view, which was adopted by Hartshorne as cosmology. Anyway, for him, it is the spatial relations that are a subject of geography: "Spatial relations are the ones that matter in geography, and no others. Nonspatial relations found among the phenomena in an area the subject matter of other specialist such as geologist, anthropologist, or economist" (Schaefer 1953: 228).

What are "spatial relations"? He pointed out that "Geography is essentially morphological. Purely geographical laws contain no reference to time and change. This is not to deny that the spatial structures we explore are, like all structures anywhere, the result of processes. But the geographer, for most part, deal with them as he finds them, ready made" (Schaefer 1953: 243-244). His "space" was, briefly, a concept of morphology, namely, a pattern in contrast to time as a series of changes. "Technically, the morphological character of geography finds its expression in its own specific tool, maps and cartography correlation" (Schaefer 1953: 244); this gives us a meaning of "morphology." It is also his concept of "pattern" and "space," which is a shape or an outline that is drawn on maps like the frontier, the coastline, a contour line, or any boundaries.

However, this "space" is not merely an outline of matter. According to him, a geographer understands a spatial "structure" as a law. Hence, the "morphological law" is not only a static "pattern." It may be caused by the "pattern," which is based on Christaller's location theory (1969). Christaller (1969: 17) said that "the basic pattern of a relative arrangement is formed by matter either pertaining to the organic or the inorganic which enclose a core or center; a centripetal arrangement. It is not merely a mode which exists in a human idealistic world, or which is made from an urge to arrange, but is organized in actuality by the nature of law in each matter." He attempted to clarify the law in the arrangement of matter through a location theory.

According to him, "this study consists of a part of a spatial science, namely geography. Therefore, it is vested high ability because it has a more total and comprehended ideas" (Christaller 1969: 386). Thus, Christaller considered location theory to be a main part of geography as a spatial science. After that, Schaefer regarded the theory as the whole of geography, not a part, and interpreted the "arrangement of matter" as a "pattern" itself rather than a more general concept. Words such as "space," "arrangement," or "law" connote an antagonism to Hartshorne's view that the "region" is unique. Schaefer followed Christaller in arguing that geographical phenomena are only an assemblage of matter.

In this, Schaefer defined geography as a science of "morphological law." It resulted from the exclusion of the "law," which is considered a subject of another field of traditional geography. He classifies laws in traditional geography into three types (Schaefer 1953: 248). The first are "the laws of physical geography." He said that these "are not strictly geographical," and used meteorology based on physics as an example as well as agronomy based on biology. The second is the "morphological law" which is studied as a kind of social science, and stated that "as far as they are morphological, these laws are genuinely geographic." The third is the "non-morphological law" in the other social sciences. Hence, he interpreted traditional geography as a miscellaneous field of mixed physical and social sciences, and named the field of "morphological law" in the latter "geography." After all, Schaefer's "morphological" geography is a subfield of the social sciences. "The real danger here is geographical isolationism. For, we have also seen that the search for these laws can only proceed in cooperation with the other social sciences" (Schaefer 1953: 249). He felt apprehension for the remoteness of geography from the whole of the systematic sciences.

The above is an outline of Schaefer's geography. His theory has new definitions of geography: (1) geography as the "spatial science" which aims to clarify the "morphological laws"; (2) geography as the subfield of a whole of social sciences. This feature is a reason for why "exceptionalism" or "quantitative revolution" became the "new geography," and why even schools criticized quantitative geography as not being able to abandon a similar theoretical basis.

b. Admiration and criticism by contemporary geography

As stated above, this criticism of "exceptionalism" was not strongly considered at first, but Bunge (1970), who was an admirer of Schaefer (Sugiura 1991: 305), understood that his "morphological" geography is based on geometry. Bunge (1970: 100, 192) said "'spatial' means not only a distance but also the whole of geometric features on the earth's surface, for instance, shape, dimension, type, distance, connection and more"; "we define what is spatial as a geometric thing or movement on the earth's surface". Thus, he explained the "morphological" concept of space strictly. Schaefer's philosophy

includes quantitative methodology. Bunge believed that all things can be analyzed quantitatively, and said that "if Manhattan Island follows a law for islands, it is only different from other islands in each genuine quantitative assemblage of changes" (Bunge 1970: 12). Thus, Bunge identified geometry with Schaefer's theory unrelated to mathematical operation. At the same time, it was generalized that Hartshorne's concept of a "unique" region is a theoretical fault of traditional geography.

Schaefer's "space" or "morphology" was welcomed on the basis of the application of exact mathematical methodology to geography. Bunge also admired Christaller's theory as his theoretical core. He stated that "if there had been no center place theory, it could not have been stated that there was a theoretical geography independent to a mother science. Because it produces a new law, geography is one of a basic science, and this statement is proved obviously by the center place theory" (Bunge 1970: 145), Bunge discovered the theoretical independence of geography in this economic geographical theory. Christaller's theory is based on economics, and hence it is a kind of social science. Therefore, Bunge also followed Schaefer's definition of geography as a subfield of social science. This is seen in his scant concern for physical geography.

A similar theory was received along with a methodological, concrete development by Haggett (1978) and others. He also considered both the relationship between geography and geometry and the divide between physical geography with human beings as an obvious fact. So, he said that "the geometric tradition is the original basis of this science for the ancient Greeks" or "geometry provides a chance to connect physical geography with humans as new cooperators" (Haggett 1978: 21-22).

This tendency was strengthened increasingly by Harvey (1979). He regarded the concept of space as the theoretical core of geography from the ancient era to today (Harvey 1979: 230-231). Then, he separated the "relative space" as "a locational character of the material object world" from the "absolute space" as "a container of all materials" (Harvey 1979: 215). "A confrontation between Hartshorne and Bunge is also understood as a confrontation between absolute space versus relative space" (Harvey 1979: 230). He understood the "quantitative revolution" as a change of a core concept in geography from "absolute space" to "relative" space.[1)] He recognized Kant as an originator of "absolute space" in geography (Harvey 1979: 77, 229) and thought that the concept is based on the Euclidean geometric understanding of the phenomena. Thus, he insisted on the invalidity of the concept of absolute space. "For the last hundred years, the concept of absolute space is not general in the philosophy of science. Kant's idea regarding space and geometry lost the confidence of the discovery of non-Euclidean geometry in the first half of the nineteenth century" (Harvey 1979: 229). In this way, Schaefer's "morphological law" was the "relative space" that related matters but was separated from it, and was sophisticated enough as a concept to deny traditional geography based on "absolute space."

Harvey likewise distinguished physical from human geography. There are great differences between the two. “Concepts in physical geography are deduced from a postulate of physics. Because physics and chemistry have more strict theory than other sciences and an empirical position that is more trusted than any social science, physical geography also has concepts based precisely on human geography (Harvey 1979: 132-133). This even includes geographical concepts that belong to the physical or social sciences for him. This view is developed from Schaefer. According to the statement that “a geographical concept of space is embedded in an extensive cultural experience” (Harvey 1979: 250), his “geography” is obviously a subfield of the social sciences. Thus, an institution in the criticism of “exceptionalism” was sophisticated for the “new geography”; finally, it became a subfield built on a high theoretical basis.

The “quantitative revolution” is supported by the attentive polishing of the logical armor. It was impulsive, and it introduced theories from other fields uncritically (Takahashi et al. 1976: 429). However, it did not have the fragility that other schools could use to overthrow it. Therefore, criticisms for quantitativism were concentrated in the character of “morphological law.”

Sack (1973), who criticized quantitativism, provided a “relational concept of space,” which is unity between geometric physical space and non-geometric matters. Kosaka (1975) showed a remit of Schaefer’s “morphology” regarding spatial patterns and completed behavioristic studies regarding a spatial process to replace it. He said, “In a study of a spatial process, a concept of space has to be defined to grasp the spatial behavior of a person. In this case, the concept of space is not the absolute as a container, but the relative that is decided as a system of coordinates based on the phenomena” (Kosaka 1975: 534). Thus, he also considered space as geometric. These criticisms aimed to add the materiality of geographical phenomena to Schaefer’s space. The former stated that it should consider materials itself, and the latter focused on the processes of the phenomena that caused the “pattern.” However, they did not abandon the geometric or “morphological” space, but rather they supported its logic.

On the other hand, while humanistic geography contrasts with quantitativism, the circumstances are similar. Relph (1991: 41-80), for example, regarded space as a collective recognition of individuals or groups, and classified it in six types by its abstractness; “practical space”, “perceptive space”, “existential space”, “constructive/planning space”, “recognititional space”, and “abstract space”. However, these types connote a boundary of surrounding matter. Thus, his space is “morphological.” He did not criticize Schaefer’s view, but rather its disregard of the recognition of the phenomena inside the “space.” Tuan (1993: 179) mentioned a spatial structure in various cultures; however, he illustrated it with geometric shapes on a plane as “morphological” as the quantitative. Humanistic geography as represented in them, in fact, aimed to refocus on subjective elements, but did not leave the theoretical

basis of quantitativism. Rather than leaving it, this school attempted to explain the reason why the geometric patterns are understood as a concept of space universally. As Yamano (1979: 63) pointed out, humanistic studies adhere to a method that interprets its results as "morphological" spatial structures; the same may be said of the concept of "place." Whether "place" is defined in terms of human subjects or others, it must be attended with a physical "pattern."

In addition, the concept of "spatiality" defined by Soja (1989: 249), who called himself a postmodern geographer, also has a "morphological" feature. "Spatiality" is, according to Soja, "an embodiment and medium of social life which is the relationship between individuals or groups, which has substantive patterns, and which is produced socially." Mizuoka (1997: 826), who adopted Marxism, said that "the space is, at first, a real existence which maintains socialization and subjects with geometric attributes". He called it "a common thesis of space." It is shown as an extensive reception of the geometric "morphological" concept. These are only some instances; we suppose that there are hardly any views that deny this concept of space. It is like a necessary condition of space. The critics of quantitativism no longer seem to be concerned with it. Massey (2005), for example, discussed the phenomena in space rather than the concept of space itself.

How did they deal with the idea of geography as a subfield of the social sciences? In the early criticism, there were theories containing physical-geographical features such as Sack (1973), or Garnier (1978), and more. After the development of methodology respecting behaviorism or humanistic geography, however, geography became focused on human or social features even in its basic theories as quoted. If they state that there is a restoration of traditional regional geography, it is wholly emphasized as a social science (Morikawa 1992). Morikawa (2002: 232) said "for human geography…is positioned firmly in social science; first of all, we have to use a common language and concept"; he expressed apprehension about geography's dependence on adjacent disciplines. It is difficult to find a consideration for physical geography in current geographical theories.

The "quantitative revolution," or changes on a geographical basis produced by the criticism of "exceptionalism," is covering our discipline even now. Both the quantitative school and its opponents continue to rely on the "morphological", "geometric" space and the view of geography as a subfield of the social sciences. It was, perhaps, a new theory that became the "quantitative revolution."

The above is, however, just half of the basic theory of geography. The nature of geography, at least, was clarified through so-called "traditional" theories before Hartshorne, who was attacked by Schaefer. This shows the problem at the core of this comparison of old and new.

2. Hartshorne and the completion of traditional geography

Although its reputation is not established, Schaefer is often mentioned as the philosophical initiator of the "quantitative revolution." In comparison, Hartshorne is not well understood today; the word "exceptionalism" always accompanies him, and the "quantitative revolution" overcame his theory generally in the current history of geography. Is it correct that he calls traditional theories merely "exceptionalism"? In this, we will reinterpret Hartshorne's view according to "*The Nature of Geography*" (Hartshorne 1957/original 1939) as his main work, and "*Perspectives on the Nature of Geography*" (Hartshorne 1975/original 1959), which was written as an answer to Schaefer.

It was, indeed, a kind of paranoia that was a motive for Schaefer's criticism of Hartshorne (Sugiura 1991: 315-316). Notwithstanding his impure motive, the criticism was interpreted as epochal, perhaps, because Hartshorne's theory in "*The Nature of Geography*" was the thorough essence of traditional geography; he coordinated traditional basic theories on his work, hence unsolved problems were condensed. In effect, Schaefer casually opposed Hartshorne, who clarified old problems in geography at first. If Hartshorne's work was less incomplete than in reality, then Schaefer's criticism would not be a criticism, much less a "revolution". It is, therefore, Hartshorne himself who was the true originator of the criticism of "exceptionalism" or "quantitative revolution." However, we cannot evaluate it without an examination of his theory. In the following, Hartshorne's views are shown in comparison with Schaefer.

Hartshorne's view of geography and science was totally incompatible with Schaefer's. He refuted "exceptionalism" in his "*The Nature of Geography*", which was published before Schaefer's attack a dozen or so years ago; he discussed a science or a study itself eloquently in saying that "a science is the only one naturally, which is divided arbitrarily because of a limit on human ability" or "it should be a distortion of a science that is an attempt that arranges distributive sciences and its parts through a simple system that differs a social science from a physical science, and both have the distributives of various classes in themselves" (Hartshorne 1957: 427). He thought that the dichotomy between a physical science and a social science, as Schaefer stated, is merely a kind of custom. He rejected the idea that treats the science of "morphological law" in the social sciences as a distortion of all sciences. Thus, Schaefer's view that geography is one of the distributive sciences could not be permitted for him. In fact, Hartshorne also considered that the dichotomy between physical geography and human geography is an empty idea. It is shown actually by following his words that "geography as a whole is classified as neither the physical nor the human, and cannot be divided into two groups", "because geography has to examine the complex phenomena in reality, it is impossible to divide between the physical and the human" (Hartshorne 1957: 427). "In geography, a character of the earth is not purely human

nor physical, but a complex of them genuinely" (Hartshorne 1975: 66). He denied, therefore, the "criticism that geography is dualistic because it contains both the human phenomena and the non-human" (Hartshorne 1957: 427), and warned that "it will cause a lot of handicaps regarding development in study that make a difference between two special features between the human and the non-human" (Hartshorne 1975: 61) after it became an actuality for Schaefer.

Of course, he didn't ignore the meaning of geography as a science. For him, geography is a field that has an intrinsic value which is the same as or higher than the other sciences. As Schaefer pointed out, in subjects of geography, there are many features that are regarded as physical sciences and social sciences. However, these systematic sciences introduce their results through different purposes and methods for each. If the inconsistent results accumulate, they cannot be substituted and can be considered geography (Hartshorne 1975: 40). Accordingly, Hartshorne focused on the consistent "total reality," and defined geography as "the empirical science field that is requested for the study of reality" (Hartshorne 1975: 40). "Exceptionalism," as Schaefer called it, was part of Hartshorne's view of geography as the "integral science," but Hartshorne replied that it is the strange "integral" that is Schaefer's "social science."

What constitutes "total reality"? Hartshorne (1957: 32, 56-70) explained that this concept was founded by Kant, Humboldt, and Ritter; it was also adopted consistently in geography. Likewise, Noma (1963: 84-85, 92) stated that "all things connect the whole in the organic view of nature" and mentioned the "the whole lived" and "the universal organism" of Humboldt, or "the global organism", "the organic whole" of Ritter as examples. These concepts were discussed in modern geography zealously; Ratzel (2006: 157) said "there is only the space of the earth", and Vidal de la Blache also regarded it as a core concept of geography that is "unité terrestre" as "the concept that the earth is one of the whole which obeys universal law that provides special instances and maintains an order in its parts" (Blache 1940: 44); de la Blache also asserts that geography considers "the universal matters related to an organism on the earth" (Blache 1940: 45). Moreover, Hettner (1991: 174) declared that "the subject of geography is, initially, a whole of the earth." Cholley (1967: 4, 10) pointed out that "the nature of the geographical feature" is what "emerges always as a complex combination, or the convergence of various factors," and "the field of geographical complex, namely the subjective field of geography corresponds to a surface of the earth itself." Hartshorne succeeded this tradition: his "total reality" is "the earth" as the others mentioned. He said, "a whole as a great region is not the whole in actuality, but merely a part of the world as our unique and perfect whole" (Hartshorne 1957: 457). It cannot, however, be a sufficient explanation that provides a concept of the earth as a subject of geography. The "total reality" or "total complex" is unanalyzable in actual studies, even the theoretical. Consequently, a geographer "must discover the mother concept of

studies consistently and rationally" (Hartshorne 1975: 44).

There is no doubt that the theorists mentioned did not find satisfaction in these comprehensive but empty definitions of geography. They claimed the practical concept in order to understand the nature of the earth as a "whole". Its typical example is Ritter's "space," that is "the spaces are filled terrestrially on the earth" (Ritter 1991: 83). While it is "a concept called 'landschaft' in current meaning," "he didn't use the word 'landschaft' but referred to the geographical 'individuals'" (Noma 1963: 97-98). Likewise, Vidal de la Blache (1940: 45-48) utilized the concept of "milieu." Hettner (1991: 182) defined the practical subject as a "spatial arrangement" based on Ritter. He commented that "geography considers a character of various areas or places, to use Ritter's phrase, "the spaces are filled terrestrially on the earth," hence "continents, nations, regions, and districts as themselves" (Hettner 1991: 183).

Hartshorne did not consider the earth itself an actual subject of geography. He adopted Hettner's "spatial arrangements" rather than other confused concepts such the "landschaft" or "environment/milieu" (Hartshorne 1957: 171; 1975: 87). In this, he called it a "space" universally and explained geography in actuality. A clear expression of his view: "in geography, factors of integration are space—although they occur at almost the same time, there are connections among the phenomena that relate to each other spatially (namely in relative locations)" (Hartshorne 1957: 325).

We should pay attention to the fact that this "space" is a concept for regulating a "region", which is requested to integrate the inner "space". In addition, it is this "region" that is the subject of geography for him. This concept can explain the nature of "the world as our unique and perfect Whole." "In order to cover the world, it is recognized that the land area which can be differed from others has fields that change variously; these make so-called regions as spaces as units" (Hartshorne 1975: 193-194). Thus, the basis of Hartshorne's geography has a theoretical core as a "space" or "region". However, what do these concepts have as definitions?

It is essential that his "space" is not an arbitrary classification. It is "an integration of the phenomena in spatial connection" and "the nature of a geographical concept" (Hartshorne 1957: 267). To one degree or another, this "space" is unified among different phenomena like an organism in anatomy[2] (Hartshorne 1975: 176). Therefore, the largest thing in the "space" and the "region" enclosed by the "space" is the whole of the earth. He mentioned "an experience of regions on the earth, as the whole brings a concept of human lebensraum in reality" (Hartshorne 1957: 318). The lebensraum, namely a "living space", is a systematic integration dividing others as a whole that human beings can experience. Thus, he defined the radical subject of geography as not "the earth", but "total reality" and characterized "the world as our unique and perfect Whole". The earth is not the whole until it becomes recognized as the "lebensraum". "The world as the subject of geography—even in the places where no one lives—is

meant to be observed as a human world" (Hartshorne 1975: 54). Without this dividing, even the earth is merely a chaotic integration of phenomena, and it cannot be discriminated from other parts of the universe.

Thus, his "space" and "region" requests integration with the whole. So, the "region" is, as he said, "a part of the actual universe which contains enormous physical and non-physical phenomena related to each other in its interior—in short, everything in one region is contained" (Hartshorne 1957: 175). There is a complex unity and a phenomena regardless of its kind. Geography "doesn't need to except whatever phenomenon belongs to a specific category", but there is no "logical basis which gives priority or higher position to a phenomenon belonging to a specific category" (Hartshorne 1957: 246). It is "basically irrational" (Hartshorne 1957: 226-227) and is even more an interpretation that a substance of a "region" is only material or a materialistic phenomenon. He stressed that "the nonmaterial phenomena are no less objective than the material facts" (Hartshorne 1957: 220).

In this respect, his view was contrary to Schaefer's contemporary materialistic idea, which found a sort of "law" on the arrangement of matter. Hartshorne thought that in the same way that space "must connect a material basis", all nonmaterial phenomena such as "a house, a language, a custom, a political loyalty, or a thought" is inevitably located on the surface (Hartshorne 1957: 224).

It is needless to say that the "region" is an extremely complex concept, and its nature is indefinite. According to Hartshorne (1957: 458), however, the concept of "region" has no nature originally because it is not a phenomenon. Thus, he regarded the "region" as "an intellectual framework that only covers the phenomena, which is an abstract concept that does not exist in reality" (Hartshorne 1957: 458). It is impossible neither "to be compared with other phenomena as a sort of phenomenon", or "to be classified in systematic general concepts", or to state "a law about a relation of other phenomena" (Hartshorne 1957: 458).

The "region" as a "unique" concept introduces such logic. Hartshorne (1957: 458-459) defined the concept with the following: "the region itself cannot be studied from a viewpoint of general concepts, and is unique in respect of an einmalig combination of the phenomena related to each other". Although it is not real substance, the "region" unifies the phenomena inside itself, which is inseparable from these phenomena.

If the concept acquires approval as the subject of geography, the nature of geography is also determined naturally in Hartshorne's logic. It is a so-called "naïve science" which "examines the reality from the naïve position that looks at matters arranged and related as they stand"; this is contrary to the artificial and more forced procedures of a systematic science that is studied which abstracts a special kind of phenomenon from its real sites (Hartshorne 1957: 433). Thus, geography as an "ideographic" or regional geographic study is formulated. He explained logically the traditional viewpoint of

geography by the concepts of "space", "region", and the "whole".

As stated above, Hartshorne's view of geography is summarized as having the subject as the union of the "whole" between the concept of "space/region" and the phenomena it encloses. These are the concepts that are deducted for the explanation of the theses of traditional geography. Next, we should pay attention to the similarity between the "space/region" and the "morphological/geometric" space after Schaefer. Both are made by the arrangement of the phenomena, and enclose it. There are only two differences; (1) whether the interiors are considered as the subject, and (2) whether the interiors are radically materialistic. Schaefer separated the "space/region" from the internal phenomena. Their ideas are not the same, but Schaefer's "morphological" concept is based on Hartshorne's "space/region", and Schaefer criticized this conceptual disorganization.

After all, it is the greatest change of "quantitative revolution" that is the division of the physical geography from the human. As stated above, Hartshorne denied the dichotomy because of the extensive subjects of geography. The quantitativism, however, permitted geography to remove own physical features.

3. The concept of space as a radical problem in geography

Reviewing the history of geography as above, we understand that geographers have supposed a similar concept of space consistently as a theoretical core of geography. This concept hardly changed through the "quantitative revolution"; it only excludes a connection between the space and the inner phenomena that was defined by Hartshorne. However, if there are no theoretical problems in the space, isn't there no end to the theoretical arguments although there has been a consistent basic concept? In this section, we clarify a character of the concept of the "space", and point out its theoretical problems. First, we consider the space advocated by Hartshorne and Schaefer on a philosophical perspective again.

To begin from the conclusion, the space which geographers suppose is similar to Aristotelianism; it is related to Aristotle's concepts of space and his theories of form (*eidos*) and material (*hylé*). It is, however, difficult to approve the statement because of the common view. Didn't Kant found the basis of modern geography, which is developed by Hartshorne or traditional geographers? Didn't Schaefer criticize its "exceptionalism" and establish the theoretical basis of contemporary geography? Or, has Newton's absolute space, which was supposed in the former theory, been superseded by the non-Euclidean related space? These questions are expected. Although there are many inaccurate conceptions, we should still introduce the classic concept of space in Western philosophy in order to address such confusion.

Aristotle was one of the originators of the theory of space in the Western world. He defined "space" as a place that concrete matters occupy in his "Physics" (Aristotle

1968b). This means an outline or boundary of a matter itself (Jammer 1980), and is not identical but inseparable from matter. However, space does not always enclose matter; for example, the matter (water) that occupies space interchanges repeatedly in the river. This space is related to his theories of form and material. Both "form" and "material" were concepts of substance in ancient Greece; the former refers to an essential difference of something from other substances, the latter is a dependent attribute of the former. Aristotle's theory of substance (1968a: 241-242) in his "Metaphysics" is based on these two concepts. According to him, there is a split in the "form" his a body as the "material" concerning a man. On the other hand, concerning matter, its shape is the "form" and its quality is the "material". Considering a round bronze, its geometric outline as "round" is the "form" and what it is made from as "bronze" is the "material". Man has a "spirit"; therefore, he is distinguished from other individuals. The bronze has round "shape"; therefore, it is also distinguished from other bronze matter.[3)] Both the "spirit" and "shape" are identities of substances. Focusing on the materiality-related geographical themes, it is based on similar logic used in both his theories of space and form. Both his "space" and "form" have an attribute of an outline that enclose something of matter. The only difference is that "space" is not matter, but "form" is the body concept of matter. His concept of "space" has the same meaning as an outline with "form," though it is not related to "material".

In the western world, an objection against Aristotle's space had not emerged until Descartes as one of the fathers of modern philosophy. He denied Aristotle's concepts and provided a new idea for a concept of space. His concept is known by the following: "it is obvious that the extension of space (of inner place) is not different from the extension of matter" (Descartes 1964: 107). So, there are no old differences between "form" and "material", or "space" and "matter"; "space" is the "matter" itself. He said "there is only one matter in the whole universe because it is recognized by its expansion" (Descartes 1964: 113). In extreme terms, he denied that the concept of space exists.

Locke (1975: 167), on the contrary, argued for "space as a simple idea". He considered "space" to be the simple idea which is acquired by visual or tactile sensation. For him, the concept of space is a kind of recognition of human subjectivity.

Leibniz understood space as a relative concept: "the order of matters grasped" (Alexander 1956: 69). This concept is nothing but a stipulation about the thing in itself (Endo 1992); therefore, it is not a substance.

Among such modern philosophers, Newton's "absolute" had the greatest influence on later generations. According to him, space is an attribute of God, which is independent to all things, therefore, it will never affect anything, neither be affected (Newton 1995). This theory restored "the view which accepts space itself", that furthermore "dominated physics until the mid-19th century" (Mach 1977: 141) in the age when Aristotelianism was broke and the concept of space was doubted.

After awhile, Kant (1961: 89-96) thought up a unique concept of space. His concept is known for its difficulty. He defined it as "the *a priori* form of the sense"; the only form to recognize outer phenomena by the sense, which is "a faculty to receive the representation by ways that a person is contacted". This "space" means "the condition which makes phenomena possible", and contains "all emergences on us" but never is related to "the entire thing in itself". Consequently, it is the way of recognition that is given for human beings transcendentally, and related not to objects like matter but to human subjects. Kant, however, approved Newtonian mechanics as a correct theory; therefore, he never denied Newton's "absolute space". However, he interpreted it as rather the form of the *a priori* cognitive faculty than "the attribute of God". Space is immanent in mankind; thus, he supposes that space is independent of outer matter. Hence, Kant's concept of space is kind of like an immanent "absolute space" (Inutake 2002: 115).

This is the gist of the classic theories of space in western philosophy. We pay attention to space in geography again. Which of these corresponds to Hartshorne's "space" or "region," which encloses the inner phenomena and is inseparable to them? Which of these corresponds to Schaefer's "morphological law," which is introduced from arrangements of matter and abstract cognition? They are, needless to say, similar to Aristotle; Hartshorne's "space/region" considers inner phenomena as if "form" makes a shape of the "material"; Schaefer's "morphological" concept is like Aristotle's "space," which surrounds "form". Other modern concepts of space stated by Descartes, Locke, Leibniz, Newton, or Kant are indifferent to "form" as a shape or an outline of matter; thus, they are quite unlike geographical space. We cannot recognize this as appropriate in Harvey (1979: 230) or Kosaka's (1975: 534) views, which consider traditional geographical space as Newton's "absolute space"; that it changed to the non-Euclidean "relative space" after the "quantitative revolution". Perhaps their interpretation was based on the following consideration. First, Harvey understood the terms "absolute space" and "relative space" as contrary between the static and the dynamic. He considered that Hartshorne's "space/region" is "absolute" because it has a "static" area, and Schaefer's "morphological" space or Bunge's "geometrical" space are "relative" because they are formed by the "dynamic" moves of matter. Kosaka's view was based on Harvey's. However, he defined "absolute space" as occupancy of coordinates independent of time and opposed it against the "relative space" as the coordinates that are inseparable to time. In Kosaka's "relative space", on account of the time-axis, the "unique" character of Hartshorne's "space/region" is not fixed; it is changed from the "absolute" to the "relative". Whatever their rights or wrongs,[4)] their interpretations are not related neither under Newton's "absolute space" as the metaphysical substance independent to all things, nor to Leibniz's "relative space" as the order forming the relations of the universe. These "static" or "dynamic" spaces are not similar to any

modern philosopher's concepts; they are rather like Aristotle's concept of space. It gives the same conclusions for either the "landschaft" or "environment/milieu" before Hartshorne, or the schools that criticized quantitativism. Hartshorne (1975: 87) said "the concept of 'natural environment'… is a collective noun among individual and complex features, and it is integrated due to being "enclosed". Judging from this word, it is clarified that he regarded the "environment" as Aristotle's "space" or "form." Theorists in humanistic or postmodern geography did not abandon the "geometric" character of space because of concepts like "a place full of meaning" or "spatiality"; Aristotle's "material" supposes the concept of space as "form." Thus, geography has adopted Aristotle's concept of space as its theoretical core.

Accordingly, the changes in the concept of geographical space by the "quantitative revolution" were limited. Schaefer allowed the concept of "formal" space, which encloses the phenomena as the "material" and unifies them to be independent by his statement of "morphological law," He and the quantitativists separated the traditional geography into "pure geography," which deals with the "formal" or "morphological" space and other systematic sciences regarding the phenomena as "material." It is also considered that the criticisms of quantitativism are a kind of revaluation of the "material" parts; all of their themes such as human subjectivity or the political-social meanings started from a restoration of the concern about the phenomena of inner "space" as "form." Although there were antipathies to extreme positivism of quantitativism, they were a movement that aimed to supplement the concept of "space/region" that lost its "material" parts (Fig. 1).

Thus, in fact, geography has succeeded the ancient concept of space of the past two thousand years through varied arguments and a "revolution" regarding its basic theory. But, why did it stick to such an old concept?

The reason is simple. It will be obvious by reconfirming the above modern philosophical concepts of space. Newton's "absolute space" is a metaphysical substance called the "limbs of the God"; it is impossible to be the subject of geography because nothing relates to it. The space as an *a priori* form

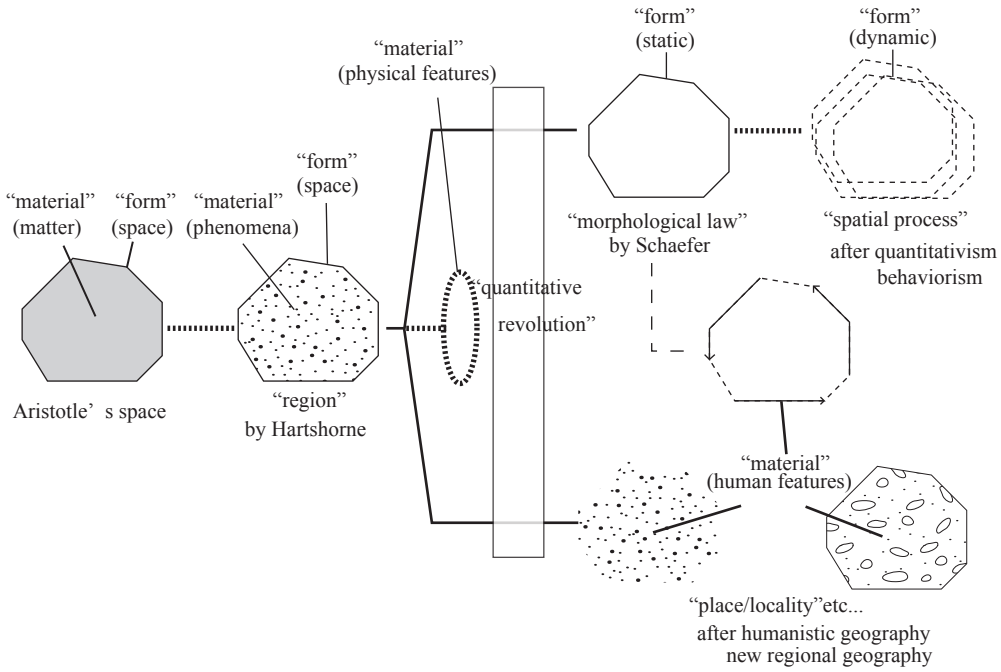

Figure 1. The geographical concept of space throughout the "quantitative revolution"

of sense that was advocated by Kant is also too metaphysical to adopt as the basis of geography.[5] As concerns Leibniz's "relative space" as the order of matters, it is insufficient to explain the nature of geography; almost all sciences deal with the "order of matter". It is not "order" but "matter" as in Descartes' view, so the conclusion is not changed because "matter" is a general subject of the sciences. Locke's concept, as a simple idea, is rather a theme of psychology.

Their concepts of space, of course, corresponded to the logic of modern sciences that they constructed. Although there are strong contrasts among Descartes, Newton, and Kant, all of their ideas have a practical point in common: scientists can deny space by studying physics. Leibniz' concept was related to mathematics; Locke's psychology was considered too. Thus, it is natural that geography has adhered to Aristotle's ancient concept of space because Aristotelianism and geography are contemporary scholarship.

We, however, should be careful to note that this geographical space does not accord perfectly with Aristotle's concept, though they are similar. Aristotle's space encloses only one matter strictly. It never encloses the "total reality" containing innumerable phenomena like geographical space. The concepts of both "form" and "material" are also concerned with only one substance. Therefore, Hartshorne's "space/region" which encloses the phenomena is not Aristotle's; it cannot be demonstrable because its inner phenomena are not unified. Schaefer (1953: 246) criticized this confusion on its definition. However, his "morphological" space also has the same difficulty in that it is made from arrangements of the disunited matters. Thus, the concept of space that has been adopted throughout the history of geography at least for two centuries is very unique in a certain sense.[6] The reason why it is very unique is due to its indefiniteness. What on earth are the grounds that this "space" encloses phenomena that are not even one matter? What explains the arrangements of various matter that are equal to the substantive "shape"? This confusion of concepts accounts for arguments on the theoretical basis of geography that includes a criticism of "exceptionalism". If the concept of space was not confusing, the discussions mentioned above would not have been unnecessary.

Should we abandon it? Of course not. It is no different from disregarding geography itself. This geographical space, though it does not have enough theoretical sophistication, has expressed the real subject of geography systematically.

Thus, we should try to explain the concept of space accurately upon considering the theoretical basis of geography. This paper focuses on Zhu-zi Xue because it has a suitable theory for geography; it is expected that Zhu-zi Xue will clarify the true nature of geographical space. We believe that many unfruitful arguments are over and both the nature of geography and its independence are undoubted if this concept of space is defined strictly.

III. The Concept of Space in Neo-Confucianism

As shown in the foregoing chapter, this paper aims to explain the character of geographical space as a kind of theoretical core that has been adopted even now, and to construct a consistent basic theory of it. In this way, we will illustrate a fundamental aspect of the nature of geography. As also stated above, however, it is a plain fact that there have not yet been sufficient discussions about space. Despite this situation, if we said suddenly that this paper defines space, perhaps no one would believe our statement. This space, in spite of the philosophical confusion surrounding it, has been the basis on which geography conforms to the modern systematic sciences. It is almost impossible to use the modern concepts of space such as that of Descartes or Newton for geographical space; this is shown by the "quantitative revolution" and succeeding schools. Then, has the discussion about space reached a limit?

Of course, new theories of space are brought forth from various quarters. This tendency became conspicuous after the "quantitative revolution," and the theories have been imported from philosophy, physics, mathematics, phycology, economics, sociology, and more. Although these foreign theories of space have had a certain influence on contemporary geography, they were insufficient in radically developing the concept of space. We cannot find a "revolution" of the traditional concept of geographical space therein, with the exception of Harvey (1979). Then, neither modern concepts of space nor new foreign theories suit the character of geography. In this situation, if we venture to give a sophisticated definition of geographical space, we should not do so in the same way that has been used in the past.

Almost all fruits of Western sciences have been adopted for contemporary geography. The reason why geography uses Aristotle's concept of space, which was approved before the mediaeval period, is that it is reasonable for explaining geography itself. If we bring in the new concepts and convert them to an elegant definition, we have to examine a novel system of theory that has not yet been imported by anyone. Therefore, we focus on the Zhu-zi Xue (朱子學). There are few theoretical concerns about not only the Zhu-zi Xue but also the entire Eastern sciences now; Senda (2008) is one of the rare exceptions, although his attempt remains in the early stage.

What is the Zhu-zi Xue? It is very difficult to answer this question in a word, but if we had to introduce it briefly, we can say that the Zhu-zi Xue is the theory of Neo-Confucianism by Zhu-xi (朱熹) and one of the completions of Confucianism developed in the Song period. This theory was also named the "Dao Xue (道學)," or the "Li Xue (理學)" according to its core concept, and was characterized by its systematic logic, which explains the total reality, from the entire universe to the subtlety of human feelings. It originates from the so-called "Bei Song Wu Zi (北宋五子)": "Zhou Dun-Yi (周敦頤)," "Cheng Yi (程頤)," "Cheng Hao (程顥)," "Zhang Zai (張載)," and "Shao Yong (邵雍)," and has been a great influence for Eastern Asia. However, the names "Dao Xue" or

"Li Xue" involve not only the theory of Zhu Xi but also the other theories of Neo-Confucianism, so we call the theory of Zhu Xi the "Zhu-zi Xue" in order to avoid confusion.

Then, which concepts of space are provided in the Zhu-zi Xue? If we could show this using earlier studies, our discussion would be easy, however there are few studies about space in the Zhu-zi Xue or in Chinese philosophy. For example, Oshio's (1979) "Ju-mon Ku-kyo Shu-go (儒門空虚聚語)" is one of the classic examples, and Liu (1992) surveyed theories of space and time through Chinese philosophy. Yamada (1978) analyzed the Zhu-zi Xue as a physical science, astronomy, and cosmology. Kinoshita (1999) mentioned the concept of time in the Zhu-zi Xue. Horiike (2002) contains a discussion about the reception of the concept of Neo-Confucianism by Western philosophers, and Imai (1958) also contains important indications about the Zhu-zi Xue metaphysics. Besides these, there are other ideas about Zhu-Xi such as those of Onodera et al. (1978), Miura (1997), Ohama (1997), Yasuda (1976), Yamane (1983), and so on. However, they did not focus on the concept of space in the Zhu-zi Xue, nor of course touch on the basis of geography. Thus, we have to analyze the concept ofspace in the Zhu-zi Xue in order to apply it to geography. Then, in this chapter, we examine this theory of space in Zhu Xi's works.

We use the following materials. First, we rely on the "Zhou-Yi Ben-Yi (周易本義)," which is a commentary on the "Yi Jing (易經)," by Zhu Xi. According to Imai (1958: 序・一), the "Yi Jing" or "Zhou Yi (周易)" as one of the Five Classics, or "Wu Jing (五經)" of Confucianism, is the source of Confucian theory and the center of metaphysics involving the theory of space, and "has preceded other Classics and been the principle of them." In addition, "the radical theoretical expressions of Confucians have been published as the commentary of this 'Yi Jing.'" Especially, we can find a systematic cosmology or metaphysical theory in the "Ji-Ci Shang Zhuan (繫辭上傳)" as one of the "Shi Yi (十翼)," which is traditionally considered as the ten commentaries on the body of "Zhou Yi" by Confucius. Then, this paper pays attention to Zhu Xi's commentary on the "Shi Yi" as the basis of the theory of space in Neo-Confucianism (we use the "Yuan Ben Zhou Yi Ben Yi (原本周易本義)" (朱熹 1983) in a facsimile edition of "Wen-Yuan Ge Si-Ku Quan-Shu (文淵閣四庫全書)"). Furthermore, we quote many sentences from the "Zhu-zi Yu Lei (朱子語類)" (朱・黎 1962: 正中書局本), which are the analects of Zhu Xi as the essence of his thought. We also use other Chinese literature as the need arises. When using direct quotes, we show the source and pages in each note.

1. "Tian-Wen" and "Di-Li"—the internalized space-time—

a. Interpretation of "Tian-Wen" "Di-Li" before Zhu Xi

When dealing with concepts of space in Chinese philosophy such as that in the Zhu-zi

Xue, we confront the problem of which concepts correspond to the Western word known as "space." In fact, this problem arises in not only Chinese philosophy but also Western philosophy, and not only for "space" but also for other concepts. It is merely an assemblage of the problems of differences in various languages. Then, as mentioned in chapter II, there is a certain common view about the character of the modern Western concepts of space. On the contrary, concepts in the Zhu-zi Xue or in other works of Chinese philosophy have sunk into oblivion even in Eastern Asia where they were taught as part of basic education. Hence, in order to examine the concept of space in the Zhu-zu Xue, we should identify "space" as a Chinese concept.

As Aristotle is behind the Western concept of space, origins of "space" can be found in Chinese philosophy as "Yu-Zhou (宇宙)," which at present generally means the universe or outer space. It appeared in the "Shi-zi (尸子)" (汪 1877) and the "Wen-zi (文子)" (李 2003), which were written in the 4th century BC when Aristotle (coincidentally) was active, and was famed as the word in the "Huai-Nan-zi (淮南子)" (劉 1919), which was written in the 2nd century BC. According to the "Huai-Nan-zi," it means infinite space-time, like Newton's absolute space and time, and it is defined as follows: "Zhou (宙) is the expanse from the past to the future, and Yu (宇) is the expanse of the four quarters and above and below" [7].

The "Dao (道)," which also appeared in the "Huai-Nan-zi," is defined as a concept of space (but not time) further details. The "Huai-Nan- zi" says that, "Originally, 'Dao' covers the heaven and supports the earth. It is diffused in all directions, so that both its height and depth are unable to be measured. However, it enshrouds the heaven and the earth in its interior, and gives 'Wu-Xing (無形),' which means the formless cause, to the universe" [8]. In short, "Dao" is the infinite diffusional space that gives birth to the universe.

Thus, the ancient Chinese concept of space is different from Aristotle's concept. It is considered not as Aristotle's "form" of space, which is related to formations of matter, but as only the field of physical beings, like Newton's concept, while it is not the "absolute," which is independent of all things as the limbs of God because it, especially "Dao," causes all physical beings. Anyway, there is a unique Chinese concept of space that is unlike the Western concepts.

Then, what is the concept that was defined as "space" by Zhu Xi? He found his concept of space in the word that geographers never leave rather than "Yu-Zhou" or "Dao." It is nothing but "Di-Li (地理)," which at present means geography itself. Here, we survey the change in meaning of "Di-Li" before Zhu Xi.

The word "Di-Li" first appeared in the "Ji-Ci Shang Zhuan" of "Yi Jing," as mentioned above. "Yi Jing" said "looking up to it and finding 'Tian-Wen (天文),' looking down to it and finding 'Di-Li,' the cause of 'You-Ming (幽明)' can be known"[9], so that a person understands the process of both the light side (Ming) and dark side (You) of the world

through observation of "Tian-Wen," which means astronomy or astronomical phenomena, and "Di-Li." This sentence, at a glance, seems to show the positivistic methodology of the research into the causes of phenomena by observation. However, we should pay attention to the fact that there were no definitions of these words "Tian-Wen," "Di-Li," or "You-Ming"; we only know that "Tian-Wen" and "Di-Li" are a pair, and that "You-Ming" is recognized by observing them. In order to know the definition of these words, we have to examine the commentaries of "Yi Jing."

The earliest commentary on "Tian-Wen" and "Di-Li" appeared in the "Han Shu (漢書)" (班・顔 1983) written by Ban Gu (班固). He defined "Tian-Wen" very briefly as "the sun, the moon, and other stars, namely the illuminants that are looked upon. 'Di-Li' means mountains, rivers, seas, and wetlands, namely where various matter are born, and then propagated"[10]. This does not seem to be a sophisticated definition. Facing such views, we are impelled to vindicate this definition by saying that because the "Han Shu" was not a commentary on "Yi Jing" originally but a history, it is inevitable that the definition is insufficient. Such a perplexity, however, will be quickly solved by again quoting Hartshorne's "The Nature of Geography" about "lebensraum," which is the basis of the logical union of the earth, the radical subject of traditional geography, as the whole of human experiences, yet by quoting a greater portion than what is quoted in chapter II. Hartshorne said as follows. "An experience of regions on the earth as a whole brings a concept of human lebensraum in real. On the most ordinary and the most obvious occasions, representative of 'lebensraum' are the earth's surface, the sun and moon, and the stellar world as a part of visible space" (Hartshorne 1957: 318).

This definition that "the earth's surface, the sun and moon, and the stellar world" as "the most ordinary and the most obvious occasions" almost corresponds with both "Tian-Wen" "and "Di-Li." Recalling that "Tian-Wen" and "Di-Li" are objects of observation in "Yi Jing," we understand that it is not a coincidental conjunction. The brief definition by the "Han Shu" expressed the world as the objects of experience and observation, like Hartshorne's idea.

This is, however, no more than an unphilosophical definition, although "Tian-Wen" and "Di-Li" were considered as concepts having a geographical aspect. Genuine commentary on these two concepts did not appear until the Tang period when Kong Ying-Da (孔穎達) wrote "Zhou Yi Zhu Shu (周易注疏)" (王 et al., 1983). Kong Ying-Da defined "Tian-Wen" and "Di-Li" as follows.

> There are heavenly bodies in the sky, and their orderly arrangements form patterns. Hence, these patterns are called as "Tian-Wen" (the word Wen "文" contains the meaning of "a pattern." Translating "Tian-Wen" word for word, it means "patterns in the heaven"). There are mountains, rivers, plains, and wetlands, and they have orderly arrangements that form patterns. Hence,

> these patterns are called “Di-Li” (the word Li “理” also contains the meaning of “a pattern.” “Di-Li” literally means “patterns on the earth”). Then, the word “Gu (故 cause)” in the sentence “hence, the cause of ‘You-Ming’ can be known” means the cause of a generation of both facts and matter. Observing “Tian-Wen” and “Di-Li” by the principle of “Yi (易),” we will know “You,” which are formless beings, and “Ming,” which are material beings, and their meanings and causes[11].

Here, Kong Ying-Da regarded “Tian-Wen” and “Di-Li” not as the heavenly bodies or the surface of the earth like the “Han Shu,” but as the patterns of the orderly arrangements of phenomena. Moreover, he considered that the causes of forming the phenomena both on the earth and in the heaven could be clarified by observing these patterns. Indeed, he abstracted the geometric patterns or relations from the world as “lebensraum.” His interpretation is just like Schafer’s “morphological” space as geometric patterns of the phenomena. Because the result was a match for the theories of present geography, Yu (于 1990: 17) commented on Kong Ying-Da’s “Zhou Yi Zhu Shu” that “the formation of ‘Di-Li’ (by Kong Ying-Da) hastened the integration of knowledge and gave the law to them” and that “it is the great progress of Chinese geography,” although this is the first commentary about “Di-Li.”

After Kong Ying-Da appeared, commentaries on both words “Tian-Wen” and “Di-Li” increased gradually, and then increased rapidly after the Song period. Of course we do not mention them one by one; they have various and sophisticated definitions. For example, “Yi Jing Jie (易經解)” (朱 1995) written by Zhu Zhang-Wen (朱長文), who was born in the Northern Song period, said

> The reason why heaven “Tian” is called patterns “Wen” is that relations such as the length and breadth or the angles of the location where heavenly bodies are observed have clear orderly patterns…the reason why the earth “Di” is called patterns “Li” is that relations like that between the high ground and the low, or between the sources and the ends of rivers, are also clear and orderly[12].

He defined both “Tian-Wen” and “Di-Li” as the relative locational relations among matter that can be illustrated as geometric patterns. His definition was based on Kong Ying-Da, while he further considered the celestial longitude and latitude of heaven, the heights of static matter, and the origins and destinations of dynamic matter on the earth were hence more modernistic. After these, commentators appeared who were sympathetic with the history of the concept of geographical space after the “quantitative revolution” such as Su Shi (蘇軾), who interpreted “Tian-Wen” and “Di-Li” as merely epistemological classifications (蘇 1983), and Zhu Zhen (朱震), who

interpreted them as having the appearance of a metaphysical principle (朱震 1983). Thus, the definition of "Tian-Wen" and "Di-Li" grew more sophisticated, and achieved one of the ultimate definitions through Zhu Xi's commentary, "Zhou Yi Ben Yi," on which this paper focuses.

b. Zhu Xi's interpretation of "Tian-Wen" and "Di-Li"

How did Zhu Xi define "Tian-Wen" and "Di-Li" in "Zhou Yi Ben Yi?" We can find this in his commentary. He noted that "Tian-Wen" means that which has day and night, up and down, while "Di-Li" means that which has south and north, height and depth" [13]. His definition, as you see, is extremely short in the original "天文則有晝夜上下，地理則有南北高深". It is a very short sentence of sixteen characters, while these two comments point out that "Tian-Wen" and "Di-Li" are a kind of space-time concept. The words "day and night, up and down" are a union of both infinite time, which consists of the continual circulation of day and night, and infinite space, which consists of the upward and downward diffusion of the universe. The words "south and north, height and depth" express finite space, which consists of the horizontal and vertical expanse of the earth. These laconic comments, however, will be doubted and criticized due to their minimalism. Then, we confirm that Zhu Xi's concepts are truly equivalent to the space-time concept and that their meanings have been greatly advanced, by referring to the Zhu-zi Xue.

First, there is a doubt that the words "up and down" in the comment about "Tian-Wen" mean not the expanse of space but merely up-and-down motions. However, it is sufficient to quote Zhu Xi's saying that "'Tian-Wen' has its half on the up side, so that it must have the other half on the down side" [14]. He declared that "Tian-Wen" is a space like an expanse that diffuses upward and downward.

Next, the interpretation that "day and night" is a concept of time may be doubtful if we do not give a supplementary explanation. It is also corroborated by Zhu Xi's sayings. For instance, he remarks that "the concept of 'Dong-Jing (動靜)' as the dynamic and the static is just like 'day and night,' and the concept of 'Yin-Yang' is just like the expanse of north, south, east, and west. Then, the words written by Zhou Don-Yi (in "Tai-Ji Tu-Shuo 太極圖説") 'once move, once stop' concern time, and the words separated as 'Ying' and 'Yan' concern location" [15], and Imai's view of this sentence is that (1958: 421) "'Dong-Jing' is explained as temporal and successional like 'day and night,' and 'Ying-Yan' is explained as spatial and directional like north, south, east, and west." The statement by Kinoshita (1999: 421), who analyzed Zhu Xi's theory of time, says that, "for Zhu Xi, it is the absolute and fundamental rhythmic progression of circulation of 'Ying-Yan' that appears as one time throughout the universe that is time as the changes of day and night."

Besides, some people may consider that "up and down" or "south and north, height

and depth" are not space but expanses of material phenomena. However, Zhu Xi defined such materials in space as "Xing-Xiang (形象)," so that "Tian-Wen" and "Di-Li" are distinguished from these as entire concepts that contain all physical things. Looking at "Zhou Yi Ben Yi," we can find the sentence "'Xiang' is the sort to which either the sun, the moon, or other stars belong, and that 'Xing' is the sort to which mountains, rivers, animals, and plants belong" [16]. It is clear that Zhu Xi did not consider these material concepts as concepts of space or time because they are not areas such as "Di-Li" in the "Han Shu," which is defined as "mountains, rivers, seas, and wetlands," but merely materials regardless of the their attributes. His "Xing" is the heavenly bodies that are separated from "Tian-Wen," and his "Xiang" is the phenomena on the earth that are separated from "Di-Li." This discrimination is similar to Ritter's view that spaces on the earth are different from the "filling" of the phenomena there. Ritter (1991: 86) said, "the spatial fillings on the earth, as are generally known, consist of two forms as solid or liquid, and dynamic or static matter." Here, comparing Ritter's "filling" in his spaces (see chapter II) with Zhu Xi's "Xing," which fills "Di-Li," we confirm that there is a strange correspondence; Ritter's comparison of solid and liquid matter is similar to Zhu Xi's definition of mountains and rivers, and the comparison of dynamic and static matter is similar to the definition of animals and plants. Then, there is only a difference between "spaces" and "Di-Li." Remembering "Di-Li" is generally translated as "geography," we understand the importance of this correspondence and the prescience of Zhu Xi.

Even so, you may think that it is a far-fetched view that we consider "day and night, up and down" as infinite, and "south and north, height and depth" as finite. On this point, Xiong He (熊禾), who commented on the "Yi Jing" interpretation in the Zhu-zi Xue, has already stated the same view by commenting on Zhu Xi's definition as follows: "looking up to Jing-Wei (經緯), namely 'Tian-Wen,' which expands longitudinally and latitudinally, looking down to Yi-Ding (一定), namely 'Di-Li,' which expands to a limited extent"[17] (熊 1995). The circulation of day and night, and the upper and lower ends of the universe are endless, or, at least, cannot be considered. On the contrary, "south and north, height and depth" have their own ends such as the South and North Poles, and the summits and the deeps. This cognitive difference is the reason why "Tian-Wen" is infinite and "Di-Li" is finite. Such a difference between the infinite and finite puzzled Zhu Xi from his infancy. He expressed his thoughts on this difference and on the impossibility of thinking of the infinite world in the following way:

> What is there outside of space? I have been confused by this problem since I was five or six years old. When I encountered the view that space is infinite, I thought it must have limits. The limits are just like a wall. There has to be something or other behind the wall. I was immersed in speculation almost sickly at that time. And still now, I

don't know the world behind the wall [18].

For him, a recognition of space or time is an indicator that divides their natures. Thus, "Tian-Wen" corresponds to Newton's absolute space and time, while "Di-Li" rather corresponds to the so-called "lebensraum." Especially, "Di-Li" defined as what is "finite" is an appropriate condition for "lebensraum," which is "an experience of regions on the earth as the whole" (Hartshorne 1957: 318).

Besides this, "Tian-Wen" and "Di-Li" themselves are concepts that are acquired by cognizance if their natures are dependent on the recognition of their limits. These are shown by the character of You (有), meaning "having," before each of the two phrases "day and night, up and down" and "south and north, height and depth." According to Zhu Xi, "Tian-Wen" is not just "day and night, up and down," and "Di-Li" is not just "south and north, height and depth"; they are what are "having" these features. Consequently, the above two phrases are understood as the space-time that is the inner phenomena in human cognizance[19].

Zhu Xi's definitions connote not only these meanings. He stated that "Tian-Wen," "Di-Li," and "Xing-Xiang" have the characters of the appearance of the principle. He said,

> The day is "Ming (明)," the night is "You (幽)," the up is "Ming," and the down is "You." Observing either the circulation of day and night or that there are heavenly bodies in the upper and lower parts of the universe, we understand the causes of "You-Ming" in "Tian-Wen." The south is "Ming," the north is "You," the height is "Ming," and the depth is "You." Observing the limits of the earth's surface, we understand the causes of "You-Ming" in "Di-Li" [20].

His comments suggest that either "day and night, up and down" or "south and north, height and depth" are in contrast to "You-Ming." Then, above infinite space and time, or the finite space called "Tian-Wen" and "Di-Li," reflects the principle that decides "You-Ming" in the world. Therefore, he answered the question "does the phrase 'looking up to it and finding "Tian-Wen (天文)," looking down to it and finding "Di-Li"' mean an observation by the 'Yi (易)' principle?" by answering:

> Yes, so the phrase "hence, the cause of 'You-Ming' follows them." "You-Ming" is just "Ying-Yan Gang-Rou (陰陽剛柔)." It is only the "Ying-Yan" principle in spite of various explanations. The south is "Ming" and the north is "You." If the sun rises, it is "Ming"; if the sun sets, it is "You." By looking at both "Tian-Wen" and "Di-Li," we know what the principle is [21].

We also understand that the contrast between "Tian-Wen" and "Di-Li," and all of their features, are in the "Yin-Yang" principle, from the following quotation.

> "Tian-Wen" is the Yang; "Di-Li" is the Yin. However, they have Yin and Yang in each of them. In the former, the day is Yang, the night is Yin; the sun is Yang, the moon is Yin. In the latter, the height is Yang, the depth is Yin; the flat is Yang, the steep is Yin; the southeast is Yang, the northwest is Yin, and so. "You-Ming" is just the "Yin-Yang" principle [22].

Furthermore, this "Yin-Yang" controls "Xing-Xiang." Dong Kai (董楷), who was a pupil of a pupil of Zhu Xi, said that,

> The changes don't occur after "Xing-Xiang" as the cause; they don't emerge like "Xing-Xiang." Then, we can recognize a locus of changes through "Xing-Xiang." The sun, the moon, or other stars belong to "Xiang"; mountains, rivers, animals, or plants belong to "Xing." Then, "Xiang" is formed by Yang Qi (陽氣, which is translated as positive energy); "Xing" is formed by Yin Qi (陰氣, which is translated as negative energy). But, because there is Yin in the Yang, the sun and a kind of star is Yang, so that the moon and other half stars are Ying. Because there is Yang in the Yin too, mountains are Yin, so that rivers are Yang [23] (董 1983).

According to this, "Xing-Xiang" is phenomena that show the principle of the changes as their cause. Zhu Xi's concepts of space-time and phenomena have the principle called "Yin-Yang" in common.

From the above, we can draw the following conclusion: Zhu-Xi's concepts of "Tian-Wen" and "Di-Li" are infinite space-time and finite space that express the "Yin-Yang" principle, and are formed in the cognizance of observers. Zhu Xi combined the traditional "Tian-Wen" and "Di-Li" since the "Han Shu" with the concepts of "Yu-Zhou" or "Dao" in the "Huai-Nan-zi." He redefined "Yu-Zhou," which is absolute space-time as "Tian-Wen," and separated "Di-Li," which is "lebensraum," from it by the standards of humans' general limits of cognizance. In addition, he considered the phenomena within "Tian-Wen" and "Di-Li" as other percepts, defined them as another concept of "Xing-Xiang," and excluded the character as the integration of phenomena from the traditional interpretation of "Tian-Wen" and "Di-Li." Finally, he concluded that they are recognized universally because they appear as the "Yin-Yang" principle. We assume that there is the logic such as that of Kant, who internalized Newton's absolute space as the *a priori* form of sense behind his consideration[24]. The concepts of "Tian-Wen" and "Di-Li," which were defined very briefly by Zhu Xi, preceded Kant's

concept of space by hundreds of years. It is, however, just one aspect of the Zhu-xi Xue space-time theory. In order to grasp the full meaning of the concepts, we have to examine the substance of space-time called "Tian-Di" and "Ren."

2. "Tian-Di" and "Ren" —the substance of space-time—

a. "Tian-Di" as the substance

It is assumed that there is a substance in our cognition as an object of cognition because "Tian-Wen" and "Di-Li" are formed by cognition. As quoted above, there must be the entity of the world deep in "Tian-Wen" and "Di-Li." Of course, we can express it in general words such as "world," "universe," "earth," and so. In fact, these general concepts are the first subjects of traditional geography; there are hardly discussions about their consistency because it is considered as self-evident, so that these words are often attacked because of their ambiguous definitions. As seen in chapter II, important concepts in traditional geography, such as "region," "environment/milieu," and "landschaft," mean "space as units" (Hartshorne 1975: 193-194), and were devised to research the ultimate and too general substance almost equal to all things. Then, the reason why these "actual" concepts of space were abandoned and the "morphological" or "geometric" spaces were abstracted from them was that the consistency of the phenomena as their "material" and conceptual consistency of "the earth" as the entirety of these phenomena were uncertain. Therefore, in order to maintain their conceptual independence and the consistency of "Tian-Wen" and "Di-Li" with "Xing-Xiang," it is necessary to define their substance strictly. How did Zhu Xi clarify the definition of the substance of space, namely "the earth" or "the world," as the ultimate subject of geography?

In China and East Asia, this kind of concept was called "Tian-Di (天地)" traditionally; and Zhu Xi used this name for his concept of "the world." This word "Tian-Di" means the heaven (天) and the earth (地). Zhu Xi, however, was not content with such an old and simple definition. He considered "Tian-Di" as the "substance of Yin-Yang Xing-Qi (陰陽形氣)" [25]. Moreover, he abstracted their core attributes and called them "Qian-Kun (乾坤)" to clarify the relation between "Tian-Di" and other beings, especially "Qi." This analysis made him able to unify the world strictly as one reasonable concept. The following is Zhu Xi's interpretation of "Tian-Di."

As in the discussion about the concept of "Tian-Di," we should pay attention to the various meanings of this traditional word; we will deal with only "Tian-Di" as the entire of world but other concepts. In Chinese philosophy, "Tian-Di" or the word "Tian" connotes various meanings, not only "heaven and the earth" or "the (physical) world" but also God, fate, nature, and virtue (Yamane 1983: 186). However, Zhu Xi, who was a kind of atheist, denied God and such characters of "Tian-Di," so that he answered the

question “is there God above in the heaven?” by saying “the ‘Li (理)’ (the ultimate and metaphysical principle of laws) controls all things” [26]. However, the word “Tian” was polysemous for him; he regarded that there is the “Tian” as the God by the context[27]. Thus, although “Tian-Di,” or “Tian,” was not given a simple meaning, it was not confusing. We should mention only “Tian-Di” as the substance of “Tian-Wen” and “Di-Li.” When we say “Tian,” it must be paired with “Di.” It is separated from other “Tian” or “Di” as the substantial concept that says “the ‘Tian’ is one huge material” [28]. For details of other meanings, see also Yamane (1983) and Yamada (1978).

As quoted earlier, Zhu Xi defined “Tian-Di” as the “substance of Yin-Yang Xing-Qi,” in short, the substance of the general physical beings and Yin-Yang beings. We can also see in the same statement that ‘“Tian-Di’ is the entity that unifies the only one huge Yin-Yang” in the “Zhu-zi Yu-Lei” [29]. Thus, it is understood that “Tian-Di” connotes the concept of “Yin-Yang.” But what is “Yin-Yang?” Indeed, this concept is one of the most abstruse words in Chinese philosophy. Therefore, we must also discuss what this concept is.

“Yin-Yang” is known as the basis of the “Yi Jing” system. This paper deals with Zhu Xi’s concepts seen in his commentaries of “Yi Jing”; the body of “Yi Jing” is binary symbols called “Gua (卦),” which consist of a sign called “Yao (爻),” either broken lines as “Yin” or full lines as “Yang.” This “Gua” has two styles: eight types of “Gua,” which consist of the triplicates of “Yao”: as Qian (乾)☰, Dui (兌)☱, Li (離)☲, Zhen (震)☳, Xun (巽)☴, Kan (坎)☵, Gen (艮)☶, and Kun (坤)☷; and sixty-four types of “Gua,” which are constructed by further double eight types. Zhu Xi considered that these “Gua” and “Yao” are produced from the “substance of Yin-Yang” as “Tian-Di” itself[30]. He emphasized the combination between “Yi Jing” and “Yin-Yang.” As he said that “a character of ‘Yi (易)’ means only Yin-Yang” [31], “Yi (易)” can only be expressed in one word: “Yin-Yang” [32], and that “Yi is just this Yin-Yang” [33], his conviction was strong. But what does this “Yin-Yang,” which is regarded as the principle, mean in actuality? Why can it be considered as the basis of “Yi?”

“Yin-Yang” is the radical nominalism that there is a difference in every moment and being. Zhu Xi said, “there has never been a non-Yin-Yang being. Just as motion and stillness, pronunciation and silence, these differences are the Yin-Yang principle itself. Suppose there is a fan. If someone uses it and fans something, it is Yang. Then, if he stops to use it, it is Yin. There is nothing that doesn’t have the principle” [34]. All differences among not only matter but also moments in the same matter, such as atoms or ideas, are Yin and Yang. According to this principle, all identities are denied. There is a material called “water.” However, there is no water but water molecules; they are separated as Yin and Yang. Then, the molecules consist of oxygen atoms and hydrogen atoms; they are also separated. The atom consists of an electron and a nucleus, and the nucleus further connotes a proton and a neutron; they are also Yin and Yang. Moreover,

the proton and the neutron consist of three quarks. The quark, which is considered one of the smallest forms of matter, also consists of its past and its future. All beings continue as differential; this differential is "Yin-Yang." It is unceasing opposition[35].

This "Yin-Yang," however, is also the basis of the theory of the creation of the universe in "Tai-Ji Tu-Shuo." We find that the word "Tai-Ji" is the metaphysical Dao and Yin-Yang is the physical "Qi (器)"[36] in the "Tai-Ji Tu-Shuo Jie (太極圖説解)" as noted in Zhu Xi's commentary of this book (湖 1981). This obviously means "Yin-Yang" are material and physical beings[37], so that this interpretation considers "Yin-Yang" as a kind of gas-like material (Yasuda 1976). This may be an extreme instance, but there is also no doubt that "Yin-Yang" is connoted by "Qi," which means general physical beings. Zhu Xi stated, "All things are Yin-Yang. There is no non-Yin-Yang things" [38], and suggested "'Yin-Yang' is just the one Qi. A decline of Yang is an increase of Yin. It is just a misunderstanding that one Yang Qi declines and the other Yin generates"[39]; the "Yin-Yang" is the perfect whole of physical beings. We can read from his thought that everything is based on the opposition of "Yin-Yang," which is principle to accomplishing the "Qi" monism. Contrary to the above "Yin-Yang" principle, this is the logic that restores all things to oneness. The differences among matter are naturally dissolved under this logic. The difference in "Yin-Yang" is only a decline and an increase, and proves all different things are originally one. Nominalistic differences do not become a reality until there are relative beings. They must be relative. Therefore, these differences are dependent on other beings. "Yin" does not become "Yin" itself without "Yang." It is the same with "Yang." Consequently, it is concluded that their difference is an aspect of the monistic material called "Yi Qi," which means physical oneness. Zhu Xi found the realistic substance in the final nominalism.

"Tian-Di" is hidden behind this theory of materials. As quoted previously, "'Tian-Di' is the entity that unifies the only one huge Yin-Yang." It is the substance that unifies the huge Yin-Yang as the mass of miscellaneous matters. "Tian-Di" assimilates various matters separated as "Yin" or "Yang" into the one world because of infinite differences. It is just the "substance of Yin-Yang Xing-Qi." However, it is not a complex concept mixed with various and disordered phenomena like the concept of "world" or "earth." Because there is nothing that can be unified, it is rather unity that is forced to be the whole.

Even so, why is "Tian-Di," which is equal to the whole world as the unifier of "Yin-Yang," considered as a radical nominalistic principle? This is because "Tian-Di" consists of the essences of "Yin-Yang." These essences are called "Qian-Kun (乾坤)," which also means pure Yin-Yang "Gua." It is understood that this concept is inseparable from "Tian-Di" by considering Zhu Xi's statement that "'Qian-Kun' is its mind and emotional side, and 'Tian-Di' is its shell. In fact, they are one principle." This can also be understood by considering his pupil's statement complementing this,

“‘Tian-Di’ is the physical being. ‘Tian-Di’ is the shell of ‘Qian-Kun,’ and ‘Qian-Kun’ is the mental and emotional side of ‘Tian-Di’” [40]. Then, Zhu Xi defined “Qian-Kun” by saying “‘Qian’ is robustness and strength: the essence of Yang,” and “the essence of Yang is robustness and strength, and its greatest embodiment is Tian” [41]; he also says “‘Kun’ is obedience: the essence of Yin,” and that “there is nothing in the embodiment of Yin as great as ‘Di’” [42]. However, their meanings have not yet been ascertained. The expressions “robustness and strength” and “obedience” are based on the text of “Yi Jing,” so it is not Zhu Xi’s original interpretation. His theory is rather influenced by Zhang Zai and is known as a precursor of Leibniz’s concept of space. In his writings “San-Liang” in the chapter “Zheng-Meng” (湖 1981), about “the essence of Yang” and “the essence of Yin” as the definition of “Qian-Kun” he said, “the essence of Yin is the action of condensation. The essence of Yang is the action of diffusion. Whenever Yin condenses something, Yang always diffuses it” [43]. He regarded the essence of “Yin-Yang” as the inherent attraction and repulsion of materials. Zhu Xi also commented that “Zhang Zai saying that ‘whenever the Yin condenses something, the Yang always diffuses it’ rather clarified the essence of ‘Yin-Yang’” [44]. The “Qian-Kun,” therefore, is the action of condensation and diffusion. It is the same as the action that creates space and materials; “Tian-Wen” and “Di-Li” as space and “Xing-Xiang” as materials are formed by the condensation and diffusion of “Yin-Yang” as “Yi Qi.” Thus, Zhu Xi said that “there is the only one ‘Yin-Yang’…there is nothing called ‘Yin-Yang.’ For example, front is Yang, rear is Yin; left is Yang, right is Yin; the upper side is Yang, the lower side is Yin”[45] or there was only the Qi of “Yin-Yang” at the time when the world begun. This sole physical material, the so-called “Qi,” moved and collided with itself, collided more violently, and finally generated a lot of dust of the matter. And this dust had nowhere to go; as a result, it condensed at the center of world as “Di.” By contrast, the rest of the “Qi,” which was clean, diffused and became the “Tian” or the heavenly bodies. They were on the outer edges of the world, and revolved around “Di”[46]. The former quotation explained the process of the formation of space; the latter explained the process of the formation of materials.

Besides this, the “Qian-Kun” is related to time. There is a sentence that “Qian knows the great beginning, Kun perfects materials (乾知大始，坤作成物)” in “Yi Jing”; Zhu Xi commented on this sentence, saying, “the word ‘know (知)’ means what rules (主). ‘Qian’ rules the beginning of matter, and ‘Kun’ perfects it,” and added, “Generally, Yang precedes Yin. Yang gives it and Ying receives it. The light and cleanliness of Yang is still formed, and the weight and cloudiness of Yin is already formed” [47]. This is not all. He also said that “the word ‘know (知)’ means what conducts. ‘Qian’ conducts the great beginning. The great beginning is the beginning of materials. ‘Qian’ creates the materials, and ‘Kun’ perfects this process” [48]. These mentioned the determination of the future of matter by “Qian-Kun.” It is an action that controls time, as opposed to

condensation and diffusion as the cause of space. It should be considered, however, as a variety of condensation and diffusion. The great beginning by "Qian" is the appearance of materials by the essence of Yang. It is caused by diffusion from the primary oneness called "Yi Qi." Then, the perfection by "Kun" is the process through which the essence of Yin creates various matter by the condensation of "Yi Qi," which was diffused and rarefied into the formless. Zhu Xi's concept of time is such circulations that repeat over the generations and the perfection of material beings; after all, it is the condensation and the diffusion of "Yin-Yang."

The following words of Zhu Xi summarized the action of "Tian-Di" and "Qian-Kun" at their essence. He said, although "Yin-Yang" consists of two words, it is a movement of "Yi Qi": ebb and flow, or vanishing and emergence of "Yi Qi." Where it flows is the Yang, where it ebbs is the Yin; where it emerges is the Yang, where it vanishes is the Yin. It means just that the movement of "Yi Qi" creates all things in the expanse of the space and time [49]. He considered that either space or time, or the materials or whatever, are generated by the condensation and diffusion of "Yi Qi." He also expressed that "Yin-Yang" creates these by the dynamic and static forms, in the following statement about "Tai-Ji Tu-Shuo." He said,

One of the "Yin-Yang" is dynamic; the other is static. The words of the "Tai-Ji Tu-Shuo," "once moves, once stops; and they become the basis of each other," represent the dynamic aspect, which is time such as the seasons. The words of the same book, "separated as Yin, as Yang, two types are fixed," represent the static, which is space such as the upside and downside and the four quarters [50].

Or, the words quoted above actually have the same meanings as "the concept of 'Dong-Jing (動靜),' as the dynamic and the static are just like 'day and night,' and the concept of 'Ying-Yan' is just like the expanse of north, south, east, and west. Then, the words (in 'Tai-Ji Tu-Shuo') 'once move, once stop' concern time, and the words 'separated as Ying, as Yan' concern location" [51]. Thus, "Yin-Yang" as "Yi Qi" is unified by "Tian-Di," which has the essence called "Qian-Kun." "Yin-Yang" are different from each other, so that they repeat an ebb and flow. However, this movement naturally forms space and time, and they are united as the one world called "Tian-Di." Thus, it was considered that "all matter has a part of the 'Qian-Kun.' It must be in even the smallest places, the most invisible points like the tip of a hair, or wherever" [52] and that "Tian-Di" as the whole world solves the opposition of "Yin-Yang" among the minutest matter through the actions of "Qian-Kun." Therefore, the scale of "Tian-Di" is elastic, as stated that "'Tian-Di' is the hugest matter of all and the matter of all is the minutest 'Tian-Di'"[53]. It is the world formed by the condensation and diffusion of "Yin-Yang." "Yin-Yang" must create space and time, so that it is just one "Tian-Di" regardless of its

scale; even if the whole universe, or "Di-Li," which is the finite space of all people's limited cognitions, a sphere of one person's cognizance, "space as a unit," a field of vision at the moment, a microcosm in an atomic nucleus, or whatever else, they are one independent "Tian-Di" as the whole[54].

This logic shows that "Tian-Di" is the substance of "Tian-Wen" and "Di-Li." As stated above, "Tian-Di" is the body of action of the formation of space and time by "Yin-Yang." Thus, it is proper that the "Yin-Yang" principle appears in "Tian-Wen" and "Di-Li" as a kind of space and time. The division between the infinite "Tian-Wen" and the finite "Di-Li" by its observability is practicable because of the nature of "Tian-Di," which unifies all things regardless of scale. Thus, the concepts of "Tian-Wen" and "Di-Li" can be explained by the logic introduced in this chapter. However, these are still inadequate for confirming that "Tian-Di" is the substance of "Tian-Wen" and "Di-Li." Why is the division of these two concepts based on human cognition? Of course, there is no contradiction. "Di-Li," which separated from "Tian-Wen," is consistently united as one concept. The question is what is the reason such a division was created.

b. "Ren" as the logic

At a glance, it is incomprehensible that "Tian-Wen" and "Di-Li" must be formed by the human cognition as an uncertain condition. This argument was, however, not particularly surprising in works of Chinese philosophy like the Zhu-zi Xue because of the traditional thought of "San-Cai (三才)," which means the incorporation of "Tian-Di" as the world and "Ren (人)" as mankind as its basis.

The thought of "San-Cai," that there are "three functions of the world," "Tian (heaven)," "Di (earth)," and "Ren (mankind)," is perhaps very old. It might have been a kind of naive religious concept that opposed mankind to "Tian-Di" as God as the ruler of the universe; "Ren" originally meant mankind itself in ancient times so that "Tian-Di" was the sky and the earth. However, the "Yi Jing" already said, "'Yi' as the book is immeasurable and provides all things; it has 'Tian Dao,' 'Di Dao,' and 'Ren Dao,' which are the principle of 'Tian-Di' and 'Ren' (易之爲書也，廣大悉備．有天道焉，有人道焉，有地道焉)." Therein, the "San-Cai" was considered as a sort of philosophical concept such as "Dao," so that it had lost its literal meaning. It is the human or psychological principle that is an abstracted concept of mankind itself, and accompanies "Tian-Di" as the physical principle that unifies space, time, and materials. Then, Zhu Xi succeeded this interpretation of the "Ren" in the "Yi Jing." He said that "the laws of both 'Qian' and 'Kun' appear in 'Tian-Di' as separate, but 'Ren' possesses both laws"[55], or "'San-Ji (三極),' as meaning 'three extremes,' is the extreme principle of 'Tian,' 'Di,' and 'Ren.' Each of the 'San-Cai' is, in fact, the 'Tai-Ji'"[56]. But why does "Ren" possess both the laws of "Qian" and "Kun?" Is "Ren," namely mere mankind, the "Tai-Ji" that rules the condensation and diffusion of the universe?

Zhu Xi approved of such an absurdity that human beings rule universal law; he understood this word "Ren" not as mankind but as the cause of law and order. And this is not original to him but is traditional. We can see that "the 'Sheng-Ren (聖人)' as the sage controls 'Tian-Di' and all matter (天地萬物, 聖人裁之)" in the "Shi-zi," and that, "inevitably, 'Tian' creates everything, and 'Di' perfects it[57]. However, they cannot rule it. Then, a monarch rules 'Ren' and accomplishes the functions of 'Tian' and 'Di.' So, he is called as a monarch. If not, how does 'Tian-Di' fulfill its nature?" [58] in the commentary on the "Yi Jing" by Si-Ma Guang (司馬 1983), who is known as the author of the famous chronicle "Zi-Zhi Tong-Jian (資治通鑑)." These words mean that "Ren" is a sort of controller of "Tian-Di." By these, we know that "Ren," which is not obedient to "Tian-Di," is as huge as the universe. "Ren," indeed, is regarded in traditional interpretations as the ruler that reigns but not creates anything.

Zhu Xi's concept of "Ren" is shown in his commentary on a sentence of the "Yi Jing": "limiting the creation of 'Tian-Di' and having no excess, forming the details of the universe and having no rest, sinking into the law of day and having no night to know. Hence, 'Shen (神)' as the divinity is omnipresent because of no direction and 'Yi (易)' is incorporeal"[59]. He commented that "the creation by 'Tian-Di' is infinite. The sage (Sheng-Ren) makes a model of it and would not let it stray from the middle way" [60]. Thus, he thought that it was necessary for the sage that "Tian-Di" creates everything in order (he considered "Shen-Ren" as the sage is "Ren" itself [61]). Here, we know that "Ren" is the principle that causes law and order. Furthermore, we can see by his more detailed comments in the "Zhu-zi Yu Lei" that

> The creation of "Tian-Di" is infinitely torrential, and it never stops melting such as metal in a furnace. Then, Shen-Ren becomes a mold—that to say, "Ren" becomes a model of the creation of "Tian-Di"—and leads it to stray from the middle way. The next words "forming details of the universe and having no rest" concern the quantity and quality of matter. "Ren" determines the inherent nature of each matter with its ideal length, size, extent, and shape, so that there is no omission in its action that is the causes law and order. The words "limiting the creation of 'Tian-Di'" mean the maximum of its actions, and "forming details of the universe" means the minimum [62].

According to this, "Ren" gives "Wu-Li (物理)," namely the inherent nature of matter to all things from "Tian-Di" as the whole to its creation. If it had not given the inherent nature to them, they would be "Rong Hua Bu Xi (鎔化不息)," that is, they would not receive its nature or any form; after all, they would have remained in formless chaos. Therefore, he answers the question "Will 'Tian-Di' collapse?" with "it must not collapse" and "however, if the principle of 'Ren' was about to be annihilated, all things would fuse

into one, simultaneously, in that moment and become simple chaos itself, so that whether a man or matter, they would become extinct, and finally a new world would be born" [63]. If the cause of law and order vanished, "Tian-Di" would lose control of its infinite creative power and return to the chaos of the beginning while swallowing up the universe. That kind of incident would be impossible, to be sure, because both "Ren" and "Tian-Di" are fundamental beings of reality. Zhu Xi denied the above question for this reason. Hence, it is understood that "Ren" according to the concept in the Zhu-zi Xue is the principle that inheres all things as the creation of "Tian-Di," from the whole world to the minutest matter, and gives the nature as law and order to them.

Such inherence of "Ren" is also mentioned in Zhu Xi's complement to his comment that "'Shen (神)' as the divinity is omnipresent because of no direction and that 'Yi (易)' is incorporeal." He said,

> This "direction" (the original Chinese word is "Fang 方") means the expanse of the upside, downside, and four quarters. The divinity of "Ren" is here or there or wherever; it lies in the whole of space. So, it is said "no direction." And then, "'Yi (易)' is incorporeal" means that sometimes it is changed into Yang from Yin, sometimes it is changed into Yin from Yang, so that its condition is not confirmed. So, it is said it is "incorporeal"…and that "Yi" is the change. The Yin-Yang is not unchangeable even for a day or for a minute (therefore it lies in the whole of time) [64].

He also emphasized that the action of "Ren" extends to the whole of space-time. "Ren" as the universal principle is immanent in "Tian-Di" as the substance of space-time.

But why does this principle have such an action, and is called "Ren," the Chinese word meaning "mankind?" It seems that there are no human features in the character of this concept as the principle. However, it should be named "Ren." There is a human feature, so that the law and order that rescue "Tian-Di" from chaos can receive the basis of their identity. The reason is shown in Zhu Xi's interpretation of the statement "being similar to the 'Tian-Di,' hence no difference; knowing the universe extensively and ruling the world, hence no excess" [65] in the "Yi Jing." He commented on it as follows.

> This sentence describes the perfection of "Xing (性)," which is the nature of matter connoting the metaphysical principle by "Sheng-Ren." "Dao" as a principle of "Tian-Di" is both "Zhi (知)" as a kind of knowledge and "Ren (仁)" as a kind of benevolence. "Tian" knows the universe extensively, and "Di" leads and forms the world; the former is done by "Zhi," the latter is done by "Ren (仁)." Then, all things can be recognized and maintain their neutrality by the coexistence of "Zhi" and "Ren (仁)" [66].

He considered this as describing that "Sheng-Ren," who is the embodiment of the "Ren (人)" principle, accomplishes the principle of "Tian-Di" through "Zhi" and "Ren (仁)." "Zhi" is an aspect of the principle of "Tian," which knows the universe; "Ren (仁)" is an aspect of the principle of "Di," which forms the world. If so, it seems that "Ren (人)" gives law and order to "Tian-Di" through these two. However, this remains unclear in the meanings of "Zhi" and "Ren (仁)." Then, we see in the other part of the "Yi Jing" that "a man who has 'Ren (仁)' as benevolence sees it and says 'it is benevolence; a man who has "Zhi" as knowledge sees it and says 'it is knowledge;' other people use it day to day and don't know it" [67]. Zhu Xi commented that "'Ren (仁)' is Yang and 'Zhi' is Yin; they embody a part of the fundamental principle. Therefore, the man who has 'Zhi' or 'Ren (仁)' regards a part of the principle as the whole in his cognizance" [68]. According to him, it is understood that "Zhi" and "Ren (仁)" are kinds of cognition. So is "Zhi" the cognition of Yin? Is "Ren (仁)" the cognition of Yang? The reason we cannot answer "yes" to these questions is expressed by Zhu Xi's comment:

> In the preceding chapter, "Zhi" belongs to "Tian" as the substance of Yang, and "Ren (仁)" belongs to "Di" as the substance of Yin; it resists description in this chapter. Why? It is because they are classified by the purity and impurity of objects of cognition in the preceding chapter; this is in contrast to this chapter, classifying them by the dynamic and the static [69].

Hence, these two are the cognitions concerned with both Yin and Yang. Zhu Xi also commented on "purity and impurity," saying, "'Zhi' is the primal cognition of the obvious and empty things, so that it belongs to 'Tian.' The phrase 'ruling the world' means what perfects the universe, and that its actual effects relate to all people, so that it belongs to 'Di'" [70]. Although it is a little difficult, we will explain the gist of his words. Generally, a vivid impression precedes other concrete sensations in the early stage of perception. Zhu Xi defined it as "Zhi," which is a form of cognition and belongs to "Tian" because of its purity, which is as diffusible as Yang. In opposition to this, after the perfection of the concrete sensation of substantial matter, our cognition can be communicated and shared by all people. This cognition is called "Ren (仁)" because it is obtained regardless of oneself and others, and is dealt with as the impure because it supposes the concrete sensation as a condensed impression. Thus, it belongs to "Di" as it is condensable, as Yin. In short, the beginning and perfection of the action of cognition are both the "purity and impurity" of "Zhi" and "Ren (仁)." On the other hand, he commented about the "the dynamic and the static" as follows.

> This classification states that everything has the nature as its fundamental

> principle, whereas each "Qi" of everything is different from each other, so that we recognize something by the similarities to their actual natures; a man who has "Ren (仁)" as benevolence will recognize only the appearances and flow of matter, and judge them as "Ren (仁)"; a man who has "Zhi" as knowledge will recognize only stability and silence, and judge them as "Zhi" [71].

Here, he interpreted "Ren (仁)" as the cognition of matter that is diffused by Yang, namely "the dynamic," and "Zhi" as another cognition of a matter that is condensed by Yin, namely "the static." Thus, as above, both "Zhi" and "Ren (仁)" are concepts that classify the cognition of everything as either sequences of its action, called "purity and impurity," or modes of it as the object of cognition called "the dynamic and the static." And, the former is a definition of its object of cognition as a temporal order, and the latter a definition of its object of cognition as a spatial order. What do they mean? After all, they are concepts of logic. There must be logic in our cognition. A halberd that pierces whatever is there and a shield that is never pierced must not coexist in our cognizance because there is logic (or *Logos*) as an order which a form of sequences and modes.

"Zhi" and "Ren (仁)" are principles of "Tian-Di," which is displayed by "Ren (人)." They are considered as the action that gives law and order to all beings through human cognition. Hence, this action of cognition, which is the principle called "Ren (人)," limits the creation of "Tian-Di"; it gives the logic to "Tian-Di."

In this way, we can understand Zhu Xi's interpretation that "Ren" gives law and order as logic to "Tian-Di" as the substance of space, time, and the universe; he regarded all law and order as merely our cognition, even strict physical laws like the law of gravity, or universal mathematical laws like the Pythagorean Theorem. Gravity no doubt exists, to be sure, but the law of gravity exists only in our cognition. These laws will emerge in our brains as simple relations, that is to say, as pure logic. The same is true of geographical laws, which sometimes include many exceptions. A kind of law, the so-called "rank-size rule," is preferred by quantitativists and is the coinage of their cognition. A concept of essential region, of course the formal region too, also can exist after we recognize some of the features and judge that these features are alike in something or other. However, we do not attach importance to the subjective. There is law and order as logic; it will appear in human cognition objectively. If no one recognizes it, there would complete chaos or disorder without logic.

Zhu Xi believed, therefore, that the incognizable world would be in chaos because there is no "Ren (人)" as logic. As mentioned above, he expected the collapse of "Tian-Di" to result from a lack of "Ren (人)," and compared the limit of space to a wall because there is law and order in the cognizable fields. Then there is the illogical and unknowable world beyond the cognizable fields, as Kant's "the thing in itself," as Zhu

Xi said “and still now, I don’t know the world behind the wall.” The basis of the division between “Tian-Wen” and “Di-Li” is born under this thought. They are divided by the possibility of cognition, namely, the presence or absence of “Ren (人).”

However, the action of “Ren (人)” is essentially infinite as we mentioned; it is considered to give law and order to the whole “Tian-Di.” Despite this, the reason why there will be a division of “Tian-Wen” and “Di-Li” is that each person cannot accomplish the action of “Ren (人)” as “Sheng-Ren” [72]. Then, the unknowable world is separated from the real world as the cognizable. Zhu Xi sighed over his ignorance about the world beyond the wall, to be sure, but he never wanted to climb over the wall. The closer a person comes to “Sheng-Ren” as an ideal embodiment of the principle of “Ren (人),” the greater the wall becomes. In consequence, this wall will ultimately enclose the whole world; this is also an almost impossible correspondence between the infinite “Tian-Wen” and the finite “Di-Li.” He sighed, indeed, not because of his ignorance but because of the fact that there is something of matter beyond the wall. He had attempted to unify the limit of “Di-Li” with the expanse of “Tian-Wen” or the whole of “Tian-Di.” This is shown by his statement “there is ‘limiting the creation of the “Tian-Di” and no excess,’ but there is either the greater limit or the smaller. Then, I know that one matter has its limit by considering my body” [73]. “Ren” as the principle of cognition gives law and order to everything individually; ideally, it acts to an infinite expanse; actually, it acts to the limits of all people’s cognitions. Then, they are separated from the incognizable chaos as the finite worlds. This is the reason why “Tian-Di” will become a world regardless of scale.

The above is an outline of the concept of “Ren (人),” which is a part of the “San-Cai.” It is the principle that gives law and order to all beings and is the basis of the division between “Tian-Wen” and “Di-Li.” However, the “Ren (人)” of the Zhu Xi supposes “Yin-Yang” is a radical nominalistic principle. It is the principle that denies any correspondences. If we analyze a something fact strictly, they must differ from each other. With such a comprehension, law and order, which is explained by some correspondences and differences among matter, will sink into vanity. Zhu Xi, therefore, considered all of them as the coinage of human cognition, to be sure, but he was not an idealistic fanatic. He devoted himself to pursuing the absolute providence, called principle, law, or order, which never has any exceptions. Furthermore, he regarded the “Yi-Yin Yi-Yang (一陰一陽)” as this providence itself. The concepts we mentioned above, which are named “Tian-Wen,” “Di-Li,” “Tian-Di,” “Ren,” “Yin-Yang,” and others, are based on this radical principle. It is the ultimate principle and the firm philosophical basis at the center of the innermost concept of space in the Zhu-zi Xue.

3. “Yi-Yin Yi-Yang” —the metaphysical principle–

Not only the name but also the philosophical definition of “Yi-Yin Yi-Yang (一陰一

陽)"—this word is seen in the "Yi Jing"—is not known. At least, it is generally referred to in East Asia as "Tian-Di," "Tian-Wen," or "Di-Li." In addition, its difference from the "Yin-Yang" is hardly understood. If there are some differences, then is it merely a form of "Yin-Yang?" Almost no Confucians, however, thought such. Especially, Zhu Xi regarded it as the very important principle at the center of creation. In this chapter, we clarify the meaning of this concept through analyzing chapter V of "Ji-Ci Shang Zhuan (繫辭上傳)" in the "Yi Jing."

It is said that "'Yi-Yin Yi-Yang' is called 'Dao'"[74] at the beginning of chapter V in "Ji-Ci Shang Zhuan." Zhu Xi commented that "Chains of interactions of 'Yin-Yang' are 'Qi' as physical facts. On the other hand, 'Li (理)' as the principle is this 'Dao'" [75]. He defined "Dao," which is the name of "Yi-Yin Yi-Yang," as the principle of "Yin-Yang" as the physical material, so that these two concepts are divided. His interpretation, in fact, succeeded the traditional commentary, especially that of Cheng Yi (程頤). Imai (1958) surveyed the detailed process of its meaning. He said that "Cheng Yi made the sharpest distinction between 'Yin-Yang' and 'Yi-Yin Yi-Yang,' and Zhu Xi succeeded his comprehension," so that Zhu Xi "divided 'Yin-Yang' and 'Yi-Yin Yi-Yang' by determining whether they are metaphysical or not" (Imai 1958: 416). In brief, "Yi-Yin Yi-Yang" is the metaphysical basis of "Yin-Yang" as a physical concept that consists of the features of "Tian-Di" or "Ren." Besides this, Zhu Xi commented, "this 'Yi-Yin Yi-Yang' is the cause of circulation, namely 'Dao'" [76], and "'Yin-Yang' is not 'Dao.' One Yin emerges, whereupon one Yang follows; this is 'Dao'" [77]. According to him, "Yi-Yin Yi-Yang" is the cause of the circulation of "Yin-Yang." Then, this circulation of "Yin-Yang" means the principle as the radical nominalism, as mentioned above. "Yi-Yin Yi-Yang" causes the nominalistic situations as chains of illimitable differences. Hence, he also commented that "'Yi-Yin Yi-Yang' is the principle of 'Tian-Di'…this sentence (in the 'Yi Jing') explains the creation by 'Tian-Di' but not human nature"[78], and shows that this principle became the beginning of the creation.

The following sentence he was referring to in the "Ji-Ci Shang Zhuan" is "that which inherits it is called the good. That which forms it is called the nature" [79]. His saying that "but human nature" concerned here. Then, he also commented,

> "Dao" is immanent in Yin and actualized in Yang; the word "inherit" means the revelation of "Dao," and "the good" is the result of creation and growth by this revelation. This explains what is related to Yang. On the other hand, the word "form" is what "Dao" becomes immanently, and "the nature" is what the matter acquires. Each matter attains its nature when it is created, whereupon they get "Dao" itself. This part explains what is related to Yin [80].

The word "Dao," of course, refers to "Yi-Yin Yi-Yang." Thus, he also said, "the result of

the circulation and the creation is 'the good,' while what condenses in everything itself is 'the nature.' 'Inherit' explains the continuity of 'the good' and 'form' explains that there is a cause of the nature, condensation" [81]. Consequently, "Dao" as "Yi-Yin Yi-Yang" controls the diffusion and condensation of "Yin-Yang." It is a chain reaction of all the matter. Then, "the nature" in the sentence is, as we quoted, not about the nature of all mankind but about the nature of all things. The "Yi Ching" mentions the nature of mankind in the following sentence of the "Ji-Ci Shang Zhuan": "A man who has 'Ren (仁)' as benevolence sees it and says 'it is benevolence; a man who has 'Zhi' as knowledge sees it and says 'it is knowledge,'" [82] as quoted above. We will not describe its contents again owing to the limitations of space, but it is clear that 'Yi-Yin Yi-Yang' is behind the nature of mankind, in looking at Zhu Xi's commentary on this. He considered that chapter V of the "Ji-Ci Shang Zhuan" shows that "Yi-Yin Yi-Yang" as the fundamental principle constructs the system of the principle of "Yin-Yang" and is the basis of "Tian-Di" and "Ren." Moreover, he proved that "Yi-Yin Yi-Yang" is the root of space-time through the forceful comments on the rest of this book.

The "Ji-Ci Shang Zhuan" follows further that "revealing it to "Ren (仁)," taking in it in "Yong (用)," beating the universe but being concerned in. "Shen-Ren" empathizes with. How complete the impressive virtues and the great enterprises are"[83]. Then, Zhu Xi interpreted it as follows.

> What "reveals it" is a kind of action from an interior to an exterior. "Ren" in the sentence is such an action of expanding creation to an exterior, so that it is a manifestation of the "impressive virtue." Contrariwise, what "takes it in" is a kind of action from an exterior to an interior. "Yong" in the sentence is such an action of secret and confined force, so that it is a manifestation of the "great enterprise." So, Master Cheng (Cheng Hao) said "'Tian-Di' has no heart and creates the universe; 'Shen-Ren' has a heart but does nothing"[84],

He goes on to say, "the fact is, the two phrases 'revealing it to "Ren (仁)," taking it in 'Yong (用)'" is one thing; the former means the cognizable such as "that which inherits it is called the good" in the preceding sentence, the latter means the uncognizable such as "that which forms it is called the nature"[85]. According to his commentary, we understand that the sentence of "Yi Jing" explained the system of creation by "Tian-Di." Moreover, the word Cheng Hao as quoted in the commentary showed that "Sheng-Ren" in the sentence corresponds to the action that gives law and order by the principle of "Ren (人)." "Tian-Di" does not have the cognition of the cause of logic, namely the "heart," while "Ren" does not have the power of the direct creation of matter, namely the "doing." So, the logical world that has law and order is constructed by the synthesis of both. Therefore, this sentence explains the interaction between "Tian-Di" as the

external beings and “Ren” as the internal beings. Furthermore, “Ren (仁)” in the sentence is not the above “Ren (仁)” as a sort of cognition.

The “Ji-Ci Shang Zhuan” gives its own comment on “the impressive virtue and great enterprise,” saying, “that which has a lot is called ‘the great enterprise;’ that which is renewed every day is called ‘the impressive virtue’”[86]. Zhu Xi commented on Zhang Zai’s commentary (張 1983) that “(Master Zhang said) ‘that which has a lot’ is what is too huge to have outside; ‘that which is renewed every day’ is what is eternal and endless” [87]. Obviously, these phrases mean the infinity of space and time. Zhu Xi also said that “we do not provide the ‘that which is renewed every day’ until we know the ‘that which has a lot.’ It is similar to the ‘Yu-Zhou (宇宙);’ they continue only after there is matter” [88], and he pointed out that space precedes time, through a comparison between these concepts in the sentence, and that “Yu” is infinite space and “Zhou” is infinite time. This is the process of the generation of space-time by the condensation and diffusion of “Yin-Yang” mentioned above.

Thus, Zhu Xi explained that “Tian-Di” and “Ren” are formed from “Yi-Yin Yi-Yang” and in the end are concepts of space-time, to borrow the difficult words used in the “Ji-Ci Shang Zhuan.” However, this is merely half the explanation. He left out an explanation for the reason why there are these substantial concepts to more following words. As his saying that “all of the sentences after the ‘the impressive virtue and the great enterprise’ explain the principle of ‘Yi (易)’” but ‘Shen-Ren’”[89], he clarified the “principle” that is omnipresent in “the impressive virtue and the great enterprise” as space-time.

“That which arises and arises is called ‘Yi (易)’” [90] is stated in the “Yi Jing.” Although this sentence is very simple and rather abrupt, Zhu Xi commented that “Yang arises in Yin; Yin arises in Yang; this change is incessant”[91] but he broke up the context. This comment shows obviously that Yin and Yang produce each other, so that there are infinite changes. It is the creation of relative interactions. And this is the “Yi” itself that is the fundamental principle behind the substantial principles of condensation and diffusion as the cause of creation. Then, we see the sentence “that which forms representation is called ‘Qian;’ that which shows a law is called ‘Kun’” [92] after them. This explains the concept of “Qian-Kun,” whereas Zhu Xi considered that “the word ‘shows’ means a kind of appearance; ‘the law’ is cognizance due to detail and dense creation”[93]. This interpretation is the uniqueness that separates “Kun” from “Qian” by the existence of material substances, so that it elucidates the nature of both the condensation and diffusion of one “Qi.” The substance is “Kun,” but there are no definitions of “Qian.” Indeed, it is an important point. No one needs to mention “Qian” because the sentence shows that the substantiality is related to the root of space; it is the arising of “Kun” as the condensation or existence of substances, but “Qian” as the diffusion or extinction of substance. It is the creation of space that is there are

substances in "Yu-Zhou" as the infinite diffusion. Therefore, this sentence shows the result of the change from "Yin" to "Yang" as the separation of substance from non-substance.

Next, we will see that "that which knows the comings by thorough investigation of numbers is called 'Zhan (占),' namely 'the divination;' that which is conversant with the changes is called 'Shi (事),' namely 'the event'" [94]. At a glance, this may show the character of the "Yi Jing" as a book of fortune telling. Zhu Xi, however, understood it as a kind of ontology and thus said, "'Zhan' is the divination, so it is the undecided 'Shi,' which belongs to Yang. 'Shi' is what does it, so it is the decided 'Zhan,' which belongs to Yin" [95]; he defined both "Zhan" and "Shi" as a division between the undecided events and the decided. And these mean the root of time. In the preceding section, we recognized that the creation of time that starts in the diffusion by "Qian" as Yang, and it is perfected in the condensation by "Kun" as Yin, while here we discover the deeper cause of time. The undecided beings are separated from an event as originally one. It will be decided, to be sure, but it is the future in the interim. After that, the event will become the decided past as a pair of future. The future will come after all; what knows that it comes is the undecided "Zhan." Then, after it comes, it will change to the past. It becomes the decided event; what knows it changes is the decided "Shi." As opposed to the above, this sentence shows the root of the creation of time as the separation of the decided events from the undecided, or from Yin to Yang.

The above two sentences state the immanence of oppositions of substances or changes. Then, the conclusion of chapter V of the "Ji-Ci Shang Zhuan" is that "the immeasurableness of the 'Yin-Yang' is called 'Shen (神)'" [96]. Here, Zhu Xi quoted Zhang Zai's comment that "it is the immeasurable because it is two" [97], and commented, "that is chapter V. It is shown therein that the substance and action of 'Dao' are only 'Yin-Yang,' and its fundamental cause is not based on 'Yin-Yang'" [98]. Perhaps, this "immeasurableness of 'Yin-Yang" is the body of "Yi-Yin Yi-Yang." There is also truth in his comment about the "fundamental cause." But his comment is almost too simple to understand. What did he state through this comment?

These mysterious words of Zhang Zai are seen in the "Zheng-Meng (正蒙)". Therein, he writes that "one thing has two bodies; 'Qi' is one, so that 'Shen' [99] "is the immeasurable because it is two." Furthermore, about the words "changing because of two" he comments "presuming and doing in the one" [100]. Zhu Xi understood that "this 'two' is 'Yin-Yang;' the 'extinction or arising,' or the 'advance or retreat' ('two' is the reason why 'presumes and does in the one;' one is the reason why is the two)…if it was not one, 'Yin-Yang' and others as 'two' would not emerge; if there is no 'Yin-Yang' and others as 'two,' the one would not also emerge" [101]. From these words, we suppose that "two" is the principle of the plural. On the contrary, "one" is the fundamental principle. Thus, he also said, "the number is two. There is only 'Yi (易)'" [102]. He considered the two, that

which is not one, or the plurality, to be the principle of "Yi." But why did he do so? The following quotation clearly shows the reason. He said, "if there is 'Li' as the principle, there is also 'Qi' as the physical; if there is 'Qi,' there is also the number. This word 'number' means division or limitation" [103]. If there is a metaphysical principle, there should be physical materials. Then, these materials have the nature as the plurality. In short, there is only difference. "Yin-Yang" or others are something different. They are the minimum condition of physical beings. Either the separation of the substance as the root of space or the separation of decided events as the root of time are a minimum pair for the oneness and will become the plural: the most minute and fundamental difference. Here, recall the principle as its essence; it is called "Yi-Yin Yi-Yang." This concept means that if there is one Yin, there must be another Yang. It is the primal difference, or difference itself. It is also a negative of absolute oneness. Whatever the physical being, it must not be one. At least, it makes a pair with the metaphysical being. Then, because there is a pair, the difference naturally emerges, and this difference promptly creates space and time in accordance with the above process. Space and time are negatives of both oneness and eternity: the infinite "Tian-Di." Besides, the action and reaction of "Yi-Yin Yi-Yang" are the most minute of law and order: "Ren." Therefore, such a fundamental difference exists in the innermost concept of space-time of Zhu-zi Xue.

This idea that a fundamental difference is placed as the root of its own theoretical basis is not wild even in the modern sciences. Hartshorne aptly stated that "all sciences are the study of the 'difference'" (Hartshorne 1975: 24). Then, it is most clearly seen through the application of the differential. The differential, as its name, is related difference. It is a method for analyzing the differences in infinitesimal changes such as "Yi-Yin Yi-Yang," so that it is given such a name. Furthermore, when it is applied to the sciences, it seeks the changes of phenomena in infinitesimal space and time. Moreover, the method to know the actual change from these infinitesimal differences is called the integral. It is similar to the process that "Yi-Yin Yi-Yang" as the fundamental difference creates "Yin-Yang," and finally "Tian-Di" appears. It is unnecessary to introduce how these mathematical methods are effective. Anyway, it is also interesting to note the fact that Leibniz, who had a thorough knowledge of "Yi Jing" in the Western world, invented these methods.

Thus, we have examined the concepts of space and other important concepts in Zhu-zi Xue. Consequently, we first recognized "Tian-Wen" as infinite space-time and "Di-Li" as finite space, and next clarified "Tian-Di" as the substance of space-time and "Ren" as the substance of logic, so that there is a division between "Tian-Wen" and "Di-Li." Finally, we demonstrated that "Yi-Yin Yi-Yang" as the fundamental difference principle creates "Tian-Di" and "Ren" as the minimum physical world. This space and time expands to an infinite field. They are no doubt the whole world itself. The world,

however, consists of infinitesimal features. Nothing will exist without this space-time or logic called “Tian-Di” and “Ren.” In Zhu-zi Xue, therefore, such a concept of space-time as a framework of the whole world, that is the minimum whole, precedes all beings. This is the gist of the theory of space in Zhu-zi Xue. We believe it is understood that Zhu Xi developed a unique and exact theoretical basis for the concept of space. In the next chapter, we adopt these Neo-Confucian concepts as the basis of geography and attempt to explain the nature of geography.

IV. The application of Neo-Confucian concept of space to geography

1. "Di-Li" as the subject of geography

This paper aims to establish the theoretical basis of geography. In order to accomplish this, we clarified in chapter II that the characteristic concept of space that it encloses the phenomena is the radical problem of geography, and examined the concept of space in Zhu-zi Xue, which is expected to be the solution to this problem. In this chapter, we will attempt to solve the former problem by the application of the concept of Neo-Confucian space, and explain the nature of the theoretical basis of geography.

Therefore, we formulate a definition of geography as grounds for the above discussion. However, to our surprise, the result is much too simple. This is because we consider it is enough to define our field and divide it from others by only adopting the Neo-Confucian concept of space.

We confirmed the concept of "Tian-Di" as infinite space-time and that of "Di-Li" as finite space. They are separated by their cognizableness and based on "Tian-Di" as the "substance of Yin-Yang Xing-Qi." Thus, "Tian-Wen" expands boundlessly to outside of cognition, whereas "Di-Li" fits into a frame of cognition. Then, "Ren" as the cognitive principle gives law and order to them. Consequently, the extent to which "Tian-Di" and "Ren" coexist is recognized as "Di-Li"; the extent to which "Ren" is absent because of its uncognizable infinite expanse and circulation is recognized as "Tian-Wen." We then defined the former "Di-Li" as the subject of geography. If this concept is adopted as the subject, geography maintains its theoretical basis and its independence. Even so, is it true that this simple definition can solve a difficulty as obstinate as a chronic illness? We provide the example of a solution to theoretical problems in order to dispel such doubts and clarify the appropriateness of our definition. Details are given below.

2. Solution to the problems

First, we verify whether "Di-Li" can be the true subject of geography or not. Traditionally, the basic subject of geography has been considered as the whole of the earth, or its surface. Does "Di-Li" conform to the traditional definition?

This question is, in fact, too easy. As mentioned in chapter III, to say nothing of Zhu Xi's definition, even Han-Shu's "Di-Li" already corresponded with Hartshorne's concept of "lebensraum." Then, Zhu Xi's "Di-Li" is more strictly systematized than these concepts. Although "lebensraum" is brought about by "an experience of regions on the earth as the whole" (Hartshorne 1957: 318), it is the "recognized" expanse but not the "cognizable finite space" as "Di-Li." "Di-Li" is the cognizable expanse. Hence, it changes its scale flexibly with the expansion and contraction of human cognizance. At present, there are still uncognizable zones for human beings, such as the depths of the earth or the sea, or the extraterrestrial sphere and so on. However, if we advance into these

zones, they would become a part of “Di-Li” as one of the cognizances. Contrariwise, if we abandoned some area, “Di-Li” would shrink. This “Di-Li” is not ambiguous like “the earth” and not too subjective like the humanistic “place.” It is a reasonable concept that consists of the surface of the earth or part of either the underground or water as traditional geographical subjects, but contains uncognizable parts of the earth as the subjects of astronomy and others.

Then, it is still not enough to explain the nature of geography. As seen in chapter II, geography has actual subjects, named “landschaft,” “region,” or, more generally, “space as a unit,” to complement the above total definition. Can we truly solve the problem by adopting the concept of “Di-Li?”

“Di-Li,” however, connotes the meanings of these “units” because of the character of “Tian-Di” as its substance; ““Tian-Di’ is the hugest matter of all, and the matter of all is the minute ‘Tian-Di’” [104], so that ‘Tian-Di’ is the one whole if it is too small. Moreover, “Di-Li” as its cognizable part is finite space. It is the world within “the wall” that encloses “Tian-Di” that had so perplexed Zhu Xi. Then, there is no limitation on that definition of “Di-Li” based on cognizance; a researcher has his “Di-Li,” all human beings have their “Di-Li,” and any other people or groups have their own “Di-Li.” Needless to say, these various ideas of “Di-Li” are not equal; they have various scales, features, phenomena, and so on. Despite this, they are one concept with the same definition. When we make a general definition of geography, “Di-Li” covers the globe because it supposes all of cognizance, from individuals to the whole of human beings. But when a geographer studies something, “Di-Li” is based on his cognizance. No one needs to incorporate another concept such as “units” or “landschaft.” He should use all cognizable spaces if he is a geographer. Even if he researches a small area, all of his “Di-Li” will fill his mind as a means of comparison or forecasting. Therefore, he also has his entire cognizance as the subject of geography. Its definition is more appropriate than the various concepts of space as a unit, which are separated by almost arbitrary standards.

Second, “Di-Li” does not have the Aristotelian character of enclosing the phenomena, as mentioned in chapter II. Thus, we abandon the character that many geographical spaces adopt as the basis of unity of the complex phenomena: space as a unit. In opposition to the preceding discussions, the pseudo-Aristotelian concept of space, like “region,” cannot be the subject of geography. For the formation of space as a unit, it is necessary to separate other units, regardless of its definition. Space as a unit is recognized after other units. If there are no other units, this space as a unit corresponds with the whole world. On the other hand, when there are other units (this is the condition of the formation of a unit), both unit A and unit B are defined as the subject of geography. If either of the units cannot be the subject, they would not satisfy the condition of space as a unit; if research is done in one unit, the subject of geography

itself will not be limited by its research area. Therefore, if there are only two units, or if there are innumerable units, all of them are considered as the subject of geography. Then, if all units are defined as the subject, it is the same as "the earth" or the "entire surface" being called the subject; they are not actual subjects such as "region" or others. If so, it is only a synonym for "the earth," so that it is impossible and inappropriate to define it as the subject of geography.

The reason why geographers pursued such concepts in spite of theoretical confusion is perhaps the consideration of systematic science. It was understood that neither the materials in physics nor the creatures in biology are the complex whole such as "the earth" in geography but are the general concepts of some scientists. Therefore, modern geography had to adopt pseudo-Aristotelian space as a unit for its own general concepts. Otherwise, it could have been disassembled as natural history by the "modern" systematic scientists. Besides, a new question arises there. "Di-Li" is, after all, the whole. Then, does it succeed the difficulties of "the earth" like concepts do? Is "Di-Li" not a united substance like materials or creatures? Even pseudo-Aristotelian space encloses the complex phenomena in itself, so that it has been criticized as "holism." How does "Di-Li" avoid these difficulties?

However, this is only a groundless fear. As discussed in chapter III, "Di-Li" and its pair "Tian-Wen" are the whole, to be sure, but they are never the complex of the features. In Zhu-zi Xue, the differences between everything are emphasized by the "Yin-Yang" theory as radical nominalism, so that the unity of the whole is demonstrated rather than the features. The same is true of "Di-Li." The substance of this cognizable and finite space exists as "Tian-Di," which is not a complex of various features or any phenomena but the unitary whole, regardless of its scale.

This view is contrary to Hartshorne's theory, which supposed a "total complex" (Hartshorne 1975: 44) and recognized that there is a unique complex of complicated phenomena in the "space/region." However, it does not confirm Schaefer's criticism that Hartshorne's concepts are "holistic" (Shaefer 1953: 246). Zhu Xi also considered that Schaefer's view is "holistic." Although he regarded the group of features, which are the general concepts and subjects of "non-exceptional" systematic sciences, as a model, are they recognized as features? We should consider again and again that the concepts of the systematic sciences such as "material," "creature," "social," "economy," and "mind" are truly unified as the substance rather than Hartshorne's "space/region"; the "material" is resolved into an elementary particle or some energy; the "creature" is also disintegrated into the organs or cells or materials in the cell; and, regarding the concepts "social," "economy," "mind," and others, they are no longer so-called "general" concepts because they do not have any strict definition. After all, this criticism is only popular in the scholastic controversy concerning universals. Schaefer applied such logic to Hartshorne's concepts but not others. He denied the similar problems in the whole of

"social science" that he approved. Therefore, we pay attention to his ardent confidence in the systematic sciences. He, Bunge, and Harvey, who was a kind of successor, or even Naito (1994), who discussed "the end of regional geography," did not doubt the unity of systematic, physical, or social sciences. They are "systematic." It is almost dogmatism. The concepts, as their subjects, are as "holistic" as the concept of "region." If these "systematic" sciences are organized by such chaotic words as "physical" and "social," geography also had its independence since ancient times. Anyway, the concept of "Di-Li" is defined strictly in this paper. Then, geography does not have to excuse its own "holistic" character, and should not embellish itself by incorporating "systematic" concepts such as "space as a unit."

Thus, because it seems that the subjects of systematic sciences are not united as a concept, the problem of geography belonging to the sciences, whether the physical or the social, is nonsensical. The dichotomy between the physical sciences and the social sciences was refused by Hartshorne and Hettner (1991: 167), as seen in chapter II. This paper agrees with their view, and we again point out its irrationality. "Di-Li" is the cognizable finite space, so that there are many features inside of it. However, it is an obvious logical leap that other fields monopolize the features, because a part of the features is defined as the subject of these fields. For example, the cell that constructs a creature contains water, and the water is a mass of compounds composed of hydrogen and oxygen. Then, there is an electric force among these atoms. However, this is not to say that the field that studies the cell or the creature is physics or chemistry. Likewise, geography studies both physical scientific features and social scientific features, to be sure, but it belongs to neither. And of course it is neither the union of these sciences nor a kind of eclecticism. Geography is geography; it studies "Di-Li" as the total reality before dividing into the physical, the social, or, needless to say, their subcategories. Suppose there is a metal. What deals with its property is chemistry; what knows its mode of movements is physics. Mineralogists investigate what kind of minerals it contains or where it is produced; Economists consider its behavior when it is minted as coinage; Anthropologists inquire into why it became money, which is an instrument of trade; Historians write about the changes to its value and analyze the cause of these changes. However, if it is processed and used as a weapon or a farm implement, other sciences should study it. Then, leaving aside whether it is gold, silver, copper, iron, or another metal, is it the subject of the physical sciences, or the social sciences? Or, should we say that it can be the subject of any science according to that science's point of view? If we should say as such, there are no problems, although a feature dealt with as the subject of geography is also studied by other systematic sciences. If a geographer talks about the turn of a season, mountains, and rivers, or sees in these the prosperity of animals and vegetation, or knows how human beings have used them; is nonplussed by wars concerning them, or aware of the essence of nature in the refugee's poem, these

features do not have to belong to a specific field one by one; also we do not have to call geography an "integral science." Frankly speaking, the attacks on geographical "holism" or on its character as an "integral science" are a kind of sophistry to deny geography itself as the "exception" of systematic dogma. If it is not, the sciences that deal with metal are refused as "holism." We do not expect results from an analysis of the total reality through "cooperation" among systematic sciences because they have different purposes from each other. Even so-called interdisciplinary studies must have one purpose; it is not realized until various specialists attempt to accomplish that purpose.

Thus, it is understood that geography is an individual field but not the "division of labor" of any other systematic field (Schaefer 1953: 227) or the "integral science" that consists of every science (Hartshorne 1957: 536-537). Geography has its own subject and purpose. This paper regards its subject as the concept "Di-Li." "Di-Li" and "Tian-Wen" are separated from its inner phenomena called "Xing-Xiang." Zhu Xi's definition seems to show the fact that "Di-Li" as a finite space is not a complex of phenomena as the subjects of systematic sciences but an independent concept of "whole." This idea may be typical "exceptionalism," which denies the systematic separation. However, if geography has a firm subject and purpose, we will welcome the idea of "exceptionalism" joyfully. Schaefer feared an isolation of geography, but why should a science fear loneliness?

Finally, we have to make clear the purpose of geography as a science of "Di-Li." Briefly, it is to know what "Di-Li" as the "whole" finite space is, and what order it has. "Di-Li" is not only the cognizable finite space but also the appearance of the "Yin-Yang" principle. Then, this principle is the order that is given to "Tian-Di" by "Ren," and based on the fundamental principle called "Yi-Yin Yi-Yang"; geography is a field that clarifies this "Yin-Yang" order of the "Di-Li." The concept of "region," its divisions, a marketing area, or others are no doubt one of the purposes of geography if they are recognized as an order in the whole space. However, we must not exclude any features of "Di-Li." "Di-Li" is not a complex of various features but the one whole subject. If we exclude anything arbitrarily, the concept of "Di-Li" as the whole will be distorted even it has only a minute scale. Therefore, we concluded that the definition that geography studies both the whole and the order of "Di-Li" is appropriate for expressing its purpose; geography aims to know "the cause of 'You-Ming'" by "looking down to it and finding 'Di-Li,'" as the "Yi Jing" said. Then we do not have to discuss the concrete methodology because geography as one of the oldest sciences has been a study of the whole of "Di-Li" and its order since ancient times. Geography has pursued the relation between "Tian-Di" as a kind of environment and "Ren" as mankind. Geography has described "Di-Li" and clarified the order that is expressed therein by various means. Consequently, we vindicate all products of geography. "Geography" is the name of a traditional field that maintains its own independence and unity as one science no less than the modern

“systematic” sciences[105].

V. Conclusion

As stated above, the aim of this paper was to define geography. In order to accomplish this purpose, we pointed out the radical problem with the theoretical basis of geography and introduced the Neo-Confucian concept of space. In closing, we survey the results of this paper.

Today is a confused age for geography. Although its concepts and schools are diverse, contradictory views coexist as if there are no difficulties. Especially, we are apprehensive about the confusion surrounding the definition of geography itself, that is, its theoretical basis, so that it is discussed in this paper. It would be, however, reckless to analyze its definition or basis without any preparation for such disorder. Thus, we first uncovered where there is something wrong with geography.

This is clarified in the discussion of chapter II, on the problem of geographical methodology. There, we examined the argument between Schaefer and Hartshorne as the beginning of the "quantitative revolution." A difference of methodology is revealed in such exchange of criticisms. If there is something consistent in spite of the opposition that divides geography into the traditional and the new, we can expect that the radical problem also decides the definition of geography. Therefore, we paid attention to this argument.

We looked at Schaefer's criticism of "exceptionalism" in order to describe the difference between the "new geography" and traditional views and evaluate its influence. His statement is clear. He denied "exceptionalism," which considers geography as neither a physical science nor a social science, and reinterpreted it as a subfield of social science that deals with a "morphological law." This "law" is a kind of "pattern" that consists of the phenomena as a shape or an outline like boundaries on a map. He called this concept space and defined it as the essential subject of geography. Then, schools of both his successors, such as quantitative geography, and his opponents, such as humanistic geography, succeeded the concept of "morphological" space and the view denying the exception of systematic sciences. They hold one theoretical basis in common despite the contradiction of each view.

On the contrary, Hartshorne's theory is irreconcilable to them. He did not consider geography as a systematic science. Furthermore, he negated the dichotomy between the physical sciences and the social sciences. Since the dichotomy is a fallacy, there is no need to discuss geography's belonging to the systematic sciences. Then, he provided the concept of "region" as the essential subject of geography; "region" is a concept of space that gives a theoretical unity to the phenomena inside it. It was defined as "unique" because it has various phenomena at each place. Therefore, a "region" is not similar to other "regions" in spite of their having the same definition. Schaefer attacked this character of being "unique," which seems to be merely a contradiction of the definition.

However, comparing the views of both, we understand that they have a common concept of "space" as the essential subject of geography, although they rejected each other's view on the relation between geography and the systematic sciences. Their two concepts of "space" have only one difference, whether it connotes the phenomena or not. Schaefer excluded the inner features from Hartshorne's "region," and abstracted "space" as the outline that encloses it. However, the successors and the opponents did not abandon the inner features that construct geographical space, despite his abstraction. In consequence, the concept of space hardly changed even after the "quantitative revolution." Thus, the influence of the "revolution" is only the exclusion of physical scientific views because of the acceptance of the dichotomy.

After this examination, we analyzed the character of this geographical space. The result was that we clarified that geographers have adopted the pseudo-Aristotelian concept of space until now. It is the outline that encloses the phenomena and that is separated from other matter by its shape. However, it is different from pure Aristotelian space because it encloses various phenomena, so that it is in fact unstable. This unstable character is the cause of the arguments and confusions presented above. We understand that it is the radical problem of geography.

In order to establish the theoretical basis of geography, we should solve such a problem. We introduced the concept of space according to Neo-Confucianism, that is, the Zhu-zi Xue, in chapter III because we expected that it shows the essential subject of geography more appropriately.

Zhu Xi gave a multilayered definition of the concept of space. When it appears as space in front itself, it is named "Di-Li." It is finite space, which is separated from "Tian-Wen" as infinite space-time and "Xing-Xiang" as the phenomena within it. The basis of these separations is rooted in our cognitions. "Di-Li" is cognizable, whereas "Tian-Wen" essentially is not. Besides, the principle called Yin-Yang appears in these concepts. They are formed as appearances of the metaphysical principle but not substantial beings. The substance of them is named "Tian-Di" or "Ren." "Tian-Di" is originally "Yi-Qi," which is a monistic concept of materials or energy. However, it is fractionalized by the "Yin-Yang" principle. Zhu Xi's "Yin-Yang" theory is the ultimate nominalism, so that not all beings can be identified. However, since this nominalism is too radical, the substances always acquire the relative. Then, because of this, "Yin-Yang" becomes a kind of monism based on "Yi-Qi." "Tian-Di" is united by this demonstration. Furthermore, the reason why this "Tian-Di" is not only "Yi-Qi" as oneness but also the complex reality is that "Tian-Di" has the action of condensation and diffusion as the essential of "Yin-Yang." "Tian-Di" as "Yi-Qi" is condensed and diffused again and again, so that it creates space, time, and matter. Moreover, there is "Ren," which construct "San-Cai" with "Tian-Di." "Ren" is the cognition principle that gives law and order to the universe. In the cognizable field that is controlled by "Ren,"

the action of “Yi-Qi” attains law and order, so that the total reality is created. The division between “Tian-Wen” and “Di-Li” is also dependent on this cognition principle. Zhu Xi said if “Ren” was extinct, “Tian-Di” would become the primitive chaos, and finally everything would sink into oneness.

In Zhu-zi Xue, the root of “Tian-Di” and “Ren” is defined: “Yi-Yin Yi-Yang” as the fundamental principle. It is different from “Yin-Yang,” which means the fundamental differential principle as the condition for the world being plural and physical. Zhu Xi stated that space, time, and logic are created as the frame of the whole physical world in the beginning. Therefore, these substances are in all matter regardless of their scale or other attributes, so that “Tian-Wen” and “Di-Li” reside in whatever has cognizance.

In chapter IV, we attempted to define geography itself by the application of the Zhu-zi Xue’s concept of space; we considered what the subject and purpose of geography are. Then, we answered the cardinal question “what is geography?” in the simplest way; geography is the field that deals with “Di-Li.” We said only that the subject of geography is “Di-Li.” It is, as mentioned above, the cognizable finite space. This concept connotes the traditional subjects of geography such as “the earth,” “surface of the earth,” and “lebensraum” as a whole. Moreover, it is not the “holistic” assemblage of various features that is criticized by Schaefer but one logical united concept. Hence, “Di-Li” and the whole of Zhu-zi Xue’s space theory will reject the criticisms of geography, especially, that “geography is illogical because its subject is not united as one concept.” “Di-Li” is neither an arbitrary division of the real world nor a chaotic mass of disorganized features. It is the independent space that is separated from the inner phenomena. Consequently, geography studies what the entire “Di-Li” is and how it obtains law and order. The purpose of geography is the clarification of “Di-Li” as the appearances of “Tian-Di” and “Ren.” This is not one of the modern Western sciences developed at the current time but a very traditional and ancient field. The fruits of geography have been accumulated throughout all ages and countries and used for various human activities. Therefore, our definition shows that geography as a huge and universal science is essentially and logically consistent, and separated from other fields obviously, despite its extensive scope of study.

In consequence, we judge that this paper is unique in three respects, as follows. First, we gave a comprehensive Neo-Confucian definition of geography. As stated above, we defined geography as the study of “Di-Li.” In other words, geography is “a discipline that studies the finite expanse, which is given law and order by a cognition principle, as part of the space-time created by the actions of condensation and diffusion from the fundamental difference as a condition of the formation of the physical world, and aims to describe its whole and the appearance of law and order.” According to this definition, we approve the fruits of geography that connote all “geographical” knowledge even in studies before the modern age, so that we make clear the logical separation from other

fields, and make the application of the Eastern philosophy called Zhu-zi Xue. Ours is unique in comparison with preceding geographical studies about its theoretical basis, which are based on Western thought and apt to exclude any results drawn from the non-Western world. Then, it also has no division from the physical, social, or other sciences, and no limitation of methodology, whether systematic, integral, or other. However, it is sufficient for us to explain the nature of geography in such a simple way if we use the logically strong concepts that are introduced through an exact analysis of total reality. The greatest contribution of this paper is such originality in terms of the theoretical basis.

Second, we removed the pseudo-Aristotelian concept of space from the definition of our field. This concept of space, which is different from Aristotle's true view, is unstable because it is considered that this concept is united by its character to enclose various and unspecific phenomena, so that it has been an obstacle to the basic theory. However, it is also the case that there is no more suitable concept for geography than the pseudo-Aristotelian one among other Western concepts. The concepts of Descartes, Newton, or Kant are universal, to be sure, but they cannot be distinguished from the phenomena in space, otherwise they have no relation to the phenomena. Hence, we cannot recognize them as the subject of geography. Thus, thepseudo-Aristotelian concept of space is still adopted now as the basis of geography.

This paper, contrariwise, introduced Neo-Confucian space. This concept holds its unity without enclosing any phenomena. It is a stable concept appropriate for the subject of geography because it connotes the phenomena although it is separate from them. In addition, it does not incorporate any concept of "space as a unit" because it is not accompanied by the enclosures of shapes or patterns, which is one of the conditions of the "unit." Therefore, our definition of geography escapes the concept of pseudo-Aristotelian space. As stated above, our definition does not refuse the fruits of other geographic studies, to be sure, but concerning the concept of space, our definition is incompatible with almost all of them. Consequently, this paper justifies the whole of geography from ancient times to the present, whereas it denounces the theories of geography totally.

Third, we provided new knowledge of the theory of space as Neo-Confucian, namely Zhu-zi Xue space. Even if our view was thoroughly denied, this result would be accepted as a progression of geographical thought at least because it showed that there is a concept of space in Eastern philosophy as systematic as in Western philosophy; its multilayered and united definition by Zhu Xi is very original and too strict. We hope that this paper expedites a geographical study based on Eastern thought.

Thus, we confirmed the subject of geography and explained its nature. The definition of geography, as we introduced, is not a theoretical limitation but a union of opposite views. Because it is comprehensive and simple, it can make various theories that state

their orthodoxness reconciled to each other. It also emphasizes that the fruits of premodern geography such as the “Fudoki (風土記)” or the “Yi-Tong-Zhi (一統誌)” cannot be distinguished theoretically from modern Western geography. Furthermore, attempting to define the subject of geography produces not an assemblage of each theory but a definition. Geography should not limit its own domain; it is one, regardless of ages and ages. The more elegant its theoretical basis, the clearer this fact becomes.

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Notes

1) As described below, Harvey's concepts of "absolute space" and "relative space" have different meaning from the general terms in the Western philosophy. The unique view of Harvey and other geographers is that these two concepts of space correspond with the contrast between Euclidean space and non-Euclidean space. It is, perhaps, a result of the confusion about the difference in concepts of space between Newton's physics and Einstein's physics with the change of mathematical ideas from Kant to Gauss.
2) In logic like this, we find the traditional organic view of nature that Hartshorne succeeded as his basic theory.
3) Here, we give a supplementary explanation because this is not easy to understand. Take the example of someone's hair leaves him body Although it is of course a general phenomenon, if we consider that his body is matter, he no longer holds his unity, for losing one hair (even though it is only a minute change). However, needless to say, he is still himself. Aristotle concluded that this unity stems from his sprit. The sprit as his "form" is not effected by a change to the body, so that he holds his identity. On the other hand, because the hair has no sprit, it is regarded as matter. This hair, or bronze in the case mentioned above, will change to other matter in a moment of transformation. There is no spirit, and their "material" is not inherent in themselves, so that the shape is the "form" of matter.
4) Blaut (1961) refused the division between the "static" region and the "dynamic" because the former is not "static" but merely "dynamic," in fact slowly.
5) The statement that Kant defined geography as a science of space means that geography should study the phenomena in Newton's "absolute space"; he only opposed geography to history. His statement did not clarify the subject of geography, and is not related to his concept of space as the "form of a priori sense."
6) It also corresponds with space as "visible matter," which is considered as the general character of geographical space (the center of figure 2) according to my feeble discussion (Mashita 2015).
7) 「往古來今謂之宙，四方上下謂之宇」(『淮南子』「斉俗訓」巻十一・九).
8) This part is according to Xu-Shen (許慎), who wrote the traditional comments. He commented on this text that "Dao is formless and huge (道無形而大也)," "Kuo is expansion, and Tuo is spreading (廓張也，拆開也)," and "Wu-Xing (無形) as the formless is the situation that the universe is still not formed. All things come from Dao, so that it is written 'the formless will give' in the text."9) 「仰以觀於天文，俯以察於地理，是故知幽明之故」.

10) 「天文，日月星辰．所昭仰也．地理，山川海澤，所生殖也.」(『漢書』郊祀志下巻・二十五下・二十六頁).

11) 「仰以觀於天文，俯以地於察地理者，天有懸象而成文章，故稱文也，地有山川原濕，各有條理，故稱理也．是故知幽明之故者，故謂事故也，以用易道仰觀俯察，知无形之幽有形之明，義理事故也.」(『周易注疏』巻十一・十三頁).

12) 「天曰文者経緯度數燦然有章也．…地曰理者高下原委脈絡分明也.」(『易経解』上繫・八頁).

13) 「天文則有晝夜上下，地理則有南北高深.」(『周易本義』巻七・四頁).

14) 「天文有半邊在上面，須有半邊在下面.」(『朱子語類』巻二・一頁・淵).

15) 「動靜如晝夜，陰陽如東西南北，分從四方去．一動一靜，以時言，分陰分陽，以位言.」(『朱子語類』巻九十四・二頁・謨・可學). "*Tai-Ji-Tu-Shuo* (太極圖説)" by Zhou Dun-Yi (周敦頤) is the metaphysical writing which is much respected as the origin of the Neo-Confucianism.

16) 「象者日月星辰之屬，形者山川動植之屬.」(『周易本義』巻七・一頁).

17)「仰觀経緯之天文，俯察一定之地理.」(『易經訓解』巻三).

18) 「某自五六歲，便煩惱道，天地四邊之外，是什麼物事．見人說四方無邊，某思量也須有箇盡處．如這壁相似．壁後也須有什麼物事．其時思量得幾乎成病．到而今，也未知那壁後（池本作「天外」．夔孫錄作「四邊」）.」(『朱子語類』巻九十四・十～十一頁・義剛．夔孫錄略).

19) "Di-Li" is not defined as time because no one can imagine the limits of time, that is, there is no finite time.

20) 「晝明夜幽上明下幽，觀晝夜之運日月星辰之上下，可見此天文幽明之所以然．南明北幽高明深幽，觀南北高深，可見此地理幽明之所以然．學履.」(『朱子語類』巻七十四・十三頁・學履).

21) 「問，仰以觀於天文，俯以察於地理，是以此易書之理仰觀俯察否．曰，所以仰以觀於天文，俯以察於地理，是故知幽明之故．幽明便只是陰陽剛柔，凡許多説話，只是説一箇陰陽．南便是明，北便是幽，日出地上便是明，日入地下便是幽．仰觀俯察，便皆知其故.」(『朱子語類』巻七十四・十三頁・不明).

22) 「仰以觀於天文，俯以察於地理，天文是陽，地理是陰，然各有陰陽．天之晝是陽，夜是陰，日是陽，月是陰．地如高屬陽，下屬陰．平坦屬陽，險阻屬陰．東南屬陽，西北屬陰．幽明便是陰陽．僩.」(『朱子語類』巻七十四・十三頁・僩).

23) 「變化非因形象而後有也．變化流行非形象，則无以見．故因形象而變化之迹可見也．日月星辰，象也．山川動植，形也．象陽氣所為．形陰氣所為．然陽中有陰，則，日星陽也，月辰陰也．陰中有陽，則，山陰而川陽.」(『周易傳義附録』巻十上・五頁).

24) We have to pay attention to the fact that there are of course essential differences in the concept of space and time between Zhu-Xi and Kant. Both are similar on only one point, that they internalize the absolute space and time. Zhu-Xi constructed an objective ontology basically, but not epistemology, as Kant did.

25) 「天地者陰陽形氣之実體」(『周易本義』巻七・一頁)

26) 「問…是蒼蒼在上者眞有主宰如是邪」…「曰此三段只一意．這箇也只是理如此.」(『朱子語類』巻一・四頁・淳).
27) 「僩問經傳中天字．曰，要人自看得分曉，也有說蒼蒼者，也有說主宰者，也有單訓理時.」(『朱子語類』巻一・四頁・僩).
28) 「天只是一个大底物.」(『朱子語類』巻一・五頁・僩).
29) 「天地統是一箇大陰陽.」(『朱子語類』巻一・七・端蒙)
30) 「此聖人作易因陰陽之実體爲卦爻之法象．莊周所謂，易以道陰陽，此之謂也.」(『周易本義』巻七・一頁).
31) 「易字義只是陰陽」『朱子語類』巻六十五・三頁・閎祖).
32) 「易只消道陰陽二字括盡」『朱子語類』巻六十五・三頁・不明).
33) 「易只是箇陰陽」『朱子語類』巻六十五・三頁・僩).
34) 「天地之間，無往而非陰陽，一動一靜，一語一默，皆是陰陽之理．至如搖扇便屬陽，住扇便屬陰，莫不有陰陽之理」(『朱子語類』巻六十五・二頁・謨).
35) Zhu-Xi's nominalistic view applies even to an absolute substance. See also Ohama (1983: 382-420).
36) 「太極形而上之道也，陰陽形而下之器也」(『性理大全』巻一・十五頁).
37) Ohama (1983) mentioned the material aspect of "Yin-Yang" in detail.
38) 「都是陰陽．無物不是陰陽」(『朱子語類』巻六十五・二頁・淳).
39) 「陰陽只是一氣，陽之退，便是陰之生．不是陽退了，又別有箇陰生」(『朱子語類』巻六十五・一頁・淳).
40) 「乾坤是性情，天地是皮殼，其實只是一箇道理．學蒙．方子錄云，天地，形而下者．天地，乾坤之皮殼．乾坤，天地之性情.」(『朱子語類』巻六十八・五頁・學蒙・方子).
41) 「乾者健也陽之性也」「陽之性健而其成形之大者為天…名之曰乾而擬之於天也」(『周易本義』乾卦・巻一・一頁).
42)「坤者順也陰之性也」「陰之成形莫大於地…故名坤而象地」(『周易本義』坤卦・巻一・三頁)
43) 「陰性凝聚，陽性發散．陰聚之，陽必散之」(『性理大全』巻五・十五頁).
44) 「橫渠言，陰聚之陽必散之一段，卻見得陰陽之情.」(『朱子語類』巻九十九・三頁・僩).
45) 「天地間只有一箇陰陽…所謂陰與陽，無處不是．且如前後，前便是陽，後便是陰．又如左右，左便是陽，右便是陰．又如上下，上面一截便是陽，下面一截便是陰.」(『朱子語類』巻七十四・四・文蔚).
46) 「天地初間只是陰陽之氣．這一箇氣運行，磨來磨去，磨得急了，便拶許多查滓．裏面無處出，便結成箇地在中央．氣之清者便為天，為日月為星辰，只在外，常周環運轉.」(『朱子語類』巻一・四頁・淳). This "Tian" is distinguished from "Tian" as the "陰陽形氣之実體," which is an astronomical substance. See also Yamada (1978).
47) 「知猶主也．乾主始物而坤作成物」「大抵陽先陰後，陽施陰受，陽之輕清未形而陰之重濁有迹也.」(『周易本義』巻七・一～二).
48) 「知者，管也．乾管卻大始，大始即物生之始．乾始物而坤成之也.」(『朱子語類』巻

七十四・三頁・謨).

49) 「陰陽雖是兩箇字，然卻只是一氣之消息，一進一退，一消一長．進處便是陽，退處便是陰．長處便是陽，消處便是陰．只是這一氣之消長做出古今天地間無限事來.」(『朱子語類』卷七十四・四頁・文蔚).

50) 「陰陽有箇流行底，有箇定位底．一動一靜，互為其根，便是流行底，寒暑往來是也．分陰分陽，兩儀立焉，便是定位底，天地上下四方是也.」(『朱子語類』卷六十五・一頁・義剛).

51) Op.15).

52) 「物物有乾坤之象．雖至微至隱纖毫之物，亦無有無者.」(『朱子語類』卷六十八・一頁・僩).

53) 「天地便是大底萬物，萬物便是小底天地.」(『朱子語類』卷六十八・十六頁・文蔚).

54) It perhaps seems difficult to approve this discussion. This is caused by refusing the concept of the “whole” in Zhu-zi Xue, which is different from the Western understanding. Kinoshita (1999: 103) called attention to this conceptual difference and said, “We pay attention therein to what the word ‘全体’ means in the current Japanese, a kind of assemblage, so that it has many quantitative meanings. The ‘全’ when Zhu-Xi said, “‘全體大用,’ however, contains qualitative depth; further, the word ‘全體’ means strong consistency.” In this, “Tian-Di” is regardless its scale because of the qualitative consistency by the “Yin-Yang” principle, as Kinoshita called “consistency.” It is never the complex whole but the “indeed one united world” (Kinoshita 1999: 72).

55) 「乾坤之理分見於天地而人兼體之也」(『周易本義』卷七・二頁).

56)「三極，天地人之至理．三才各一太極也」(『周易本義』卷七・三頁).

57) The “Sage” was often mentioned as the embodiment of the “Ren” principle in Chinese philosophy.

58) 「夫萬物生之者天也，成之者地也，天地能生成之，而不能治也．君者所以治人而成天地之功也．非后則天地何以得通乎」(『温公易説』泰卦・卷二・一頁).

59) 「範圍天地之化而不過．曲成萬物而不遺．通乎晝夜之道而知．故神无方而易无體.」

60) 「範如鑄金之有模範，圍匡郭也．天地之化无窮，而聖人爲之範圍不使過於中道.」(『周易本義』卷七・四頁).

61) ”Such as the Sage is only the man” (如聖人則只是人)” (『朱子語類』卷七十四・廿二頁・謨).

62) 「天地之化，滔滔無窮，如一爐金汁，鎔化不息．聖人則為之鑄瀉成器，使人模範匡郭，不使過於中道也．曲成萬物而不遺，此又是就事物之分量形質．隨其大小闊狹，長短方圓，無不各成就此物之理，無有遺闕．範圍天地，是極其大而言，曲成萬物，是極其小而言.」(『朱子語類』卷七十四・十六頁・學履).

63) 「問，天地會壞否．曰，不會壞．只是相將人無道極了，便一齊打合，混沌一番，人物都盡，又重新起.」(『朱子語類』・卷一・六頁・揚).

64) 「方是四方上下．神卻或在此或在彼．故云，無方．易無體者，或自陰而陽，或自陽而陰，無確定底，故云，無體．…易是變易，陰陽無一日不變，無一時不變.」(『朱子語類』卷七十四・十七頁・淵).

65) 「與天地相似，故不違．知周乎萬物，而道濟天下，故不過.」

66) 「此聖人盡性之事也．天地之道知仁而已．知周萬物者天也，道済天下者地也．知且仁則知而不過矣.」(『周易本義』巻七・四頁).
67) 「仁者見之謂之仁．知者見之謂之知.」
68) 「仁陽知陰，各得是道之一隅．故隨其所見而目爲全體也.」(『周易本義』巻七・五頁).
69) 「或曰上章以知屬乎天，仁屬乎地，與此不同，何也．曰，彼以清濁言，此以動静言.」(『周易本義』巻七・五頁).
70) 「智是先知得較虛，故屬之天．道濟天下，則普濟萬物，實惠及民，故屬之地.」(『朱子語類』巻七十四・十五頁・學履).
71) 「此言萬物各具是性，但氣稟不同，各以其性之所近者窺之．故仁者只見得他發生流動處，便以為仁．知者只見得他貞靜處，便以為知.」(『朱子語類』巻七十四・十九頁・學蒙)
72) Following loyally the logic of Zhu-zi Xue, the body of “Ren” as an epistemic action is not only human beings, because “Xing (性)” is “Li (理),” and it dwells in “Qi (気)” as universal matter. The so-called “Xing” is “Li” (性即理) and “Li” and “Qi” adapt to each other. Despite the magnificent meaning, it was named “Ren” based on the “San-Cai” (三才), as traditional terms.
73) 「範圍天地之化而不過」，自有大底範圍，又自有小底範圍．而今且就身上看，一事有一箇範圍．(『朱子語類』巻七十四・十四～十五頁・僩).
74) 「一陰一陽之謂道」.
75) 「陰陽迭運者氣也．其理則所謂道.」(『周易本義』巻七・四頁).
76) 「今曰一陰一陽，則是所以循環者，乃道也.」(『朱子語類』巻七十四・十七頁・驤).
77) 「陰陽非道也，一陰又一陽，循環不已，乃道也.」(『朱子語類』巻七十四・十七頁・銖).
78) 「一陰一陽，此是天地之理…這一段是說天地生成萬物之意，不是說人性上事.」(『朱子語類』巻七十四・十八頁・謨，去偽).
79) 「継之者善也，成之者性也」
80) 「道具於陰而行乎陽．継言其發也，善謂化育之功，陽之事也．成言其具也，性謂物之所受，言物生則有性而各具是道也．陰之事也.」 (『周易本義』巻七・四頁).
81) 「流行造化處是善，凝成於我者即是性．繼，是接續綿綿不息之意．成，是凝成有主之意.」(『朱子語類』巻七十四・十八頁・大雅)
82) Op. 67.
83) 「顯諸仁，藏諸用，鼓萬物而不與．聖人同憂．盛德大業至矣哉.」
84) 「顯，自内而外也．仁謂造化之功，德之發也．藏，自外而内也．用謂機緘之妙，業之發也．程子曰天地無心而成化，聖人有心而無爲.」(『周易本義』巻七・五頁).
85) 「顯諸仁，藏諸用二句，只是一事．顯諸仁，是可見底，便是繼之者善也．藏諸用，是不可見底，便是成之者性也.」(『朱子語類』巻七十四・十九頁・僩).
86) 「富有之謂大業，日新之謂盛德」
87) 「張子曰，富有者大無外，日新者久無窮.」(『周易本義』巻七・五頁).
88) 「先說箇富有，方始說日新，此與說宇宙相似．先是有這物事了，方始相連相續去.」(『朱子語類』巻七十四・・淵)

89)「盛德大業以下，都是說易之理，非指聖人而言.」(『朱子語類』卷七十四・廿二頁・營).
90) 「生生之謂易.」
91) 「陰生陽，陽生陰，其變無窮」(『周易本義』卷七・五頁).
92) 「成象之謂乾，效法之謂坤.」
93) 「效，呈也，法謂造化之詳密而可見者.」(『周易本義』卷七・五頁).
94) 「極数知來之謂占，通變之謂事.」
95) 「占，筮也，事之未定者，屬乎陽也．事，行事也，占之已決者，屬乎陰也.」(『周易本義』卷七・五頁).
96) 「陰陽不測之謂神.」
97) 「張子曰，両在故不測.」(『周易本義』卷七・五頁).
98) 「此第五章，言，道之體用，不外乎陰陽，而其所以然者，未嘗倚於陰陽也．(『周易本義』卷七・五頁).
99) 「一物兩體，氣也一，故神.」(『性理大全』卷五・八頁).
100) 「兩故化.」「推行於一.」(『性理大全』卷五・八頁).
101) 「兩者，陰陽，消長，進退．(兩者所以推行於一．一所以為兩)…非一則陰陽消長無自而見. 非陰陽消長, 則一亦不可得而見矣.」(『朱子語類』卷九十八・六頁・不明). The quotation in parentheses is the comment by a pupil.
102) 「數只有二，只有易是.」『朱子語類』(卷六十五・七頁・揚).
103) 「有是理，便有是氣．有是氣，便有是數．蓋數乃是分界限處.」『朱子語類』(卷六十五・六頁・義剛).
104) Op.53).
105) We should add to the distinction between “Di-Li” and “Tian-Wen.” “Tian-Wen” means the unity of infinite space-time. Then, the sciences that take it as their subject are astronomy and history. Half of “Tian-Wen” is the uncognizable concept of space. It is the unity of the world that is hardly recognized, such as extraterrestrial or inter-terrestrial places, so that the sciences that deal with it contain astronomy, geology, or a kind of geoscience; the earth is considered one of the celestial bodies. In actuality, we do not know most of the earth without its surface. Then, the other half of “Tian-Wen” is the uncognizable concept of time. The science of time is represented by history, but it seems to be strange that history belongs to the same class as astronomy. This “history” involves not only human history but also geographical and cosmic histories. If we study the origin of cultures, human beings, creatures, the earth itself, and whatever else, they will be dealt with as the theme of astronomy because they are related to various matter and can be traced back to the beginning of the universe. Therefore, the science of “Tian-Wen” is defined as the integration of both astronomy and history. It is necessary to take such classification into account for definition of geography, however we will discuss this in another paper.

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