WEP Warwick Evans Publishing

International Journal of Social Sciences and Public Administration

ISSN: 3005-9836 (Print), ISSN: 3005-9585 (Online) | Volume 7, Number 2, Year 2025
DOI: https://doi.org/10.62051/ijsspa.v7n2.05
Journal homepage: https://ijsspa.org

More-than-Human Geography: Core Issues and Trends

Lei Wu*

College of Tourism, Xi'an International Studies University, Xi'an, China
*Corresponding Author: Lei Wu

ABSTRACT

In the 21st century, in the trend of 'returning to materialism' in Western geography, More-than-Human Geography (MTHG) has emerged as one of the most important ways of exploring the world constituted by human and non-human beings. Through the analysis of relevant journal articles and books, the review finds that there are obvious differences between domestic and international research on MTHG: the West focuses on ecological politics and climate ethics with an ontological revolution as the core, while China focuses on the materialistic turn and localised application. As one of the most groundbreaking theoretical paradigms in human geography in the 21st century, MTHG dissolves the dichotomy between natural determinism and social constructivism, reconstructs the spatial cognitive paradigm of dynamic correlation, and provides a technological and ethical framework for cross-species collaboration in urban planning and ecological restoration.

KEYWORDS

More-than-Human Geography; New Materialism; Materiality Turn; Nature-Society; Non-Human Subjects.

1. INTRODUCTION

Since the emergence of the 'post-humanist turn' in the field of humanities and social sciences at the end of the 20th century, Western human geography has undergone a profound ontological reconstruction. Traditional geography has long been subject to Cartesian subject-object dualism and anthropocentrism, which treats 'nature' as a passive object of study[1] and 'society' as a one-dimensional spatial representation of human activities. This cognitive paradigm reveals significant theoretical limitations when dealing with complex issues such as global climate change, species extinction, and alienation of technological objects. Against this background, new cultural geographers such as Sarah Whatmore and Bruce Braun have taken the lead in launching a methodological revolution, proposing the research paradigm of 'More-than-Human Geography' (MTHG) [2]. This paradigm deconstructs Human Exceptionalism and brings non-human actors such as viruses, algorithms, and geological formations into the core of geographic analyses[3], such as Braun's study of the interaction between Arctic ice melting and Inuit For example, Braun's study of Arctic ice melt and Inuit community interactions reveals the role of the climate system as a 'dynamic entity' in shaping the regional political economy[4]. It is worth noting that MTHG is not a complete rejection of traditional human geography, but an attempt to construct a more inclusive spatial explanatory framework in the context of the ecological crisis of the Anthropocene[5].

More-than-Human Geography (MTHG), with its central claim of Relational Ontology, emphasises that geographic phenomena are heterogeneous assemblages of human and non-human actors in dynamic networks[6]. According to Whatmore and Greenhough, the theoretical roots of MTHG can be traced back to three philosophical streams: firstly, Actor-Network Theory (ANT), which was

proposed by scholars such as Bruno Latour and others to completely deconstruct ‘nature’ and ‘society’. Latour and other scholars have thoroughly deconstructed the dichotomy between ‘nature’ and “society”, and advocated that non-human entities such as technological objects, microorganisms, and climate systems should be regarded as ‘actors’ with mobility[7]. Latour's laboratory research reveals the symmetrical involvement of humans and non-humans (e.g., experimental apparatus, bacterial samples) in the production of scientific knowledge[8], which lays the foundation for the MTHG's ‘de-anthropocentric’ analytical framework. Second, there is the biophilosophy perspective developed by Deleuze and Guattari. Inspired by Rhizomatic Thinking, MTHG views life as a fluid, generative process, rather than a fixed entity[6], and Greenhough further proposes the concept of Vital Materiality, which emphasises the importance of the ‘human’ and the ‘human’. Greenhough further proposed the concept of Vital Materiality, which emphasises the active participation of plants, animals, viruses and other life forms in shaping space through their metabolism, mutation and other abilities[9]. The spread of pathogens in globalised networks has not only changed human mobility patterns, but also reconfigured the governance logic of urban public health spaces. Thirdly, the Non-Representational Theory (NRT) founded by Nigel Thrift criticises the over-reliance of traditional geography on representation, and focuses instead on immediate processes of spatial production, such as bodily practices and emotional experiences[10]. MTHG absorbed the essence of its methodology and developed the tracking research of ‘Following the Actors’, e.g. Hinchliffe et al. documented the interactions between migratory birds and the management of wetlands in London, to reveal the ‘cross-species collaboration’ of migratory birds. For example, Hinchliffe et al. documented the interaction between migratory birds and wetland management in London, revealing how ‘cross-species collaboration’ generates new urban ecological spaces[11].

Nourished by this triple theory, MTHG has established two major principles of methodology: the ontology of relevance and the analysis of symmetry. The former rejects the a priori categorisation of “human” and “non-human” and focuses instead on the networks that emerge from their interactions[2]; the latter gives non-human actors the same explanatory weight as humans, e.g., in analysing climate change, one needs to look at the co-constructive mechanisms of glacial mass wasting and climate policy. Analyses of climate change need to look at the co-constructive mechanisms of glacial mass wasting and climate policy[4].

As one of the most groundbreaking theoretical paradigms in human geography in the 21st century, MTHG breaks through the rigid opposition between ‘natural determinism’ and ‘social constructivism’ in traditional geography, and repositions the research object as ‘human-nonhuman hybrid collectives’ (Hybrid Collectives) through the ‘relevance turn’. The relevance turn‘repositioned the object of study as ’human-nonhuman hybrid collectives[12]. This epistemological change has allowed geographers to examine the co-construction of glacial materiality and climate policy in climate change research[13], or to analyse how smart algorithms reshape the spatial and temporal experiences of residents in urban studies[15]. On the practical level, the theory has been deeply involved in urban planning, ecological restoration and other application fields. Gandy proposed the concept of ‘liquid infrastructure’, which emphasises the coordination of human needs and the metabolic cycle of microbial communities in the design of urban drainage systems[15]; practice has shown that MTHG not only provides a critical lens to perceive the world, but also opens up new paths for the realisation of the SDGs at the techno-political level.

It can be seen that MTHG advocates interdisciplinary and academic research, which crosses the boundaries between physical geography and human geography, covers cultural geography and political and economic geography, and encourages geography researchers to let go of academic authority and go into the things in pursuit of other sources of knowledge production[16]. Therefore, MTHG is able to fully mobilise the expertise of various disciplines, academic authorities and local knowledge, integrate theories and methods of various disciplines, and consider the impacts of various sources of knowledge, in order to achieve the goal of discovering the world of MTH - a more vivid and rich world where humans and non-humans interact and coexist[6].

2. CURRENT STATUS OF WESTERN MTHG RESEARCH

Western scholars have carried out multidimensional explorations of 'transhuman geographies', with the central theme focusing on the critique and reconstruction of the traditional anthropocentric paradigm of geography, emphasising the dynamic co-constructive relationship between non-human subjects (animals, materiality, the environment, etc.) and human societies. The review will integrate and analyse existing research in five themes: new animal geographies, urban space, materiality, bodily practices and environmental climate.

2.1. The Progress of Western Animal Geographies

Taking the ontological turn beyond human geography as its base, the new animal geography subverts the cognitive framework of traditional geography, which regards animals as passive objects or ecological symbols, and focuses on the co-constructive roles of animals as dynamic subjects in the production of social space, revealing that 'society' and 'everyday life' are essentially not the exclusive domains of humans . Instead, it focuses on the co-constitutive role of animals as dynamic subjects in the production of social space, revealing that 'society' and 'everyday life' are not essentially the exclusive domain of humans[17].

Hodgetts and Lorimer have proposed 'animal genomic geographies' , which emphasises how gene technology and animal conservation policies can reconfigure the spatial relationship between humans and wildlife[18]. Srinivasan, further demonstrates through his study of street dogs in India that species management policy is a political practice of "naturalisation" - street dogs are defined as "wild" or "domesticated". The process of defining street dogs as "wild" or "domesticated" directly shapes the mechanisms of exclusion and inclusion in urban space, demonstrating that the concept of "nature" is itself a product of negotiation between human and non-human forces[19]. Kiernan et al. use the Australian white ibis as an example to explore how urban animals have transformed from 'pests' to 'symbiotic partners', challenging the single dominant narrative of human ecology in cities[20]. In addition, Van Patter proposes the concept of synanthropy by tracking the trajectories of individual coyotes in cities, emphasising that animals actively intervene in urban spatial planning through mobility strategies, and challenging the unidirectional definition of 'order' by human beings. The concept of synanthropy has been proposed, emphasising that animals actively intervene in urban spatial planning through mobility strategies, challenging the unidirectional definition of order[21]. Together, such studies suggest that animals exist not only as components of ecosystems, but also as political subjects that shape socio-cultural spaces[22]. Neo-Animal Geography thus materialises a theoretical core that transcends human geography - rejecting the epistemology of human exceptionalism, and instead considering 'society' as a heterogeneous field of continuous negotiation between humans and non-humans[23].

2.2. Transhuman Reconfiguration of Urban Space

The study of cities from the perspective of More-than-Human Geography has completely overturned the traditional perception of the city as an exclusive container for human beings, and has instead defined urban space as a dynamic field of co-evolution between human beings and non-human actors (plants, microorganisms, animals, climatic systems, etc.). The core of this shift is the revelation that the material form, social relations and governance logic of the city are essentially the product of cross-species interactions and the intertwining of multiple material forces.

Robertson's theory of 'relational place-making' emphasises that the spatial production of cities is not a projection of unilateral human will, but the result of continuous negotiation between humans and non-humans through daily contact[24]. Steele et al. further challenged the modernist planning paradigm with the concept of 'wild cities', pointing out that 'uncontrolled' natural forces in cities (e.g., the spread of invasive plants, the occupation of abandoned buildings by birds) are not "chaos"

that needs to be regulated, but rather ‘chaos’ that needs to be regulated. ‘chaos’, but rather an indispensable creative subject in the reproduction of space[25].

In the context of urban governance, Ernwein's ecological restoration projects in urban parks reveal that so-called ‘artificial nature’ is the result of the collaborative labour of human workers and non-human beings, such as insect pollinators and soil fungi - microbial degradation of pollutants, earthworms turning over the soil, and other processes are directly involved in the production of ‘green space’[26]. ‘Sheikh et al. propose a framework of ’multispecies regional governance" (multispecies regional governance), which argues that urban planning needs to take into account migratory routes of migratory birds, changes in river hydrology, and the impacts of the climate on the environment. Sheikh et al. proposed the framework of multispecies regional governance, which argues that urban planning needs to incorporate non-human variables such as migratory routes and river hydrological changes into the decision-making system. Seasonal movements of animals may require adjustments to the design of transport networks, while climatic fluctuations may require a reassessment of the durability of building materials[27]. Meanwhile, Choi et al. demonstrated through the Curating with Care project that neglecting non-human needs such as insect habitats and soil microbial networks in the design of urban public spaces can lead to a structural lack of ecological justice[28].

Taken together, these studies suggest that the ‘transhumanity’ of the city is not only reflected in the symbiosis of material landscapes, but also in the reconfiguration of power relations: non-human forces have always intervened in the urban evolution process as equal spatial creators. This perspective not only dismantles the human monopoly on the definition of ‘urbanity’, but also calls for a shift in urban planning from ‘management of nature’ to ‘complicity with nature’[25] [29].

2.3. Materialistic Turn

As a central theoretical breakthrough that transcends human geography, the materiality turn completely dismantles the traditional presupposition of the material as a passive object, and instead considers non-human entities such as technologies, infrastructures, and organisms as spatial co-constructors with dynamic and generative power, emphasising how material networks dynamically shape the topology of social relations.

Whatmore proposes “materialist returns”, which advocates analysing the ways in which human interactions with non-human materials (e.g. rivers, industrial waste) reshape local identities through hybrid networks[2]. Polluted rivers not only exist as physical entities, but also actively intervene in community health disputes and land property rights negotiations through processes such as chemical diffusion and ecological chain rupture[2]. At the micro-scale, Barry's ethnography of walking on footbridges shows that the generation of spatial experience is not simply a result of human perception: the thermal expansion and contraction of bridge deck materials, the changes in surface texture caused by wind and rain erosion, and the tactile sensation of the pedestrian's feet and the regulation of balance form a complex feedback, which define the spatial attribute of ‘walkability’[30]. Such studies have overturned the instrumental theory of ‘matter serving function’, and instead viewed matter as an actor with temporal and mutational potentials. Sharp et al. go on to call for a “more-than-human physical geography”, arguing for the inclusion of non-human processes such as geological plate movements and microbial decomposition in geo-ethical frameworks, such as how volcanic ash dispersal has reshaped the politics of aviation, or how soil flora has influenced the history of agricultural colonisation[30]. The radical nature of the materiality turn is further exemplified by its deconstruction of binaries: Latour's theory of “non-modernity” suggests that the “nature/culture” divide in modern societies is a false narrative - the design of nuclear waste facilities is dependent on both engineering and engineering technology. The design of nuclear waste disposal facilities relies on engineering and is governed by the laws of half-life of radioactive materials, exposing the inseparability of human and non-human forces[8].

Such studies show that matter is far from a static backdrop, but rather heterogeneous engineers who continuously reconfigure social space through networked practices (e.g., chemical reactions, biological metabolism, mechanical wear and tear)[16]. The materiality turn thus pushes geography from 'how humans shape matter' to 'how matter shapes the world together with humans', providing an ontological and methodological basis for the core issue of 'transcending anthropocentrism'. This provides a dual ontological and methodological path for the central issue of 'transcending anthropocentrism' [2] [23].

2.4. Bodily Practices and Non-Human Perception

In addition to its ongoing focus on non-human life, MTHG's recent research has also begun to focus on human beings themselves, influenced by the 'body turn' of the new cultural geography, whose research on the body is to some extent similar to that of the geographies of health in that it deals with the body, life and health, but emphasises the close relationship between human beings and their non-human material surroundings. surrounding non-human matter.

Couper's ethnography of green/blue spaces suggests that the nature of 'nature healing' is not a one-way drawing of energy from the environment by humans, but rather a continuous dialogue between the body and non-human elements such as plant volatile organic compounds (VOCs), water microorganisms, air ions, etc., through the sense of smell and touch, e.g., respiratory regulation of asthma sufferers may be closely related to lichen releasing antimicrobial compounds[31]. Judge further introduced the concept of 'neurodiversity' and advocated the inclusion of non-human modes of perception (e.g., animal hearing, plant signalling) into the cognitive framework of geography[32]. These studies view the body as a more-than-human interface, emphasising the multifaceted and cross-species nature of perception[33]. The analysis of everyday practices also highlights the symbiosis between the body and the non-human environment: Marković takes the example of rhythmmanalysis of smoking behaviour, which reveals that tobacco combustion is not only subject to the biological clock of the human body, but is also dynamically coupled with non-human variables such as air humidity and wind speed: the diffusion paths of smoke particles reconstruct the behaviour of an office or an office building. The diffusion path of smoke particles reconfigures the social space of an office or a street corner, while the rate of nicotine metabolism is shaped by the diversity of intestinal flora[34]. Such studies expose the limitations of the "behaviourist" paradigm of traditional public health policy, which reduces health to autonomous human choices while ignoring the material colonisation of bodily states by non-human forces (e.g. air pollution, microbial ecology)[35].

These studies consider human life and health as essentially dynamic symbioses assembled by multiple species. From genes to the atmosphere, from gut flora to urban haze, the body has always acted as a 'transhuman interface' weaving networks of existence[33]. Transhuman geography thus injects a new paradigm into the geography of health, rejecting disease as individualised pathology, and instead tracking the cross-border politics of toxins, viruses, and nutrient flows between the human body and non-human environments[36], such as how the COVID-19 pandemic exposed the lethal entanglement of human beings with bats, pangolins, and cold-chain logistic systems[36] [37].

2.5. The Transhuman Ethics of the Climate Crisis

MTHG's critical intervention in the climate crisis lies in the complete deconstruction of the hegemonic logic of species implicit in the Anthropocene narrative, and to construct an ethical framework for the Earth based on multi-species symbiosis and mutual responsibility. Instead, he constructs an ethical framework for the earth based on multi-species symbiosis and mutual responsibility. He argues that the environmental problems of the earth are not merely a technical dilemma of human beings, but an ethical-political crisis in which human beings are deeply entangled in the system of non-human beings and materials.

Lorimer takes the beaver ecosystem project as an example and puts forward the concept of 'weirding worlding', advocating the reassessment of the ethical dimensions of ecological restoration projects through a non-human perspective[38]. Blue et al. critique the logic of one-way human control of the virus in the COVID-19 pandemic from the perspective of 'genomic trans-biopolitics'[36]. Various infrastructural studies, on the other hand, provide a figurative perspective on climate ethics. For example, Maller criticises the instrumental pitfalls of mainstream nature-based solutions: afforestation that pursues carbon sequestration targets while ignoring bird habitat fragmentation and loss of soil microbial diversity reproduces the colonial logic of environmental exploitation[39].

Together, these studies call for a response-ability ethic as an alternative to human exceptionalism[40], and the 'transhuman physical geography' proposed by Sharp et al. demands that non-human time scales such as glacier melt rates and ocean acidification processes be incorporated into climate policy assessments, e.g. prehistoric viruses released by thawing Arctic permafrost must be used as a legitimising variable in global health governance[30]. Margulies et al. take a post-human political ecology perspective, exposing how carbon offset mechanisms reduce ecosystems such as mangroves and peatlands to 'carbon account' figures, erasing their ethical value as multi-species life networks[41].

MTHG is radical in that it rejects the climate crisis as a salvation narrative in which 'humans save the planet', and instead emphasises the reflexive penalties of the Earth system, such as the intensification of tropical cyclones, hay fever epidemics, and the crisis of crop pollination. An ethical contract that recognises non-human subjectivities is needed to address this crisis - from international climate negotiations to community-based adaptation planning, the sonar communications of cetaceans, the carbon allocation networks of fungi, and the climatic memories of monsoons should become equal subjects of knowledge for decision-making considerations[25] [40].

3. CURRENT STATUS OF MTHG RESEARCH IN CHINA

Based on the perspective of new cultural geography, Chinese scholars' explorations of 'transcending human geography' have shown distinctive localised characteristics, with the core issues focusing on the critical reflection on the anthropocentric paradigm of traditional human geography, and emphasising material agency, participation of non-human subjects, and the dialectical reconfiguration of nature-society. The following is an overview of four themes: the new materialist turn, spatial practices of non-human subjects, nature-society dichotomies, and trans-local practices from the perspective of mobility.

3.1. The New Materialism and the Materiality Turn

New materialist research is emerging in Chinese cultural geography, emphasising the dynamic role of material entities in spatial production. It has completely overturned the cognitive paradigm of 'matter passively carrying cultural meanings', and instead positioned material entities (architectural monuments, artefacts, waste streams, etc.) as spatial co-constructors with the ability of reflexivity, and emphasised their active roles in the production of localities and networks of power.

Guo's framework of 'cultural geography for new materialism' systematically criticises the simplification of the instrumental role of the material in traditional research, and advocates that material processes such as the ageing of non-heritage artefacts and the weathering of architectural monuments be considered as actors actively involved in the negotiation of local meanings. The mould growth on the white walls of Huizhou buildings not only exists as a physical decay, but also reconfigures the logic of tourists' perception of 'ancient charm' through the change of visual texture, which promotes the shift of heritage conservation from 'landscape restoration' to material The change of visual texture also restructures the logic of visitors' perception of 'ancient charm' through the change of visual texture[42]. The study of 'non-representation and rematerialisation' by Zhu Hong and Wang Min further reveals that the material characteristics (material and texture) of traditional

handicrafts can reshape the logic of local cultural identity through interaction with consumers' tactile experience[43].

In the field of tourism geography, Yin Duo et al. take Lijiang Ancient City as a typical case, pointing out that the essence of 'locality' in tourism space is the dynamic assembly of human and non-human materials, revealing how non-human elements in tourism consumption (e.g., weathering of ancient architectural stones and microbial communities in water systems) are coupled with tourists' sensory experience, and promoting the development of locality from 'static heritage' to 'static heritage'. 'static heritage' to 'dynamic symbiotic network'[44]. Other scholars have approached the issue from the perspective of geographies of consumption, critiquing the bias of the theory of 'symbolic consumption' towards human subjectivity, and emphasising the implicit domination of material metabolism (cross-border flows of e-waste) over global production networks[45].

Together, these studies have challenged the epistemological hegemony of 'representation first' in cultural geography. Guo points out that the "decoding of meaning" paradigm of Western neo-cultural geography relegates matter to the role of a carrier of cultural symbols, while the new materialist turn is revealed through "material storytelling"[46]. This ontological turn suggests that matter is not only a vehicle for cultural representation, but also a spatial co-conspirator in the ongoing game of human practices through its physical properties.

3.2. Spatial Practices of Non-Human Subjects

Chinese scholars have gradually paid attention to the political participation of non-human subjects (e.g., pets and microorganisms) in urban space. By deconstructing the cognitive hegemony of 'human beings' exclusive spatial sovereignty', they have systematically revealed the political roles of non-human subjects (pets, microorganisms, etc.) as spatial practitioners, and emphasised their role in reconfiguring the power relations and logic of governance in cities through their physical actions, material flows and ecological interactions.

Sun et al put forward a framework for analysing the 'economic geography of the pet phenomenon', pointing out that pets, as 'quasi-family members', have reconfigured the rules of public space in the community, and that their daily activities (such as barking and defecating) have forced the reconfiguration of the rules of public space in the community. The designation of pet parks not only redistributes the right to use green space, but also transforms 'human-pet coexistence' into a political arena for negotiating spatial rights through infrastructure such as faecal collection devices and soundproof fences[49]. Based on the study of pet-carrying leisure, it is found that pets intervene in the 'invisible agenda' of urban planning through physical movement (olfactory marking, path selection), forming a chain effect of 'pet mobility-capital response-spatial reproduction', for example, 'pet mobility-capital response-spatial reproduction'. A chain effect of 'pet mobility - capital response - spatial reproduction' is formed, such as the rise of pet-friendly commercial neighbourhoods[50].

At the institutional spatial level, Chinese scholars have taken zoos as their research objects, critiquing the logic of animal spatial regulation under the traditional 'human gaze', and emphasising the reverse shaping of enclosure design and visitor flow by animal behaviours (e.g., group living habits, breeding needs), with animal behaviours directly participating in spatial governance[49]. Analysing the phenomenon of travelling with pets from the perspective of new materialism, they pointed out that the flow of materials such as pet hair and excreta can reconstruct the hygiene governance system of tourist sites[51]. In addition, Huang Yuling et al. focused on the symbiotic relationship between microorganisms and urban space, revealing that the diversity of intestinal flora indirectly affects the formulation of urban public health policies through human health, e.g., the enhancement of the metabolic efficiency of anaerobic bacteria in municipal waste treatment and the optimisation of the ventilation system of public toilets are actually the spatial consequences of the synergistic interaction between microbial ecology and human health[51].

These studies show that from pet footprints to microbial metabolism, non-human subjects have always acted as equal spatial makers, constantly rewriting the spatial script of anthropocentrism through embodied practices [47] [49].

3.3. Dialectical Reconstruction of Nature-Society

Chinese scholars are committed to breaking the nature-humanities dichotomy and exploring the dynamic integration of the two in spatial practices. MTHG's reconstruction of nature-society relations is centred on the revelation of the deep involvement of natural elements (landforms, species, ecosystems) in the spatial production of society as a dynamic subject, and on breaking the passive positioning of nature as a 'background' or a 'resource' in traditional research, emphasising its political logic of reshaping human practices through material characteristics and ecological processes. It breaks the passive positioning of nature as 'background' or 'resource' in traditional research, and emphasises its political logic of reshaping human practices through material characteristics and ecological processes.

The framework of 'unified geography' proposed by Tang Maolin and others criticises the separation of the disciplines of physical and human geography, pointing out that climate change and ecological processes are essentially the direct intervention of non-human forces in social space. For example, drought-induced crop loss not only changes the rural economic structure, but also reshapes the local cultural network through the folk ritual of praying for rain, arguing for the inclusion of climate change and ecological processes in the socio-spatial analysis[52]. As a result, subsequent Chinese scholars have proposed the concept of 'social nature', which reveals how the discourse of 'wilderness' in the construction of nature reserves has been reconfigured by political and economic forces, such as panda territorial demands and reproductive cycles, forcing the adjustment of reserve boundaries and the design of tourism routes, demonstrating that nature is not an object to be constructed. This proves that nature is not an object to be constructed, but a subject to regulate human spatial decision-making through biological behaviours[53]. Scholar Zhou Shangyi emphasises the inter-constructive relationship between landscape evolution and local cultural memory, for example, how the Loess Plateau's gully topography consolidates local identity through folklore and farming rituals[54]. In traditional village conservation research, natural elements such as ancient trees and water systems are not only the 'background' of cultural heritage, but also the core participants of villagers' daily practices (rituals and festivals)[55]. At the micro-practice level, scholars intervene in children's geographies by reconstructing nature-society relations, and find that natural environments (wetlands, forests) directly shape children's affective geographies through tactile, olfactory, and other sensory stimuli[56].

Together, these studies suggest that the 'dialectical reconfiguration' of nature-society is a spatial politics of continuous play between non-human material forces and human practices, rather than a simple binary fusion[52][53].

3.4. Cross-Local Practices in a Mobility Perspective

MTHG's study of mobility completely rejects the simplified narrative of 'mobility as human displacement' and instead defines mobility as a complex network of cross-border flows and spatial reconfigurations of non-human elements (substances, species, microorganisms, etc.), emphasising their active participation in the generation of trans-local power relations through their material identities and ecological interactions.

Taking the trans-local practices of intangible cultural heritage as an example, Zhu Hong et al. reveal that the mobility of traditional skills is far from being a mere cultural transmission, and that the material carriers of traditional skills (embroidery and pottery) (silk thread and clay) react chemically with the climate and soil of the destinations during the mobility to reconfigure the local adaptations of the crafts[57]. Leilei Li et al."s study of urban villages in Shenzhen highlights the grassroots politics

of non-human materiality, where the rate of rusting of steel bars in construction waste and the root invasion of exotic plants (Banyan Tree) challenge the 'purity" criterion of official heritage preservation through physical compression and chemical decomposition, giving rise to informal eco-heritage practices based on material decay[58].

Crucially, mobility studies have exposed the anthropocentric fictionality of the concept of "boundary". Cheng Yeqing et al. pointed out in traditional village conservation that the spread of pollen from ancient trees in the wind and the migration of microorganisms from the watershed continue to blur the ecological boundaries between the village and the outside world, forcing conservation planning to shift from 'static boundary control' to 'mobility network'. This has forced conservation planning to shift from 'static boundary control' to 'mobile network governance'[55]. Together, these cases show that the essence of trans-local practices is the redefinition of spatial belonging and power configuration by non-human elements through mobility, rather than the filling of fixed containers by human subjects[57].

Chinese research on transhuman geographies is characterised by both theoretical introduction and local empirical evidence, with core topics covering material agency, empowerment of non-human subjects, nature-society dialectics and reconfiguration of mobility networks. Although these studies are still in the developmental stage, they have initially formed an academic consensus criticising anthropocentrism and advocating multi-species symbiosis[6].

4. CONCLUSION

4.1. Analysis of Chinese and Western MTHG Studies

MTHG presents differentiated theoretical paths and methodological practices in the tension between globalisation and localisation, and the heterogeneity of its academic vein maps the deep divide between Eastern and Western philosophical traditions, as well as reveals the practical concerns in different modernisation contexts. The review systematically analyses the dialogue and tension between Chinese and Western studies through the three dimensions of theoretical path, methodology and empirical focus.

4.1.1. Heterogeneity of Theoretical Paths

Western transhuman geography research has taken the ontological revolution as its core demand, and through paradigms such as New Materialism[2] and Actor Network Theory[8], it has completely rejected human exceptionalism[40], and regarded non-human subjects (animals, matter, microorganisms, etc.) as equal spatial producers[25]. The radicality of this theory is reflected in the following: first, the rejection of 'nature-society' dualism, such as Latour pointed out the 'non-modern' nature of nuclear waste, the 'nature-culture' fragmentation of modern society is really a 'nature-culture' fragmentation. For example, Latour points out the 'non-modern' nature of nuclear waste, the 'nature-culture' split in modern society is a false narrative, and nuclear waste disposal exposes the inseparability of human and non-human forces[8]; secondly, it emphasises the agency of non-humans, such as Lorimer's example of the beaver's ecosystem project, which argues for the reassessment of the ethical dimension of the ecological restoration project through the lens of non-humans[38]. The research is essentially an epistemological critique of human exceptionalism, attempting to reconfigure the research unit of geography through non-human agency. On the contrary, the Chinese study demonstrates the theoretical character of critical accommodation. In introducing new materialism, Guo Wen creatively put forward the concept of 'material narrative[42], juxtaposing the process of material transmutation, such as the oxidation of pigments in Dunhuang murals and the physical wear and tear of gold bricks in the Forbidden City, with the textual narratives of dynastic change and cultural memory, to reveal how material decay participates in the construction of national identity as a 'non-discursive force'. The concept of 'dynamic heritage' put forward by Cheng Yeqing's team in the protection of traditional villages is more locally innovative, taking traditional villages as a case

study, exploring the process of ‘dynamic heritage’ of natural elements such as ancient trees and water systems[55].

This difference in theoretical paths stems from disciplinary traditions, as Western research is driven by post-humanist philosophies and pursues epistemological revolutions, while Chinese scholars are more application-oriented, trying to open up the space for analyses of non-human subjects in the fields of rural revitalisation and cultural heritage. Yin Duo's analysis of the ancient city of Lijiang[44] draws on Whatmore's hybrid geography[2], but the research focuses on the sustainable management of the tourist site, reflecting a distinctive application-orientation feature.

4.1.2. Methodological Separation and Convergence

Western MTHG research has widely adopted mixed methodologies, with Hodgetts and Lorimer pioneering “genomic geography”[18], which combines DNA barcoding technology with ethnography to reveal how the discourse of genetic purity in the Scottish Red Squirrel Conservation Programme reconfigures the spatial rights of species. Such methodological innovations not only break through the qualitative tradition of human geography, but also achieve quantitative characterisation of non-human agency through material sensing technologies (e.g. biochips, isotope tracing)[30]. The methodological practice of MTHG research in China is still dominated by qualitative analysis. Although Huang Yuling's team attempted to introduce microbiome sequencing technology[51], their analysis of the diversity of flora in urban public toilets ultimately returned to qualitative discussions of public health policy, failing to establish a mathematical model of microbial metabolic rates and spatial governance. In the study on the distribution of pet hospitals by Sun Josiah et al[59], although GIS hotspot analysis was applied, the interpretation of spatial patterns still relied on interview texts, forming a rupture between technical representations and humanistic interpretations. This dilemma reflects the structural barriers to methodological transformation: on the one hand, the formation of an interdisciplinary technical team faces the constraints of a disciplinary assessment system; on the other hand, the ethical standards for the collection of non-human data have not yet been established.

It is noteworthy that there is a convergence of methodologies in the field of sensory geography: Marković's analysis of smoking rhythms[34] and Chinese scholar Huang Xiang's study of children's nature perception[56] both attempt to capture physiological indicators, such as heart rate and galvanic response, through biosensors, so as to transform the invisible body-environment interactions into analysable data. This kind of intervention of ‘embodied cognitive science’ may become a key path to break through the hegemony of human language interpretation.

4.1.3. Divisions of Focus in the Empirical Field

Western research has produced significant results in the field of ecopolitics and climate ethics. For example, Sharp et al. have proposed a ‘transhuman physical geography’, which argues for the inclusion of geological-climatic processes such as glacial movement rates and atmospheric circulation patterns in the framework of climate ethics[30]. The study regards the environmental crisis as a cross-species justice issue, with a sharp critical edge. Domestic studies focus more on urbanisation and cultural heritage. For example, Zhu Hong et al. use the trans-local practice of non-heritage to reveal the local adaptation of material flows [57], expanding the application scenarios of non-human perspectives. This difference reflects the difference in academic function: Western research follows the tradition of critical theory and regards geography as a ‘tool for emancipatory knowledge production’, while domestic research plays more of a ‘policy science role’ and seeks for incremental improvements within the space of institutional elasticity.

In the field of climate adaptation, Chinese and Western MTHG studies show an interesting mirror relationship: Lorimer's beaver study[38] emphasises the climate regulation function of non-human ecological engineers, and advocates the inclusion of species restoration in the carbon trading system; while the village study by Cheng Yeqing's team[55] pays attention to the value of the climatic memory of the annual rings of ancient trees, and tries to establish a mechanism for connecting the traditional

ecological knowledge with the modern meteorological data. This kind of 'animal actor' is not only the most important, but also the most important. The complementary perspectives of 'animal actors' and 'plant archives' suggest the potential for cross-cultural dialogue.

Thus, the differences between Chinese and Western MTHG research are essentially academic projections of different experiences of modernity. The West is moving towards a radical ontological revolution against the backdrop of a deep ecological crisis, while China is exploring progressive applied innovations in the midst of rapid urbanisation. Instead of being regarded as an obstacle to theoretical maturity, this heterogeneity provides ideological resources for constructing a geographic narrative of pluralistic modernity.

4.2. Challenges in MTHG Research

From an ontological perspective, despite the MTHG's claim to subvert anthropocentrism, most of the studies still imply a cognitive species bias. For example, most Chinese pet studies have explored the role of pet facilities in promoting community harmony from the perspective of 'human needs' [47] [48], while ignoring the spatial rights of the animals themselves. Although Western research emphasises non-human agency, it still relies on the human language system for methodological explanations ('translating' animal behaviour through ethnography), essentially othering non-human subjects [21] [22]. This contradiction exposes the unfinished nature of the ontological revolution, and how to construct a truly egalitarian cognitive framework of intersubjectivity remains the central challenge.

On a methodological level, the empiricalisation of non-human agency faces a double challenge: first, the invisibility of material agency . For example, processes such as microbial metabolism[51] and e-waste corrosion[45] rely on high-precision instrumentation, but the interpretation of their spatial-political effects (public health policy adjustments) is still monopolised by humans; and secondly, the incommensurability of cross-species perception. the neurodiversity framework proposed by Judge[32] attempts to incorporate non-human perceptual modalities, but human researchers are unable to truly experience bat sonar localisation or plant chemical signalling. localisation or chemical signalling in plants, resulting in analyses stopping at the metaphorical level.

From an interdisciplinary perspective, MTHG needs to be deeply integrated with fields such as ecology and life sciences, but existing collaborations mostly remain in conceptual borrowing rather than methodological co-creation. For example, Sharp et al. proposed 'transhuman physical geography'[30], but did not establish a causal model to explain geological processes and social change; and Yuling Huang et al.'s microbiological study[51] introduced ecological data, but did not form a closed-loop analysis with public health policy. This shallow crossover is difficult to respond to complex issues, such as the multi-species adaptation mechanism of climate change.

5. DISCUSSION

As reflection on the ontological and methodological limitations of transhuman geography continues to deepen, a breakthrough point for future research could focus on technological innovations and innovations in the field of how to respond to the climate crisis. This direction can not only respond to the dilemma of the 'hegemony of human language interpretation' in the existing methodology, but also provide a more operational critical path for structural ecological violence.

In response to the climate crisis, Chinese geography is facing an unprecedented paradigm reconstruction under the dual context of the global climate crisis and the construction of a local ecological civilisation. As typhoon paths increasingly deviate from historical patterns, and droughts and floods break traditional farming rhythms, climate adaptation is no longer a mere technological response, but a complex geographic process embedded in the right to life and cultural memory of non-human subjects. Future research can break through the 'anthropocentric' framework of climate governance, and incorporate the respiration of carbon sinks in forests, migratory bird trajectories, and

microbial metabolic networks into the core dimensions of spatial decision-making, so as to find a dynamic balance between technical rationality and eco-ethical tensions. Therefore, the real multi-species governance should rely on microbial sensing network[51], and construct the 'microbe-community' synergistic adaptation model to achieve the endogenous unity of ecological restoration and community development.

Secondly, transhuman geography, with its deep insight into non-human subjectivity, provides a new cognitive framework and practical principles for technological path innovation. Technology development and application must abandon the one-way dominant logic of instrumental rationality, and instead construct an inclusive technology ethics. The survival rhythm, material metabolism and spatial practice of non-human beings should be regarded as intrinsic constituents rather than passive objects. Taking the mangrove restoration project in China as an example, the traditional technological pathway focuses on the physical efficacy of wind and wave resistance, while the transcendental human geography perspective requires the inclusion of the cave creation of fiddler crabs, the synergistic relationship between microbial carbon and nitrogen cycling, and the growth of mangrove roots in the technological assessment system[51] [55]. By developing multimodal biosensors, researchers can break the dichotomy between 'natural restoration' and 'human intervention', and make the technological system an interface of ecological dialogue between humans and non-humans.

Therefore, transcending human geography and breaking the anthropocentric technological logic provides an opportunity for a paradigm revolution in China's climate adaptation research. Microbial sensing networks reveal the ethical turn of technological sovereignty-technology is not only a tool for governance, but also a medium for negotiating cross-species justice. This research path transforms geography from a 'human monologue' to a 'symbiosis of all things' narrative, and provides a critical and constructive ideological tool for solving the ecological crisis and realising sustainable development through ontological revolution, technological ethical reconstruction, and cross-species governance practices. Through its ontological revolution, technological ethical reconstruction and cross-species governance practice, it provides both critical and constructive thinking tools for solving the ecological crisis and achieving sustainable development.

CONFLICTS OF INTEREST

The authors declare that they have no conflict of interest.

ACKNOWLEDGEMENTS

At this point, the writing of the thesis has come to an end. In the process of completing this thesis, I was deeply impressed by the vastness of academic research and the meagreness of personal power, and fortunately, with the help and selfless support of my teachers and friends, I was able to get through the fog and reach the other side.

REFERENCES

[1] Castree Noel, Nash Catherine. "Introduction: Posthumanism in question." Environment and Planning A: Economy and Space, Vol. 36, No. 8, pp. 1341–1348, 2004. https://doi.org/10.1068/a37168

[2] Whatmore Sarah. "Materialist returns: Practising cultural geography in and for a more-than-human world." Cultural Geographies, Vol. 13, No. 4, pp. 600–609, 2006. https://doi.org/10.1191/1474474006cgj377oa

[3] Bennett Judith. Vibrant Matter: A Political Ecology of Things. Durham: Duke University Press, 2010, pp. 1–232. https://doi.org/10.2307/j.ctv111jh6w

[4] Braun Bruce. "Environmental issues: Inventive life." Progress in Human Geography, Vol. 32, No. 5, pp. 667–679, 2008. https://doi.org/10.1177/0309132507088030

[5] Lorimer Jamie. “Probiotic environmentalities: Rewilding with wolves and worms.” Theory, Culture & Society, Vol. 34, No. 4, pp. 27–48, 2017. https://doi.org/10.1177/0263276417695866

[6] Lu Wei, Yin Duo, Zhu Hong. “The progress of more-than-human geographies in Western geography.” Acta Geographica Sinica, Vol.74, No.10, pp.2178–2191, 2019.https://www.rdfybk.com/CN/lexeme/showArticleByLexeme.do?articleID=46537

[7] Latour Bruno. “Reassembling the Social: An Introduction to Actor-Network-Theory”, Oxford University Press, Oxford, 2005, pp. 1–301. https://global.oup.com/academic/product/reassembling-the-social-9780199256051

[8] Latour Bruno. “We Have Never Been Modern”, Longman, London, 1993, pp.1–157. https://www.hup.harvard.edu/books/9780674948396

[9] Greenhough Beth. “Vitalist Geographies: Life and the More-than-Human”, Routledge, Abingdon, 2016, pp. 1–218. https://www.routledge.com/Vitalist-Geographies/Greenhough/p/book/9781138647527

[10] Thrift Nigel. “Non-Representational Theory: Space, Politics, Affect”, Routledge, Abingdon, 2008, pp. 1–336. https://www.routledge.com/Non-Representational-Theory-Space-Politics-Affect/Thrift/p/book/9780415307718

[11] Hinchliffe, Steve, Matthew B. Kearnes, Monica Degen, Sarah Whatmore. “Urban wild things: A cosmopolitical experiment.” Environment and Planning D: Society and Space, Vol. 23, No. 5, pp. 643–658, 2005. https://doi.org/10.1068/d351t

[12] Whatmore Sarah. “Hybrid Geographies: Natures Cultures Spaces”, SAGE Publications, London, 2002, pp. 1–208. https://us.sagepub.com/en-us/nam/hybrid-geographies/book211986

[13] Carey Mark. “In the Shadow of Melting Glaciers: Climate Change and Andean Society”, Oxford University Press, New York, 2010, pp. 1–288. https://global.oup.com/academic/product/in-the-shadow-of-melting-glaciers-9780195396065

[14] Kitchin Rob, Dodge Martin. “Code/Space: Software and Everyday Life”, MIT Press, Cambridge, MA, 2011, pp. 1–304. https://mitpress.mit.edu/9780262015080/code-space/

[15] Gandy Matthew. The Fabric of Space: Water, Modernity, and the Urban Imagination. Cambridge, MA: MIT Press, 2014, pp. 1–352 . https://www.rdfybk.com//9780262028257/the-fabric-of-space/

[16] Beth Greenhough. “More-than-human Geographies”, in The SAGE Handbook of Human Geography, edited by Roger Lee, Noel Castree, Rob Kitchin, Victoria Lawson, Anssi Paasi, Chris Philo, Sarah Radcliffe, Susan M. Roberts, and Charles W. J. Withers, SAGE Publications, London, pp. 94–119, 2014. https://www.rdfybk.com//10.4135/9781446247617.n5

[17] Buller Henry. “Animal geographies I.” Progress in Human Geography, Vol. 38, No. 2, pp. 308–318, 2014. https://doi.org/10.1177/0309132513486220

[18] Hodgetts, Timothy, Jamie Lorimer. “Methodologies for animals’ geographies: Cultures, communication and genomics.” Cultural Geographies, Vol. 22, No. 2, pp. 285–295, 2015. https://doi.org/10.1177/1474474014525114

[19] Srinivasan, Krithika. “Conservation biopolitics and the sustainability episteme.” Environment and Planning A: Economy and Space, Vol. 49, No. 7, pp. 1458–1476, 2017. https://doi.org/10.1177/0308518X17702693

[20] McKiernan, Shaun, Lesley Instone. “From pest to partner: Rethinking the Australian white ibis in the more-than-human city.” Cultural Geographies, Vol. 23, No. 3, pp. 475–494, 2016. https://doi.org/10.1177/1474474015590671

[21] Van Patter Lauren E. “Individual animal geographies for the more-than-human city: Storying synanthropy and cynanthropy with urban coyotes.” Environment and Planning E: Nature and Space, Vol. 5, No. 4, pp. 2216–2239, 2022. https://doi.org/10.1177/25148486221079458

[22] Gibbs Leah. “Animal geographies III: Relational and political.” Progress in Human Geography, Vol. 48, No. 5, pp. 677–687, 2024. https://doi.org/10.1177/03091325221117907

[23] Hodgetts Timothy, Lorimer Jamie. “More-than-Human: A Companion”, Taylor & Francis, London, 2024, pp. 1–244. https://www.routledge.com/More-than-Human-A-Companion/Hodgetts-Lorimer/p/book/9781032062047

[24] Robertson S A. “Rethinking relational ideas of place in more-than-human cities.” Geography Compass, Vol. 12, No. 4, e12367, 2018. https://doi.org/10.1111/gec3.12367

[25] Steele Wendy, Ilan Wiesel, Cecily Maller. “More-than-human cities: Where the wild things are.”Geoforum, Vol. 106, pp. 411–415, 2019. https://doi.org/10.1016/j.geoforum.2019.09.007

[26] Ernwein Marion. “Bringing urban parks to life: The more-than-human politics of urban ecological work.” Annals of the American Association of Geographers, Vol. 111, No. 2, pp. 559–576, 2021. https://doi.org/10.1080/24694452.2020.1795754

[27] Sheikh Hira, Peta Mitchell, Marcus Foth. “More-than-human city-region foresight: Multispecies entanglements in regional governance and planning.” Regional Studies, Vol. 57, No. 4, pp. 642–655, 2023. https://doi.org/10.1080/00343404.2022.2131447

[28] Choi Jaz Hee-jeong, Kit Braybrooke, Laura Forlano. “Care-full co-curation: Critical urban placemaking for more-than-human futures.” Cities, Vol. 132, 103955, 2023. https://doi.org/10.1016/j.cities.2022.103955

[29] Maller Cecily. “Re-orienting nature-based solutions with more-than-human thinking.” Cities, Vol. 113, 103155, 2021. https://doi.org/10.1016/j.cities.2021.103155

[30] Sharp Emma L., Gary J. Brierley, Jennifer Salmond, Nicolas Lewis. “Geoethical futures: A call for more-than-human physical geography.” Environment and Planning F: Philosophy, Theory, Models, Methods and Practice, Vol. 1, No. 1, pp. 66–81, 2022. https://doi.org/10.1177/26349825211062708

[31] Couper Pauline R. “The embodied spatialities of being in nature: Encountering the nature/culture binary in green/blue space.” Cultural Geographies, Vol. 25, No. 2, pp. 285–299, 2018. https://doi.org/10.1177/1474474017705133

[32] Judge Sara M. “Languages of sensing: Bringing neurodiversity into more-than-human geography.” Environment and Planning D: Society and Space, Vol. 36, No. 6, pp. 1101–1119, 2018. https://doi.org/10.1177/0263775818799741

[33] Oliver Catherine. "Dancing with foxes: More-than-human design in ‘the chicken city’." Transactions of the Institute of British Geographers 50.2 (2025): e12695. https://doi.org/10.1111/tran.12695

[34] Marković Ivan.“Out of place, out of time: Towards a more-than-human rhythmanalysis of smoking.” Cultural Geographies, Vol. 26, No. 4, pp. 487–503, 2019. https://doi.org/10.1177/1474474019830673

[35] Andrews Gavin J. “Health geographies II: The posthuman turn.” Progress in Human Geography, Vol. 43, No. 6, pp. 1109–1119, 2019. https://doi.org/10.1177/0309132518765608

[36] Blue Gwendolyn, Rock Melanie. “Genomic trans-biopolitics: Why more-than-human geography is critical amid the COVID-19 pandemic.” Dialogues in Human Geography, Vol. 10, No. 2, pp. 287–290, 2020. https://doi.org/10.1177/2043820620935252

[37] Jackson Paul, Neely Abigail H. “Triangulating health: Toward a practice of a political ecology of health.” Progress in Human Geography, Vol. 39, No. 1, pp. 47–64, 2015. https://doi.org/10.1177/0309132514527031

[38] Lorimer Jamie. “Worlding and weirding with beaver: A more-than-human political ecology of ecosystem engineering.” Transactions of the Institute of British Geographers, e12698, 2024. https://doi.org/10.1111/tran.12698

[39] Maller Cecily. Re-orienting nature-based solutions with more-than-human thinking[J]. Cities, 2021, 113: 103155.https://doi.org/10.1016/j.cities.2021.103155

[40] Brown Katrina M, Frode Flemsæter, Katrina Rønningen. “More-than-human geographies of property: Moving towards spatial justice with response-ability.” Geoforum, Vol. 99, pp. 54–62, 2019. https://doi.org/10.1016/j.geoforum.2018.11.009

[41] Margulies Jared D, Brock Bersaglio. “Furthering post-human political ecologies.” Geoforum, Vol. 94, pp. 103–106, 2018. https://doi.org/10.1016/j.geoforum.2018.05.005

[42] GUO Wen. Research on new materialism in cultural geography[J]. Acta Geographica Sinica, 2023, 78(12): 2922-2938 https://doi.org/10.11821/dlxb202312002

[43] WANG Min, JIANG Ronghao, ZHU Hong. “Non-representational”, “re-materializing” and the research methods of new cultural geography[J]. Progress in Geography, 2019, 38(2): 153-163 https://doi.org/10.18306/dlkxjz.2019.02.001

[44] Yin Duo, Gao Quan, Lu Wei, et al.“Construction and consumption of Lijiang Old Town from the perspective of more-than-human geography.”Tourism Tribune, Vol. 36, No. 4, pp. 96–105, 2021. https://doi.org/10.19765/j.cnki.1002-5006.2021.04.011

[45] Zhao Yizheng, Chen Pinyu, Kong Xiang. “Progress and reflection on consumption geography from the perspective of new materialism.” Progress in Geography, Vol. 40, No. 8, pp. 1419–1429, 2021. https://www.rdfybk.com//EN/lexeme/showArticleByLexeme.do?articleID=50253

[46] Guo Wen. “The origin, connotation, and significance of the new paradigm of Western social and cultural geography.” Geographical Research, Vol. 39, No. 3, 2020. https://doi.org/10.11821/dlyj020190097

[47] Sun Jiaojiao, Lü Xingyang, Li Yaoqi, et al. “Economic geography perspectives on pet phenomena: Multiple topics and innovative directions.” Economic Geography, Vol. 42, No. 7, pp. 1–10, 2022. https://doi.org/10.15957/j.cnki.jjdl.2022.07.001

[48] Cheng Li, Wang Yunlang, Shang Yufei, et al. “Complexity of pet leisure participation from the perspective of leisure constraint.” Human Geography, Vol. 40, No. 1, pp. 26–36, 2021. http://rwdl.xisu.edu.cn/CN/10.13959/j.issn.1003-2398.2025.01.004

[49] Huang Huizhu, Zhang Min, Chen Peipei. “Caring practices of urban nature: Space, relations and behavior in zoos.”Human Geography, Vol. 38, No. 5, pp. 98–106, 2023. https://www.rdfybk.com//CN/10.13959/j.issn.1003-2398.2023.05.012

[50] Zhang Yufen, Wang Qiang, Chen Yufeng. “Traveling with pets: Connotation, characteristics and its analysis from the perspective of new materialism.” World Regional Studies, Vol. 33, No. 11, 2024. https://www.rdfybk.com//CN/10.3969/j.issn.1004-9479.2024.11.20230059

[51] Huang Yuling, An Ning, Zhang Bo. “Rethinking the Relationship between Microbes, Bodies and Cities from the Perspective of Mobilities.” Tropical Geography, Vol. 44, No. 9, 2024. https://www.rdfybk.com//10.13284/j.cnki.rddl.20230439

[52] TANG Maolin, LU Pin, LIU Maosong. “Unity of Geography beyond Dichotomy of Physical and Human Geography.” Tropical Geography, Vol.30, No.2, pp.101–107,120, 2010. https://www.rdfybk.com//CN/Y2010/V30/I2/101

[53] WEI Jun-feng, MING Qing-zhong. “SOCIAL NATURE: THE LINEAGE AND PROSPECTS OF RESEARCH ON THE SOCIAL CONSTRUCTION OF NATURE.” Human Geography, Vol. 40, No. 1, pp. 18–25, 2025. http://rwdl.xisu.edu.cn/CN/10.13959/j.issn.1003-2398.2025.01.003

[54] Shangyi Zhou. “On the Basis of the Integration of Physical Geography and Human Geography: A Response to the Article by Christian Kesteloot and Lorenzo Bagnoli.” Tropical Geography, 2023, pp. 1–4. https://www.rddl.com.cn/CN/abstract/abstract55867.shtml

[55] Cheng Yeqing, Hu Shougeng, Yang Ren, et al. “Protection and utilization of traditional Chinese villages towards rural revitalization: Challenges and prospects.” Journal of Natural Resources, Vol. 39, No. 8, pp. 1735–1759, 2024. https://doi.org/10.31497/zrzyxb.20240801

[56] HUANG Xiang. “THE CHILDREN-NATURE RELATIONSHIP: CONTACT, COGNIZATION AND EMOTION” Human Geography, Vol. 35, No. 6, pp. 9–17, 2020. https://www.rdfybk.com//CN/10.13959/j.issn.1003-2398.2020.06.002

[57] WEI Lei, ZHU Hong. “The translocal practices of intangible cultural heritage in the perspective of geography.” Acta Geographica Sinica, Vol. 77, No. 2, 2022. https://www.geog.com.cn/article/2022/0375-5444/0375-5444-77-2-492.shtml

[58] LI Lei-lei, REN Jun. “URBAN VILLAGE AS URBAN HERITAGE:PUBLIC GEOGRAPHIES AND A CASE STUDY OF SHENZHEN.” Human Geography, Vol. 32, No. 5, pp. 33–39, 2017. http://rwdl.xisu.edu.cn/CN/10.13959/j.issn.1003-2398.2017.05.005

[59] SUN Jiaojiao, HU Hongji, GUO Yingzhi. “Spatial Distribution and Influencing Factors of Urban Pet Hospitals: A Case Study of Shanghai.” Economic Geography, Vol. 44, No. 3, pp. 86–96, 2024. https://www.rdfybk.com//CN/lexeme/showArticleByLexeme.do?articleID=69328