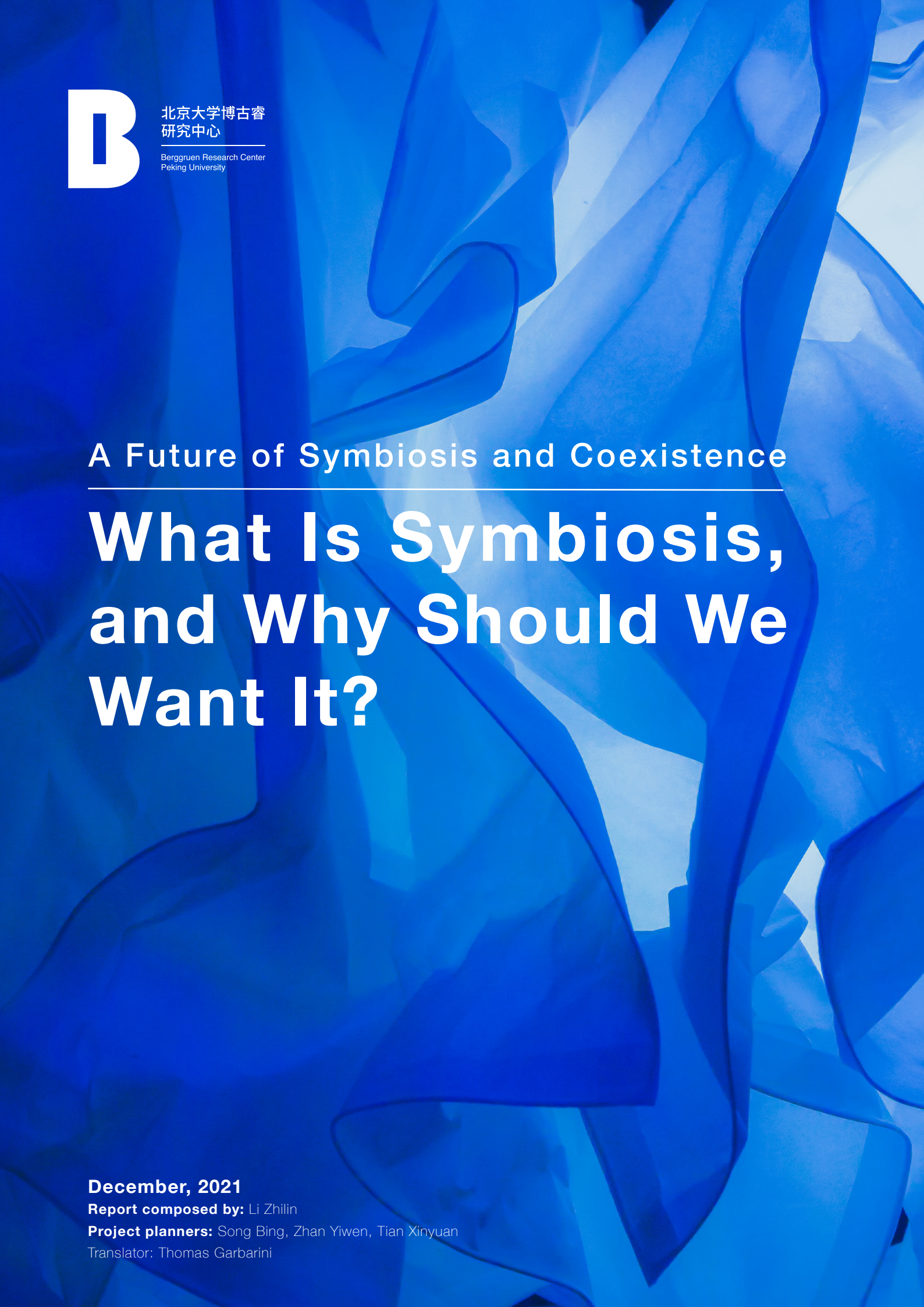

北京大学博古睿
研究中心

Berggruen Research Center
Peking University

A Future of Symbiosis and Coexistence

What Is Symbiosis, and Why Should We Want It?

December, 2021
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Part 1

Introduction

In 1879, the German microbiologist Heinrich Anton de Bary first introduced the concept of symbiosis to describe a system of mutual reciprocity and coexistence among organisms. Nowadays, it is becoming increasingly apparent that symbiotic systems are not just widespread in the natural world; the concept of symbiosis is in fact a complex set of ideas that can be extended to the fields of social science and philosophy. It has its beginnings in the sustained transformations of ontology and epistemology, and echoes throughout the history of human thought. In discussions of human-nature symbiosis ranging from early Eastern and Western naturalist philosophy to modern-day global ecological ethics and environmental philosophy; in explorations of human-society symbiosis from the ancient Chinese “nature and humankind” duality and Taoism to Western sociology and Marxism; and even as a symbiotic global governance extrapolated from economics and management science, symbiosis and coexistence demonstrate their significance as metaconcepts in addressing global issues.

The Berggruen Institute advocates leveraging Eastern and Western resources to explore and unearth the holistic interests that support all of humankind and our environment, as well as concepts and plans for a future replete with symbiosis and coexistence. From exploring the essence of cognition and intelligence to an open and diverse "Tianxia" view with relational rationality, we hope to gain a thorough understanding of the fundamental thinking of modern civilizations and prepare for an inclusive, peaceful, prosperous future of ubiquitous interconnectedness. Starting this year, we have begun a series of events under the theme "Facing a future of symbiosis and coexistence: from natural philosophy to planetary governance," which aims to explore what symbiosis and coexistence mean and what value they serve to our current epoch in a multidisciplinary—covering philosophy, sociology, economics, global governance, and other fields—and multidimensional way.

From August to October in 2021, the Berggruen Institute China Center held two forums, inviting thinkers from the fields of biology, ecology, Chinese philosophy, and philosophy of science and technology. By integrating their research objectives, these scholars reported and shared ideas on the phenomena, implications, and extensions of symbiosis in a multifaceted, interdisciplinary manner, tying together the scientific facts, evolutionary logic, philosophical connotations, and ideological resources of symbiosis, thus bringing to light many worthwhile issues for further exploration and consideration. It could be said that we are still far from realizing just how extensive our interconnectedness is; truly understanding this fact will go a long way in changing the world.

The first event in this series, the academic forum "Symbiosis: Life Science and Philosophy Perspectives," was held in late August 2021, focusing on the biology and philosophy foundation of the symbiosis concept. This forum aimed to launch an interdisciplinary discussion starting from the fields of natural science and philosophy to explore the crucial role that the concept of symbiosis plays when we engage in philosophical reflection of natural ecosystems and human society. Some of the prominent topics included: What is the biological and evolutionary foundation of symbiosis? Which ideological resources from Chinese and Eastern philosophy can help us understand symbiosis? What does the idea of symbiosis mean to ecological philosophy and the philosophy of science and technology?

The second event in this series, "The construction of the symbiosis concept and its implications," concluded in early October. Building on the first forum, we hoped to clarify the connotations, implications, and definitions of the term "symbiosis" in different fields. Speaking from the paradigm of conceptual construction, the attending scholars explored whether or not symbiosis could be used to describe a specific concept, providing a common foundation for future interdisciplinary discussions.

This report aims to introduce the views of the scholars at these two events, thus acting as a reference for future events.

Part 2

Participants

(in alphabetic order)

Chen Xia, Research Fellow, Institute of Philosophy, Chinese Academy of Social Sciences

Gong Jun, Professor, Department of Philosophy, Sun Yat-sen University

Ishii Tsuyoshi, Professor of Chinese Philosophy, University of Tokyo, Komaba

Lu Qiaoying, Assistant Professor, Department of Philosophy and Religious Studies, Peking University

Lu Zhi, Professor and Deputy Director, Centre for Nature and Society, Peking University

Ren Xiao, Professor, Director of the Center for Chinese Foreign Policy, Fudan University

Song Bing, Vice President, Berggruen Institute

Wu Genyou, Professor, School of Philosophy, Wuhan University

Xiao Xianjing, Professor, Institute for Science, Technology and Society, South China Normal University

Yang Shijian, Associate Professor, Department of Philosophy, Xiamen University

Zhan Yiwen, Lecturer, School of Philosophy, Beijing Normal University

Zhang Xianglong, Professor, Department of Philosophy and Religious Studies,Peking University

Zhao Liping, Professor and Eveleigh-Fenton Chair of Applied Microbiology, Department of Biochemistry and Microbiology, School of Environmental and Biological Sciences, Rutgers, State University of New Jersey

Part 3

Symbiosis in large-and small-scale ecological systems

Beginning with the description of biological existence and evolution, the term "symbiosis" was born in the natural world and reveals a profound pattern of interaction between things in natural ecology. From the smallest fungus and cell to the largest human and nature, symbiosis is everywhere, constantly shaping the underlying logic of our understanding of the world.

Considerations and implementation of human-nature symbiosis: the importance of biodiversity

Professor Lu Zhi of the School of Life Sciences at Peking University is a renowned scholar and initiator in the field of environmental and animal conservation in China. She is also the director of the Peking University Center for Nature and Society, and founder of the Shan Shui Conservation Center. Professor Lu has spent a considerable amount of time researching nature conservation and sustainable development, as well as implementing public welfare projects and advocating for policy changes. In her view, the concept of “symbiosis” is not an established research topic; rather, symbiosis is a reality that is constantly unfolding around us.

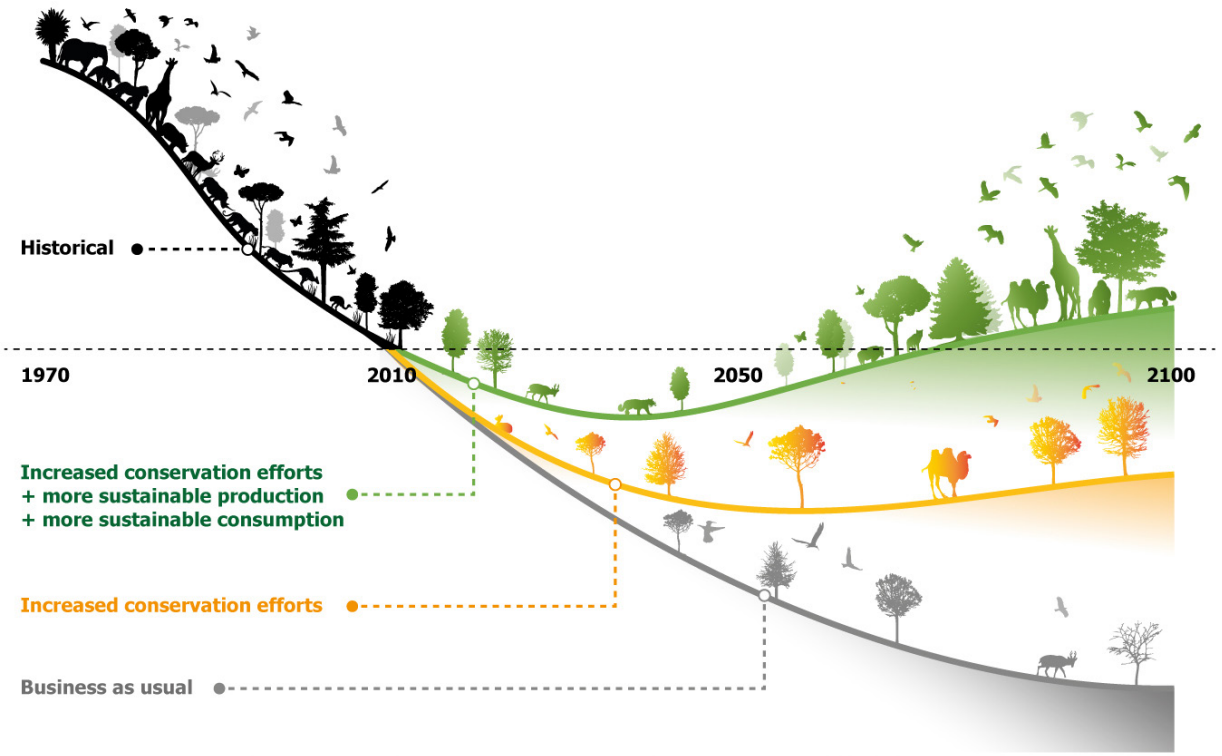
During her presentation, Professor Lu shared how researching the habitat of the giant panda made her realize the complexity of symbiosis as a means of balancing the relationship between humankind and nature.

The giant panda's habitat is the Qinling mountain range. Positioned at the boundary of North and South China, the Qinling range is a transition zone with abundant natural resources and high ecological resilience. The area has been the staging grounds for a back-and-forth tug of war between humans and nature since ancient times: during times of war or famine, it would see large influxes of refugees, who would then depart during times of prosperity. During the planned economy era of massive steel production, the range was cultivated and local plant life was destroyed, only to be restored again during times of economic depression. When China embraced a market economy which encouraged wanton deforestation and the tenets of sustainable management were disregarded, the giant panda lost space to reproduce. It wasn't until the establishment of a national nature preserve that the giant panda was provided with space to breed and policy protection, but then it became a matter of how the people living in the nature preserve should survive, how they could coexist with the giant panda while still making ends meet.

Professor Lu believes that protecting wildlife, protecting the environment, and protecting humanity are isomorphic goals. The important part is recognizing the complexity and possibilities of symbiotic relationships. If we take a broad view and recognize the four-billion-year history of life on Earth, we will see that Homo sapiens only emerged a brief 170,000 years ago, and we represent just one tributary of the great river of natural evolution. Yet we have obtained the ability to drastically reshape the Earth, bringing the life cycle of the planet into the Anthropocene age. No matter how powerful we've become, however, we are still shackled to nature. We still rely to a high degree on nature for nearly one half of our economic activity. In 2019, 50% of the global GDP either directly or indirectly came from nature and its ecosystems. But each step forward for humanity has been mirrored by a step back for the natural world; natural ecosystems have degraded an average of 47% worldwide, biodiversity is plummeting, and the relationship between humanity and nature is growing increasingly tense.

Biodiversity loss is not just an external threat, but an economic hazard as well. Even though the environmental Kuznets curve provides an experiential description of the stages of economic growth and their environmental consequences, climate change and other extreme ecological disasters are already rearing their heads. We cannot wait until all countries are prosperous to settle our environmental debt.

Through her continued commitment to public welfare projects, Professor Lu has come to believe that the "not rich but green" model of sustainable economic development is humanity's only choice for avoiding destruction. From inviting commercial beekeepers to panda sanctuaries to aid with reforestation, to operating snow leopard conservation tours in the Sanjiangyuan Nature Reserve, to exploring how traditional Tibetan culture preserved species richness, harmonious symbiosis between humanity and the natural word requires that we both dare to imagine and dare to act.



Bending the curve of biodiversity loss
Photo:iDiv

Symbiosis between microorganisms and the human body: How does our gut microbiota define us?

Zhao Liping, a microbiologist and professor in the Department of Biochemistry and Microbiology at Rutgers and the School of Life Sciences and Technology at Shanghai Jiaotong University, is known throughout the world for his research of gut microbiota. While Professor Zhao agrees with Professor Lu Zhi that the large-scale relationship between humans and nature is important, there is a small-scale ecosystem—inside our bodies—that requires symbiosis as well.

Professor Zhao believes that we “humans” are not the closed and singular systems we often imagine ourselves as. Research into the microorganisms that live symbiotically with us is redefining what it means to be human. The microbiome of the symbiotic microorganisms that reside in our intestines is just as complex as a tropical rainforest, and the microbes themselves possess hundreds of times more DNA than humans. Figuring out how to protect and nurture this massive microbiome, and maintain a harmonious relationship between our bodies and these microorganisms, is no less important than achieving harmony with the natural environment of the exterior world.

Professor Zhao noted at the opening of his talk that symbiosis is a fundamental concept in microbiology. Every plant and animal cell is itself a testament to symbiosis, in that the earliest formation of cell structure involved one bacterium entering into the body of another,

which gradually turned into organelles that provide host cells with energy. The mitochondria that exist in nearly every human cell are one such organelle. Chlorophyll, responsible for plant photosynthesis, was also formed this way. Internal symbiosis is achieved because the host cell protects the organelle in exchange for energy.

If we look beyond the cellular level, we will find that our surface is also home to all kinds of microorganisms, from our mouths to our stomachs. The large intestine is particularly fertile ground for microorganisms. Through Professor Zhao's research of the gut microbiome and metabolic health, he discovered the first intestinal bacterium that causes obesity in humans; developed an intervention plan for obesity and diabetes that targets the gut microbiome; and established microbiome data based on the functional group to be used for discovering new health strategies. This research has led Professor Zhao to believe that we require a new, tripartite way of looking at health.

The first aspect of this triad involves how we look at the human body, and recognizing the existence of the massive number of symbiotic microbes in our bodies. The genes which control all aspects of our life are not limited to the 20,000 or so genes we inherit from our parents; our gut microbiota, which act as a second, acquired genome, also affect us deeply. The second part of the triad is a new view of nutrition. We can no longer only consider how nutrients will affect our bodies; we must also consider how they can better protect the microorganisms inside us. Thirdly, we need a new view of disease, an understanding that the physiologically active substances produced by our gut microbiota can enter our bloodstream and drastically alter the pathological development of diseases in our bodies.

All of Professor Zhao's research points to a profound conclusion: microorganisms depend on and coexist with humans and other living creatures. We live in a sea of microorganisms, and everything we do is accompanied by these unseen, omnipresent microbes. If this symbiotic system is damaged—if, for example, we fail to take in enough fiber, a substance which humans cannot use but which our gut microbiota needs—then these microbes will not secrete short-chain fatty acids, which in turn will make us susceptible to conditions like obesity and diabetes. If the core gut microbiota that protects our bodies could be spread vertically and horizontally to our family members through natural birth and breastfeeding, the health of future generations would be more secure. There are also some crucial types of intestinal bacteria that play important roles to the overall health of the microbiome, much like large trees in a forest that act as anchors for other vegetation. The restoration of our "intestinal forest" relies on the growth and abundance of these critical bacteria. In this regard, symbiosis is just as important for the natural ecosystem as it is for our bodily ecosystems.

Professor Zhao noted that the boundaries between people may blur as we realize just how much we exchange microorganisms in our interactions with one another. When we eat together or converse, we might be exchanging gut microbiota. If we consider this microbiota as part of our bodies (like an organ), then how can we discriminate between "you" and "me?" This is a philosophical question worth pondering.

Part 4

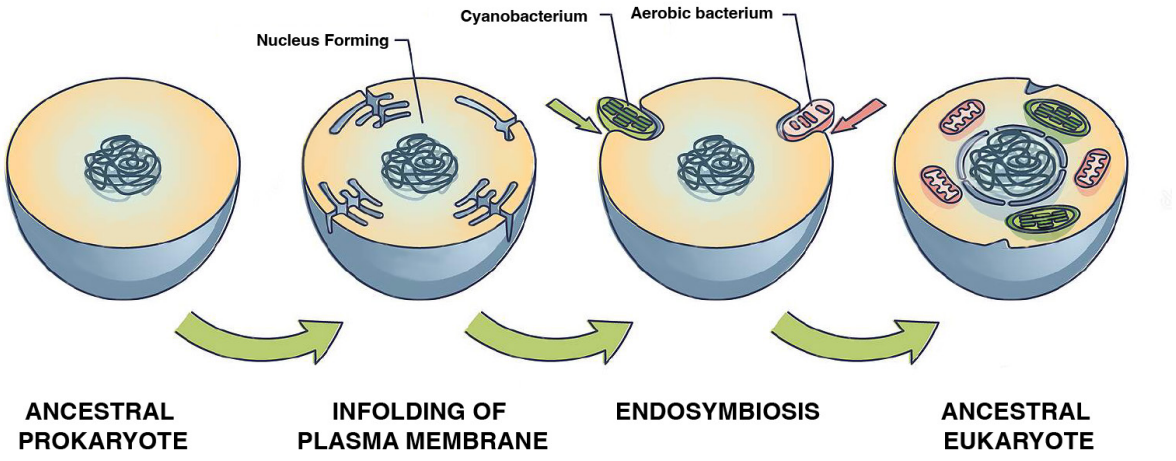
Symbiotic evolution in philosophy of biology and environmental philosophy

Incorporating the dimension of time, philosophers who think about biology and environment continue to find in history the shadow of symbiosis and its possibility as a mechanism of natural evolution. Since then, symbiosis is not only the way the world comes, but also the place it goes.

The possibilities and limitations of symbiosis as an evolutionary mechanism

Starting from a theoretical perspective, Lu Qiaoying, assistant professor in the Department of Philosophy and Religious Studies at Peking University, introduced the evolutionary basis of symbiosis. Before delving into specifics, however, Dr.Lu first provided a simple elaboration of the “philosophy of biology” research approach she would be using in her talk, describing it as philosophical analysis of the conceptual problems of biology.

Philosophy of biology hopes to explore how to understand life itself, especially since one of the essential characteristics of life on earth is that it does not exist in a state of chaos; the boundaries between individual organisms are clearly delineated. This even prompted Aristotle’s view that individuals as organisms were the most basic existents. The phenomena of symbiosis, however, provide a serious challenge to this position.



The Endosymbiosis Theory

Photo:dreamstime

Lichens and gut microbiota are two classic examples of early symbiosis because they spend most of their time living with other organisms in a state of mutual influence, forming what appears to be a new mode of existence in which the boundaries between actual bodies are unclear. The process by which mitochondria and chloroplasts gradually became organelles that Professor Zhao Liping remarked upon, meanwhile, is notable to biologists and philosophers because symbiosis might also be an evolutionary mechanism. One of the reasons that symbiosis was not immediately discussed by the mainstream as an evolutionary mechanism, however, was due to how the concept of symbiosis, a biological evolutionary phenomenon, could be applied to the resolution of social conflict. The idea of maintaining individuality while simultaneously promoting social cooperation was picked up by social scientists and politicians, and mainstream biologists were turned off by the politicization of symbiosis.

Another reason that research of symbiosis was neglected by evolutionists was that it conflicted with a major view of modern biology called modern evolutionary synthesis (also known as new synthesis, modern synthesis, and neo-Darwinism), a combination of Darwinian natural selection and Mendelian inheritance. The basic tenets of modern synthesis—that genes were the basic units of evolution; that evolution was change in the gene frequencies of groups composed of individual organisms; and that the fittest survived through competition and elimination—was at odds with the cooperative model proposed by symbiotic evolution. The latter was rejected as a research paradigm by mainstream biologists until a turning point in the 1960s. It is now worth researching and discussing in greater depth.

Dr.Lu noted that in the world of philosophy of biology there are two outlooks regarding life that are extremely important when discussing symbiosis as an evolutionary mechanism.

The first is a neo-Darwinian outlook, which holds that natural selection and reproduction are the essential characteristics of life, and that Darwinian individuals are the basic units of natural selection. Classic Darwinian individuals are determined along three axes: the bottleneck effect, reproductive specialization, and overall integration. The relationship between symbiotic composites and Darwinian individuals is a crucial issue when considering whether symbiotic evolution should be integrated into this outlook. The second outlook is that of organicism, which states that an organism's primary objective is its own subsistence. This makes metabolism an organism's most remarkable trait, followed only after by the ability to reproduce. In other words, individuality is not a trait of living things, and thus to understand life we do not need to figure out if they are individuals or symbiotic composites; rather, the essence of life activity is in collectively maintaining metabolism. This view is more accommodating to research of symbiotic evolution.

Dr.Lu believes that we still have a lot to learn about symbiosis in the context of these different outlooks on life, and she looks forward to future discussions on the topic and challenges to current thought.

The ontology of biological and environmental symbiotic evolution

Xiao Xianjing, distinguished professor at South China Normal University, discussed the possibilities of biological and environmental symbiotic evolution from an ontological perspective.

Professor Xiao believes that after Darwin's theory of evolution revoked humans' demi-god status, turning us into an existent at once great and small, we relied on the subject-object thought dichotomy to place ourselves above the natural world, leading to destruction of the ecosystem. If we are to achieve harmonious symbiosis and coevolution between humans and nature, we must first clarify whether or not harmonious symbiosis and coevolution is possible between natural existents (such as between living creatures, and between living creatures and the environment). To this end there are four questions we must answer:

Is there harmonious symbiosis and coevolution among living creatures, and among living creatures and the environment, in Darwin's theory of evolution?

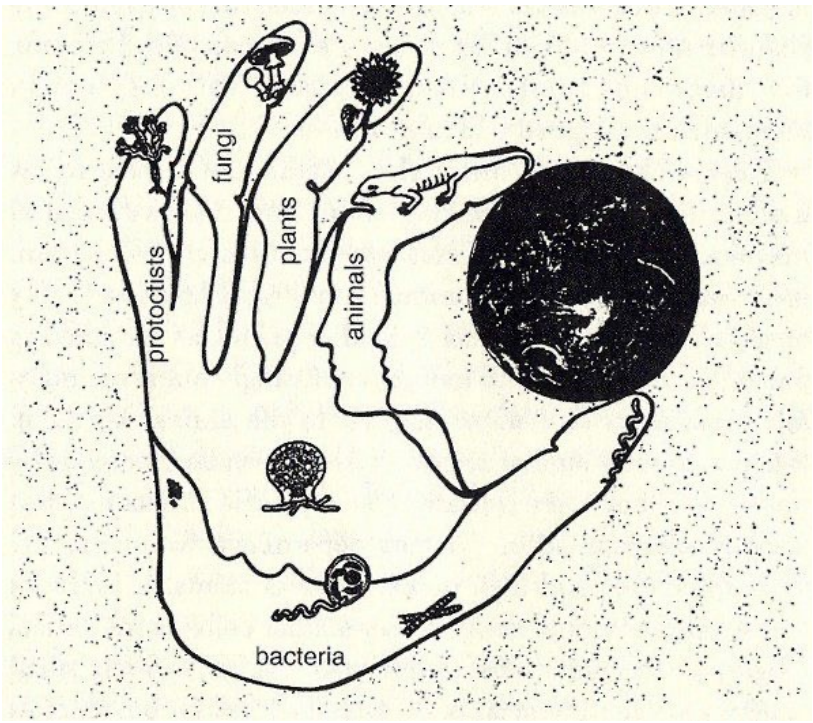
1. Does there exist harmonious symbiosis and coevolution among living creatures and between living creatures and the environment? How far have humans come in recognizing this?
2. What are the characteristics of harmonious symbiosis and coevolution among living creatures and between living creatures and the environment?
3. Up to now, has there been harmonious symbiosis and coevolution between humanity and nature? If not, what kind of concept of harmonious symbiosis and coevolution between humanity and nature should we establish? Which measures should we implement to realize this concept?

From the end of the 19th century to the 1950s, there was debate among biologists about the concepts of parasitism and symbiosis. Scholars from different disciplines each had their own opinions about which phenomena should be included under the umbrella of symbiosis; some believed symbiosis should be limited to long-term mutualism between living creatures, while others believed it should include long-term mutualism, commensalism, and parasitism. Coevolution is more so reflected in mutually beneficial symbiotic systems. It exists in all interactions between species, impacting the character differentiation, genetic patterns, and regional population adaptation of the parties involved in the interaction.

According to Professor Xiao, if we focus on the relations arising from the evolution of living creatures in the natural world, there does not have to be harmonious symbiosis and coevolution among the living creatures which Darwin's theory revealed were based on competition; however, there can be harmonious symbiosis and coevolution among the living creatures that exist because of natural selection. Multidimensional, multifaceted research has revealed that symbiosis-dominated coevolution among biological populations can be seen at all scales of the ecosystem—in coevolution of eukaryotic life forms; in mutualistic

symbiotic evolution between plants and microorganisms in land ecosystems; in continuous organisms that possess multiple symbiosis models; and even in ecological communities, entire ecosystems, and the whole planet according to the Gaia hypothesis (which posits the Earth itself as a superorganism, whereby life forms on the planet's surface optimize its physical and chemical environment, thereby satisfying its needs to the greatest extent).

The advent of the Anthropocene age (in 2019, the Anthropocene Working Group composed of 34 scientists established a new geological epoch, the Anthropocene, signifying the massive changes to the planet caused by human activities) is having radical impacts on symbiotic structures at all scales around the world—a sixth mass extinction event, climate crises, ecological debt... Professor Xiao believes that we must implement measures to ensure harmonious symbiosis and coevolution between humanity and nature. We must first build consensus, including the establishment of concepts of biological symbiosis and coevolution between organisms and the environment, and the establishment of a concept of the harmonious symbiosis and coevolution between humanity and nature. The convivialist manifesto, initiated by the French Annales school and signed by hundreds of humanities and social sciences scholars around the world, is an innovative attempt in this regard. Additionally, we should improve the human system so that the human system and the natural system can develop together and coevolve at all levels while adequately recognizing the basis of the human system and the natural system. Finally, we may also need science and technology that return to and comply with nature; and to focus on the sublation of ancient scientific traditions and more modern science in different areas so as to promote the development of ecological technology.



Professor Xiao remarked that humanity must recognize its limits. In today's age, when substance and "people" are extremely inflated, we would do well to temper our enthusiasm, and pursue long-term symbiosis and coexistence by understanding the relationship between humanity and other existents from a broader perspective of life forms, nature, and the environment.

"Five Kingdom Hand"
Image Credit: "Five Kingdoms: An Illustrated Guide to the Phyla of Life on Earth" by Lynn Margulis

Part 5

Symbiosis and coexistence in Chinese philosophy: interdependence and harmony between humanity and nature

At this forum, there were five philosophy scholars who analyzed and investigated the implications of the concept of symbiosis from Confucian, Buddhist, and Taoist perspectives. They systematically expound the concern, construction and understanding of symbiosis in the history of Chinese philosophy, and provided a wonderful exposition of symbiosis as a worldwide ideological resource.

Imagining Chinese philosophy and a symbiotic world: the gap of Wen and the edge of chaos

Professor Tsuyoshi Ishii from the University of Tokyo first brought up the debate between Chinese and Western ideals of symbiosis using Chinese philosophy as a basis. Professor Ishii believes that symbiosis is not just a value and goal that humanity should strive for, but a precondition for our survival.

Rather than describe the reality of symbiosis between things as a harmonious relationship, Professor Ishii believes it is better to describe it as a combative relationship full of conflicts and contradictions. The famed architect Kurokawa Kisho, who popularized the concept of symbiosis in Japan, formulated his idea of “the symbiosis of life and death” in precisely this context. This reality shows that there will be a deadly tension between our ideals of symbiosis and our pursuit of symbiosis in practice. Humanity, when seeking out symbiotic forms of governance and social order, will often instead end up with a rigid

structure marked by oppression and exclusion. The ideal of symbiosis is thus degraded into a governance mechanism that suppresses the outside world, and which is isolationist and xenophobic. Carl Schmitt's friend-enemy distinction and Giorgio Agamben's homo sacer ("sacred man") are two reflective theories on the logic of rule in modern politics that explicate the characteristics of this type of mechanism.

The question is, then, how should we imagine a symbiotic mechanism different from this? Here Professor Ishii introduces the concept of core unity of *wen* (language) and *li* (pattern) present in the theories of Xunzi, Zhuangzi, and the Neo-Confucianists, which describe a kind of pattern in the world. In this view, we study, emulate, and train in technology to achieve a kind of trained spontaneity, thereby breaking the pattern, changing and creating the world. As Michael Puett once said, "We are always creating ourselves, always creating the world; we, and the world we live in, are already products of artifice." The "gaps of *wen*," meanwhile, are the gaps that inevitably exist between the real, natural world and the natural world we describe with language. These gaps, these barriers, are like the *hundun* (the central chaos that dominated the world before it was split into two) spoken of by Zhuangzi. As we rationalize the natural world and impose order upon it, we threaten to destroy chaos.

As Stuart Kauffman once said, "I suspect that the fate of all complex adapting systems in the biosphere—from single cells to economies—is to evolve to a natural state between order and chaos, a grand compromise between structure and surprise. We will find a place in the sun, poised on the edge of chaos, sustained for a time in that sun's radiance". This "edge of chaos" implies that as we change the natural world, we must maintain a level of caution and subjective agency, allowing the entire world to protect its self-existing order rather than moving further and further away from nature.

For example, on the material level of carbon dioxide, humans already coexist with our own kind, and we live symbiotically with other species as well. Furthermore, we are already capable of living symbiotically with humanity as a whole and other species that are yet to come. This is not a mysterious "truth," but a common fact. Our internality, however, prevents us from catching up to this reality. Perhaps we must overcome the allure of internality, and even reject the allure of philosophy. Perhaps we must strive to realize the existence of this type of humanity.

The key to elevating the reality of symbiosis to its ideal is still people. In Professor Ishii's view, ancient Chinese philosophy provides a great contemplative resource for us in this regard, supplying a possible theoretical direction for the practical exploration of achieving the goal of symbiosis.

Confucianism: the "interconnected benevolence" of Neo-Confucianism and the ideal of symbiosis

From a Confucian philosophy standpoint, Professor Wu Genyou of the Wuhan University School of Philosophy uses the Neo-Confucian idea of "interconnected benevolence" to explain Confucian symbiosis.

Assimilating the foundations of Taoist, Mohist, and Buddhist thought, Neo-Confucianism pioneered a new idea of *ren*, or benevolence, that integrated humans with the natural world. This concept of benevolence expanded upon the Confucian understanding of benevolence centered on filial piety for one's blood relations, enlarging the scope of benevolence to include the entire world, thereby creating a new universal order incorporating solicitude for one's family, fellow humans, and other creatures. This concept might be seen as a kind of Confucian symbiosis for traditional Chinese societies. The viewpoints of Neo- Confucian scholars Zhang Zai, the brothers Cheng Hao and Cheng Yi, and Wang Yangming are representative of this concept.

Zhang Zai's idea of the shared essence of all things can be viewed as a type of ethical symbiosis, the theory of which is based on the philosophical (not to be confused with a scientific, material) theory of qi. This qi theory also forms the basis for Zhang Zai's theory of natural law. Even though there are antagonistic activities—such as carnivorous predators hunting herbivores—in a symbiotic world based on qi, it is still a world of symbiosis abiding by the natural order. Such a symbiotic world entails certain ethical requirements, which Zhang Zai expressed as the idea that since all things come from the same source, one cannot sensibly speak of personal gain. Since nothing is wholly independent, there is a natural balance whereby energy fluctuations in one place affect energy in another. Thus, whenever we contemplate taking some action, we must consider a symbiotic point of view that is grand, holistic, and communal, and not just act in our own self-interest. Zhang Zai also stated that our gustatory desires are expressions of the aggressive instinct of qi; thus, we must curb such material desires lest they adversely affect our moral integrity.

In addition to their contributions to ethics, the Cheng brothers, Cheng Hao and Cheng Yi, explained the crucial breakthrough effect that interconnected benevolence had on the "Interactions Between Heaven and Mankind" doctrine from an epistemological viewpoint. They believed that *ren* (benevolence, humaneness) could no longer be considered as the pre-Qin Confucian ren based on loving one's fellow humans, but rather a new concept marked by suffused oneness with all things. This new concept of ren encourages us to recognize the vitality in all living creatures, viewing them not as mere objects that we possess, control, and utilize, but as integral existents inextricably linked with our own survival. It can be compared to the Taoist philosophical essence of *yi*, or change, and the *sheng sheng* concept of flourishing growth.

The Cheng brothers agreed with Zhang Zai that nothing in the world exists independently from everything else. They further pointed out that from a cosmic point of view, humans, as beings in the world interacting with other creatures, cannot be distinguished from those creatures they share the world with. In other words, there isn't much that is unique about humans. And yet humans are also described as the "heart" of the world, and thus we bear responsibility for the intrinsic order of the biosphere; we are admonished to treat other creatures as they are, and not hold them to our own standards. In other words, we must show care and compassion for lowly creatures, but also—taking the natural world as our model—esteem ourselves and strive for self-perfection, thus symbiotically coexisting with

all living creatures with both prudence and modesty.

According to the thought of Wang Yangming, a renowned scholar of the Neo-Confucian school, the symbiotic idea of universal oneness can be explained on three different levels. The first level describes that the natural relationship between humans and other creatures is one of interconnectedness. This interconnectedness relies primarily on the exchange of qi to realize a state of symbiosis. The second level is the symbiotic relationship of the ethical form of Neo-Confucianism, namely that all people should have interconnected feelings. People of learning are especially obligated to possess moral empathy and love others. The third level explains that, as individual moral agents with consciousness and self-awareness, and precisely because we possess the consciousness and self-awareness of conscientious individual moral agents, "universal oneness" is what allows for a flourishing civilization. Intrinsic oneness—that is to say, a state of symbiosis—without the light of human morality, can only ever breed a dark and uncivilized society.

Without an ecosystem that can support human life, there can be no human civilization to speak of. This is where symbiosis comes into play. We must adjust and correct our philosophy of life, and adapt it to the needs of human symbiosis, especially regarding recent industrialization and forms of existence dominated by Western capitalist ideologies. Professor Wu believes that explicating the symbiosis of classical Confucianism through the moral and metaphysical lens of the "interconnected benevolence" of Neo-Confucianism can provide intellectual experience and precedent for symbiosis in an era of globalization.

Taoism: How the "heaven and earth" view of prosperity of the Taipingjing supports symbiosis

Professor Chen Xia of the Chinese Academy of Social Sciences Institute of Philosophy systematically introduced the "heaven and earth" view of prosperity, biodiversity, and symbolism of Taoism.

Professor Chen explained that Taoism does not stigmatize the natural human desire for wealth, but rather offers to assist us in accumulating it, encouraging and supporting the reasonable, lawful, sensible pursuit and creation of wealth. But when we blindly pursue personal material gain, we often end up neglecting Zhuangzi's "heaven and earth" view of prosperity—that "wealth lies in diversity." This view regards the diversity of creatures on heaven and earth (in the world) as riches, and thus what true wealth is.

The Han-era Taoist scripture Taipingjing notes that true wealth lies in diversity, the myriad forms of living and nonliving things in their totality. The diminishment or destruction of life, especially the significant loss of species, is thus seen as a form of poverty. The extirpation of a species is the annihilation of the Heavenly Principle; the extinction of any species harms the natural system and tarnishes the natural order. Thus, grievances enacted toward living creatures block the flow of *qi* throughout the world, impacting every living thing, including humankind and our societies and nations.

Unfortunately, modern science has verified that the Earth is undergoing a constant

reduction of species. Biologists estimate that there are currently around 5 to 10 million species on Earth, compared to a historic peak during the planet's most prosperous age of 100 to 250 million species. During the Mesozoic era, species went extinct at a rate of one per 1,000 years. From the 16th to 19th century, this rate increased to one species extinction every four years. For a species to exist requires thousands of years of survival adaptation; thus, the extinction of a species represents the termination of thousands of years of history. And the loss of one species endangers the survival of 20 to 30 other species. This makes the 2,000-year-old Taoist assertion that the loss of a single creature leads to widespread annihilation startlingly perspicacious. The Taoist view of prosperity determines the level of wealth in the world by the number of living creatures, and magnifies the loss of one species to a grievous harm done to the Heavenly Principle and the natural order, describing this state of affairs as "the poverty of heaven and earth."

Humans are directly responsible for the poverty of the world. Taoism reminds us that humans control the fates of all living creatures. Humans are more capable than all other creatures in the biosphere, and thus our actions greatly impact the natural world. Professor Chen offered such characterizations of humankind as the "commander of all life on earth," "the ruler of life," and the "overseer of fate," elevating humankind to a deific status responsible for all life. By doing so, he hopes to urge humankind to take on the sacred mission of protecting other species, to use our powers of reason and morality, to expand the scope of our moral concern, to limit actions which violate natural order, to uphold the ecological equilibrium of the natural world, and to live in harmonious symbiosis with other creatures.

Buddhism: From symbiosis to self-reliance

Lastly, Gong Jun, professor of philosophy at Sun Yat-sen University, gave a detailed talk on relating the dependent origination and symbiosis concepts of Buddhism with modern thought. Professor Gong believes that the Buddhist concept of dependent origination is, in the existing world (the phenomenal world), symbiosis. This includes all aspects of the natural world and human social activity, and implies that all forms of being are only possible because they are mutually conditional. All dharma of the phenomenal world, including the five aggregates (human form, sensation, perception, formation, and discernment), the twelve ayatanas (the six inner ayatanas: eyes, ears, noses, tongues, bodies, and minds; and the six outer ayatanas: visible objects, sounds, odors, tastes, touch, and mental objects), and the eighteen components of perception (the twelve ayatanas plus six sense consciousnesses) are interdependent and constantly changing. At the same time, mind and consciousness (the Buddhist notions that all things are created by the mind alone, and that all phenomena are nothing but manifestations in consciousness) play a dominant role in all types of symbiotic relationship structures among humans and nature. This concept permeates Hinayana and Mahayana Buddhism.

This Buddhist concept of "dependent origination" symbiosis has much to say about animals (vegetarianism) and plants that has tremendous value to modern environmentalism. The question of whether or not plants are sentient and should thus be respected and protected

as other sentient beings, for example, has been answered affirmatively in traditional Indian Buddhism. Professor Gong pointed out the interesting fact that even though Chinese Tiantai Buddhism asserts that non-sentient things—plants, for example—possess Buddha nature, this notion has been widely ignored in China. He suspects this has something to do with the humanistic focus of Confucianism, the prevailing thought system of Chinese culture.

Professor Gong believes that the transcendence of the symbiotic world in Buddhism is its most remarkable viewpoint, because according to the Buddha, the emergence of symbiosis is itself a depraved process. Dependent origination includes the existence of all phenomena of humans and the external world, but the Buddha proved in an ontological sense the existence of problems and vexations in the symbiotic world. This essentially means that, everything in the world only exists as a result of symbiosis, and nothing has an unchanging substantial existence; and yet despite this, humans pine for immutability, which causes suffering. All dharma of the five aggregates are impermanent and interdependent; this is the anatta (non-self, unsubstanceness), pain, and emptiness of dharma.

At the same time, the Buddha did not specially discuss the principles of symbiosis from the level of nature or human technology. He believed that the mind and consciousness were the origins of symbiosis, and sought to relieve the problems caused by symbiosis from these dimensions. The goal of Buddhism is liberation, which means extricating oneself from the cycle of symbiosis. This entails reaching a state of self-reliance, and avoiding and overcoming the cycle by training one's awareness, thereby attaining a state that Buddhism describes as relying on no one but oneself. We might see this as a transcendence of the dharma of symbiosis. Mahayana, the primary Buddhist tradition of East Asia, on the other hand, advocates that we strive for self-reliance not by avoiding the world of symbiosis but while remaining in it; resolving the problems of the world from within the world, a transcendent path that resolves the problems of humanity from the relations of coexistence. Professor Gong offers this as Buddhism's contribution to modern thinking on symbiosis.

The philosophy and theory of the symbiosis of yin and yang: Family-based social groups and the science-tech best-suited to human-and-earth life

We can find extremely insightful and perspicacious musings on symbiosis in Chinese philosophy. Zhang Xianglong, professor of philosophy at Peking University, constructed a philosophic theory of symbiosis by comparing Chinese and Western views. In his talk, he proposed that the survival unit of human symbiosis is not the individual, and not the collective, but the families and familial social groups in between. The apposite technology for this theory of symbiosis and family-based structure is not the advanced technology we have now, but a science-tech best-suited to human-and-earth life that promotes human longevity and survival.

In Professor Zhang's view, the Western philosophical tradition, from Parmenides to Hegel, does not offer a theory of symbiosis. Instead, it has tried to identify singularized "forms" (Plato), "essences" (Aristotle), or "cogitos" (Descartes). Expressed as "atoms" (Democritus)

and “impressions” (Hume), it sought to construct the world or knowledge from these fundamental existents. Yet these are all just incidental combinations and concatenations that have nothing to do with symbiosis. This is not the case with contemporary Western philosophy, however. Philosophy of life, phenomenology, pragmatism, Wittgenstein’s later thought, and process philosophy all strive to allow the original method of interaction between humans and the world to break free of the linear modality of the subject-object dichotomy and enter a pre-reflective generated structure that fuses both parties.

Professor Zhang believes that only Heidegger’s ontology was able to breach the chasm between humans and the world, placing humans in the world from the outset, obtaining an interconnected state of “Being-with” (Mitsein) with the world (including all living creatures and other people). But this concept of symbiosis did not delve deeply into the relationship between humans and other living species; it did not get pushed to its most important philosophical conclusion.

In Professor Zhang’s view, the most pertinent and most thorough theory for understanding symbiosis is the *yin and yang* theory of Taoism. The symbiosis of *yin and yang* is complete and unreserved; it is continuously generated; it creates life-time through the process of flourishing growth. As a philosophic theory, *yin and yang* are the contrasting and complementary (inter-necessary) source of life. It does not have an independent existence, but gives rise to the world through its random fluctuations and intersections. *Yin and yang* are not two objects or even two fundamental elements. They are a pair. They are one. They cannot be cleft in two. They are a pair, but through their differences they overcome any discriminatory type of speciesism, racism, or hierarchicalism. Such a deep-level theory of symbiosis guarantees a robust ecological theory and brings us closer to a state of existence in which humanity and nature are one.

Professor Zhang notes that the heterogeneous nature of *yin and yang* is expressed by the fact that they are at once oppositional and mutually necessary. This type of relationship is always creating a new state that produces *yuan qi* (original *qi*), but which is not yet deterministic or objectifiable. The symbiosis and constant generation of *yin and yang* give it an advantage in dealing with the uncertain future.

Applied to human life, this theory is first of all reflected in the family and in familial relations. According to Confucianism, we must first realize symbiosis between people if we are to achieve symbiosis between people and the world. The original form of this interpersonal symbiosis is the Confucian *qinqin* concept, the lifelong instinct to be devoted to one’s family members. Parents represent the past. As such, they belong to *yin*. Children represent the future, and thus *yang*. The past and future of their lives are woven together to create the flourishing time structure of a family’s life, which gives survival its original significance. We might say that humans are members of a family rather than individuals; symbiotes, then, are families and not collectives. The fundamental lifetime of a family not only creates symbiosis by making family members love one another; it also allows family-based social groups and nature to coexist symbiotically by supporting one another. Cooperation needs living time. Altruism needs evolution among groups. And this all originates from the time generated by *yin and yang* and the groups that arise from this. In our world, its primary manifestation is the family.

Advanced technology will not help us realize symbiotic technology, because advanced technology, which only seeks greater power, always leads to human isolation and through various ways damages our Earth, which is naturally symbiotic. Professor Zhang believes we should choose the science-tech best-suited to human-and-earth life, as only this can create positive symbiosis among people, and between people and nature. This type of technology is a diverse, open technology that consistently applies three principles (green, pro-family, and abundance), and includes sublations and modifications of traditional technology, as well as detoxified, green advanced technologies. Livable technology also has its own optimum structure which consists of limiting myriad technologies to achieve a state of positive symbiosis, thus creating potential for enduring, free, happy human life.

Image Credit: Creation of the Gods I

Part 6

Symbiosis in international relations

Turning our considerations from philosophy back to the real world, international, multi-agential cooperation and competition is perhaps the one area of the modern global landscape that most needs symbiosis. Why is there so much conflict and disagreement, machinations and castigations in international relations? This is not the world any of us want to see. Many scholars of international politics have turned their attention to the question of how we might find our way out of this predicament.

In his presentation, Professor Ren Xiao, professor at the Institute of International Studies at Fudan University, explained the "Symbiosis School"of international relations.

Professor Ren pointed out that in the last 20 years, scholars in Shanghai have been engaging in spirited academic discussion about issues revolving around the theory of symbiosis. This trend started from sociology, when Hu Shoujun, a sociologist at Fudan University, proposed a clear "theory of social symbiosis" in 2000. Professor Hu's view posited that symbiosis was a basic method of human survival. He urged that we should abandon struggle philosophy based on a "framework of class struggle" and instead guide our society with the theory of symbiosis. In 2006, Professor Hu published *A Theory of Social Symbiosis*, in which he further analyzed how symbiosis could be applied to a sociological framework. It is worth noticing that Professor Hu also borrowed ideas from Taoism; he believed that social agents must struggle and compromise in order to reach a symbiotic state in which both parties are satisfied—which has been expressed in Taoism as the idea of *yin* (compromise) and *yang* (struggle) surging together to create harmonious balance.

The work of sociologists in Shanghai—Professor Hu among them—caught the attention of international relations scholars in that same city. Thanks to efforts from Professor Ren and other scholars, the symbiosis concept was brought into the academic world of Chinese international relations. In 2013, Professor Ren published a paper in the journal *World Economics and Politics*, addressing problems in international relations with the symbiosis concept; in 2015 he compiled *Symbiosis: Rise of the Shanghai School*; and in 2019 he

published *Toward a World Symbiosis*, thus creating a clear system of theories for "international symbiosis."

In Professor Ren's view, the starting point of Western international relations theory is in overcoming a state of anarchy in world politics. A mindset fixated on overcoming can only ever lead to one type of world government. But in reality we are faced with myriad difficulties, and we need to imagine other possibilities. We must use three factors to understand symbiosis in international relations theory.

First, we must realize that diversity is the original disposition of the world. Different areas of the world have diverse values, systems, history, culture, and views. Western international relations theory views this as anarchy, but for Chinese thinkers who emphasize symbiosis, this is just the way the world is. A state of diversity is what determines the differences between things, but these differences do not have to cause conflict or contradiction. Symbiosis views the existence of differences as a natural state, and differences between agents as a vital force that facilitates mutual stimulation.

The second necessary factor is equality of values among agents participating in international relations. Agents cannot negate each other's values, for their existences and forms of existing are all valid. No civilization is greater than another. No country can claim their values are supreme just because it had some type of developmental advantage. The proper purpose of symbiosis in international relations is to display respect rather than enmity, to possess goodwill rather than irreconcilable hostility.

Third, different concepts of civilization and governance methods each have their own logic and their own historical, cultural, and social context. Conflict can be mediated by voting, by discussion, or through the management methods of tribal societies. We cannot divorce ourselves from the specific context when analyzing problems and contradictions.

Professor Ren believes that at present and for quite a while into the future, China will have to make many complicated international decisions—between symbiosis and confrontation, dialogue and partisanship, inclusivity and exclusivity, partnerships and alliances. In its diplomatic affairs, China will require the patience to construct symbiotic international relations that promote peaceful development and the determination to firmly uphold China's national interests.

Part 7

Analyzing the concept of symbiosis

When "symbiosis" becomes a term that is constantly brought up throughout the course of a forum, it behoves us to analyze just what this term means. For this, Dr.Yang Shijian from Xiamen University and Dr.Zhan Yiwen from Beijing Normal University provide analyses from the points of view of philosophy of biology and metaphysics respectively.

Symbiosis: Analysis of philosophy of biology implications

Yang Shijian described how, ever since its conception, the term "symbiosis" has been used widely as jargon in fields like economics, sociology, and politics. Within biology, however, as Lynn Margulis pointed out: "There has never been a clear, unanimous general definition of symbiosis." The term was coined by the German scientist Heinrich Anton de Bary in 1878, when he defined it as "the living together of unlike organisms." De Bary's definition, however, only describes the denotations of the concept of symbiosis, not its implications.

At present, there are primarily two types of symbiotic systems: holobiont and non-holobiont. A good example of the former is cows and the microorganisms of their rumen. The two rely on each other closely; the cow is able to digest fiber with the help of the microorganisms. An example of non-holobiont symbiosis is the suckermouth catfish; it feasts on parasites and rotten meat on the skin of larger fish, and in doing so keeps their skin healthy. The crucial determinant between these two types of symbiosis is whether or not both parties form a holobiont, or if they remain independent individuals.

Zilber-Rosenburg and others defined holobiont as "a host organism and all of the microorganisms linked to it." Dr.Yang, however, believes this definition is still too vague. "All of the microorganisms linked to it" is an overly broad range, including endosymbionts that are joined closely with their hosts, such as the intracellular bacteria of aphids; microorganisms that are only loosely connected to their hosts, such as microbes that live on the skin of other creatures; and even microorganisms in the external environment that frequently come in contact with the host. It is doubtful whether or not this latter relationship

can be regarded as holobiont symbiosis.

Yang provides a more precise definition: a holobiont is a symbiotic complex formed by a multicellular plant or animal organism and the microbiota that live inside its body. Based on this definition, we can identify two major traits of holobionts: 1) a holobiont is a composite formed by symbiosis between different species; 2) it is formed by macrobe-microbe symbiosis; it is intra-individual symbiosis (microorganisms within the body of a multicellular plant or animal organism).

For this definition, we must also clarify what is meant by "symbiotic complex." Yang believes there are many different representations that can be used to characterize this term, three of which may be found below:

1. Organism representation: According to Lynn Margulis, units from cells all the way to the largest tissues and even entire ecospheres can be considered autopoietic entities. The primary attributes of life in this concept are cell membranes and metabolism; reproduction and related traits are secondary.
2. "Ecological community" representation: Derek Skillings believes that the holobiont is more appropriately regarded as an ecological community, and not an organism. His reasons are that, first of all, even if repeated interaction within a system benefits both parties, this does not imply the formation of functional integration or active cooperation; and, secondly, that the host and its microbiota rely on each other for metabolism does not imply that the entire holobiont forms a functionally integrated whole.
3. The "immunity continuum" standard: Thomas Pradeu's criteria for an organism: "A functionally integrated whole composed of heterogeneous components that are linked by strong biochemical interactions in a local area, and that are controlled by the immune function of the system as a whole; this immunity is continuously replicated and maintains a constant moderate strength."
4. ……

With such a profusion of ways to characterize a symbiotic complex, which one should we choose? How can we ensure that we're all operating on the same level when we analyze this concept? Yang suggests that we implement an analysis of the organizational hierarchy of symbiotic complex.

The hierarchical level refers to the specific organizational levels of organisms, including a widely accepted biological level that is used as a frame of reference (typically the cellular level); other levels are differentiated as existing either above or below this level in the hierarchy. The unit name of each level is an "absolute designation." Without hierarchy, the absolute reference levels are cancelled, and the unit name of each level does not designate a specific biological entity; this is a "relative designation." The non-hierarchical level is abstract; it typically only includes two levels—components and the whole. As a heuristic framework, it can be applied to different specific biological levels so as to reveal the general existence of certain relationships at different levels.

Dr.Yang believes that if we wish to use absolute designations, we must thoroughly analyze

Different biological representations	Relative designation or absolute designation?
The view of Lynn Margulis and others: viewing different symbiotic systems and even the units of different organizational levels of the ecosphere as organisms	This is best understood as a relative designation; understanding it as an absolute designation would erase the essential differences between life forms at all levels.
Thomas Pradeu's concept of an organism as defined by the "immunity continuum"	Since this characterization relies to a large extent on the specific functions of the immune systems of multicellular organisms, it should be understood as an absolute designation based on specific organizational levels.
The "ecological perspective" espoused by Scott Gilbert and Maureen A. O'Malley	A heuristic framework that emphasizes and explains certain attributes (such as the heterogeneity of components) similar to the usual meaning of "ecological community" within the scope of research. This perspective does not exclude the existence of other attributes similar to usual "organisms." Thus, it should be considered a relative designation.
Frédéric Bouchard's view: describing the holobiont as an ecological commuanity	This view's emphasis on fluid, transient internal relations makes it markedly different from the usual relations between the internal components of an organism; it is best understood as an absolute designation.

the levels characterized by our representations, and compare them with a set of specific, widely accepted theoretical frameworks about biological levels, in this way sorting out each level. This is especially necessary for holobionts with relatively complex internal organizational structures. Research into this area has thus far been largely overlooked, however.

From this view, from the perspective of absolute designations, holobionts should be viewed as organisms, and non-holobionts should be seen as forming ecological community relations. The main determinant in this is whether or not the internal components of a holobiont can "co-develop," creating a negative feedback mechanism at the cellular and molecular level, as well as whether or not its internal components can form an "immunity continuum." From the conclusions drawn from this analytical framework, Dr.Yang provides a precise standard for determining what is meant by a "symbiotic" relationship in biology.

Symbiosis and contemporary metaphysics

According to assistant professor Zhan Yiwen of Beijing Normal University, the concept of symbiosis touches upon profound metaphysical questions. From its conception to its widespread use, different disciplines have strived to impose their interpretations onto the word. The word's meaning, furthermore, is currently "drifting," which makes it difficult to pin down. From a conceptual engineering point of view, it might be insufficient to simply assume that the theories of natural science (fields of biology) can adequately describe all the complex meanings of the term "symbiosis;" we must endeavor to understand the more subtle implications of the word.

The background of symbiosis is a complex question of contemporary analytic philosophy, namely, “What is the general structure, or the metaphysical nature, of the relationship between the parts and the whole?” This is as profound a philosophical question now as it was in ancient times, and the phenomenon of symbiosis leads us to believe that we have further to go than we might have imagined in trying to understand the essence of metaphysical composition.

On an essential level, a symbiotic composite does not appear to be a simple collection, in the way that a dozen fish form a school; nor is it a full-blooded emergent entity, like a singular living organism. A symbiotic composite is not an abstract entity, as its foundation is physical. Additionally, a symbiotic composite seems to possess certain emergent properties that are not shared by each of its parts.

Zhan pointed out that we must answer two questions in regard to any composite: 1) Does the composite rely on other physical entities (is it independent or dependent)? 2) Is the composite metaphysically fundamental or metaphysically derivative?

	Independent	Dependent
Metaphysically fundamental	Mereological simples	Full-blooded emergent entities
Metaphysically derivative	Abstract entities	Complex objects, artifacts, etc.

Guided by these two questions, we realize first of all that symbiotic composites are dependent entities. And yet they don’t seem to be full-blooded emergent entities, nor do they seem to be typical complex objects. Typical complex objects can possess irreducible structural properties and even emergent properties. Examples of full-blooded emergent entities include mental substance, ontic structural realism, Huayan Buddhism, and so on. Here, Zhan pointed out that we must answer two questions in regard to any composite: proposes a working hypothesis that to imagine symbiotic composites as a type of composite that is in between complex entities and full-blooded emergent entities.

There are two core problems to consider here. The first is the composition as identity (CAI) problem, which states that we can describe a composite in an arithmetically identical way—describing a deck of cards, for instance, as an assemblage composed of 54 individual cards—and in this way quite easily explain the compositional relationship between the parts and the whole; but this might lessen the importance of the problem of composition, and leave us unable to explain the structural properties of the whole. So how do we explain that a composite is somehow “greater than the sum of its parts”? One possible option is to modalize the principles of CAI to make the individual identity of symbiosis both qualitatively and numerically vague.

	Independent	Dependent
Metaphysically fundamental	Mereological simples	Full-blooded emergent entities
Contingently/vaguely fundamental	Surplus structures	Slice-sensitive emergent entities
Metaphysically derivative	Abstract entities	Complex objects, artifacts, etc.

In other words, a symbiotic composite is (on a special ontological level) only “vaguely” an individual. As a whole, it is multi-faceted, and its overall identity changes based on how we choose to divide its facets.

Dr.Zhan believes that, on one hand, new advances in biology and philosophy of biology pose many challenges to the classical theoretical framework of metaphysics and its fundamental concepts (concepts of individuality, compositional relations, and so on). On the other hand, however, the (new) foundation of the theoretical framework of metaphysics can be important to better understanding and even help to shape new, fundamental concepts in biology and the philosophy of biology. Through creative discourse and conceptual experimentation, new concepts don’t necessarily have to perfectly take the inferential roles of existing concepts over. Although this indeed could lead to the risk of verbal disputes, as long as we try to speak as clearly as possible on what we are talking about, philosophical analysis may still have an important role to play in cross-theoretical dialogue.

Part 8

Summary

Ideas related to symbiosis and coexistence advocate utilizing the principles of the community to resolve all types of conflict to create inter-agential relations between nature, society, people, and other life forms, thus realizing the common advancement of individuals, groups, ecospheres, and even civilizations, and preparing us for a future world of harmonious mutualism. We might say that the reappearance of widespread symbiotic relationships is a revelation of the laws of empirical phenomena, a philosophical viewpoint with profound implications, and even more so a guide for action. Eastern philosophy, which has a long and profound history of contemplating symbiosis, appears incredibly valuable in an era of mounting global crises. It is worth integrating the contemporary problem domain and engaging in further discussions to achieve common understanding.

As was mentioned during the forum, scientists have somewhat resisted the jargonization of symbiosis by philosophers, as doing so seems to be a misappropriation of the term and a conscious semantic obscuration used to speak of other things. Philosophers, on the other hand, refuse to be constrained by science, and are unwilling to only discuss problems according to the categories and directions designated by science; they would hope to transcend and extrapolate beyond these restrictions. This tension highlights the urgency of interdisciplinary dialogue and exchange of fundamental ideas which this forum provided. If we wish to make progress in understanding the world, we must seek consensus between the humanities and the natural sciences, and strive for mutual understanding and inspiration using the best knowledge of each field.

After this forum, which was focused on symbiosis from biological and philosophical perspectives, the Berggruen Institute plans to hold more events to further unearth multi-oriented ideas about symbiosis. We look forward to building a multi-disciplinary consensus on the concept of symbiosis that embraces the thoughts of international relations, anthropology, political science, sociology, and economics. We will also strive to better organize the results of these discussions so as to promote scholarly discourse between Eastern and Western thinkers regarding symbiosis. This last point, in fact, segues into the question of how best to translate “symbiosis,” or, as it is expressed in Chinese, gong sheng.

As the discussions were all in Chinese, forum participants agreed that the most common translations of gong sheng—symbiosis, convivialism, coexistence—all fail to accurately convey the true connotations of the idea. Professor Zhang Xianglong suggested the term “co-generation,” going further to describe it as “complementary-opposite-generation;” this captures the simultaneously complementary and heterogeneous nature of yin and yang, as well as the idea of continuous growth and generation—both of which are implied by *Gong Sheng*. Of course, we might also simply express the idea in English as “gong sheng,” thus bringing a uniquely Chinese philosophical perspective to the world stage. For the sake of clarity, this English report has used the term “symbiosis” throughout to express the Chinese idea of gong sheng, both philosophically and scientifically. The Berggruen Institute welcomes all discussion and suggestions on the matter.